

(Field Survey: August 2007)

Ex-post Monitoring Report

Evaluator: Atsushi Hashimoto (Maenam Advisory Co., Ltd.)

Project Name: Sri Lanka “Transportation Rehabilitation Project (Railways)” (L/A No. SL-P25)

Loan Outline

Loan Amount/Disbursed Amount : 10,617 million yen/ 9,114 million yen
Loan Agreement : August 1990
Final Disbursement Date : November 1999
Ex-post Evaluation : FY2002
Executing Agency : Sri Lanka Railways

Project Objective

The objective is to strengthen railway transport capacity by developing railway infrastructure (repairing locomotive performance, modernizing a rolling stock workshop, and rehabilitating track) in the Greater Colombo area, and thereby contribute to the improvement of the relative convenience of the railway as a means of transportation.

Consultant: Japan Railway Technical Service, etc.

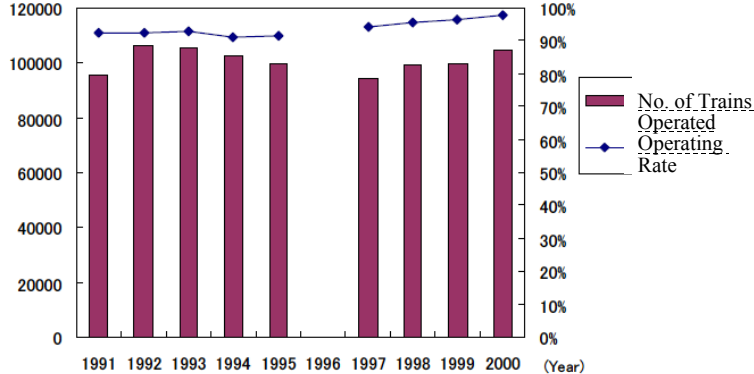
Contractors: Itochu Corporation, ABB HENSCHEL AKTIENGESELLSCHAFT (Germany), etc.

Overview of Results

Item	At Time of Ex-Post Evaluation	At Time of Ex-Post Monitoring
Effectiveness and Impact Effectiveness	This project consisted of (1) improvement of tracks (i) overall track improvement (approximately 100 km) of a congested track segment on the outskirts of Colombo (Colombo-Bampalapitiya, Colombo -Gampaha, (ii) laying of auxiliary rails to prevent derauling on sharp curves on the Colombo-Kandy segment, Colombo-Negombo segment, and the Colombo-Galle segment, (2) rehabilitation of 10 diesel hydraulic locomotives, and (3) procurement and installation of equipment for repairing locomotives at a rolling stock workshop.	<div><p>Given the aged condition of the infrastructure of the Sri Lanka Railway, the railway infrastructure developed by this project is producing a certain effect on maintenance of transport capacity and is still effective. Nearly all of the equipment introduced at the rolling stock workshop is in use and is effective in ensuring transport capacity, but there is still room for improvement in the efficiency of the workshop's operation.</p></div> <p>Reference: Concerning Sri Lanka Railways (SLR) SLR's total track length is 1,640 km (at the time of examination). There is no train service in the northeastern area. As part of track extension work, double tracks are being built on single-track sections on the Colombo-Kandy segment. To maintain transport capacity, purchases are</p>

Item	At Time of Ex-Post Evaluation						At Time of Ex-Post Monitoring																																																																																																																																									
	<p>(1)Number of passengers and passenger volume</p> <p>As shown on the table below, the number of travelers declined from the mid-1990s. Sri Lanka Railway attributes this to a shortage of locomotives. Meanwhile in 1999, tracks were repaired and rehabilitated locomotives were introduced, and to measure the effect of that, it is necessary to continue observation of the service record henceforth.</p>						<p>being made of locomotives, passenger cars, and diesel multiple units (DMUs, with 6 passenger cars; one unit consists of a front section that is both a locomotive and a passenger car, 4 passenger cars, and a rear section that is a passenger and a driver’s seat; used on local and commuter lines). In addition, from 2000 up to the present, construction of 5 bridges and a southern coastal line communications project have been implemented.</p>																																																																																																																																									
	<p>Table 1: Number of Passengers and Passenger Volume (1990-2000)</p> <table><tr><th colspan="2"></th><th>1990</th><th>1991</th><th>1992</th><th>1993</th><th>1994</th></tr><tr><td rowspan="2">Number of Passengers (million persons)</td><td>Actual</td><td>68</td><td>70</td><td>73</td><td>78</td><td>85</td></tr><tr><td>Index</td><td>100</td><td>103</td><td>107</td><td>115</td><td>125</td></tr><tr><td rowspan="2">Passenger Volume (million person-km)</td><td>Actual</td><td>2,780</td><td>2,653</td><td>2,613</td><td>2,821</td><td>3,201</td></tr><tr><td>Index (1990=100)</td><td>100</td><td>95</td><td>94</td><td>101</td><td>115</td></tr><tr><th colspan="2"></th><th>1995</th><th>1996</th><th>1997</th><th>1998</th><th>1999</th></tr><tr><td rowspan="2">Number of Passengers (million persons)</td><td>Actual</td><td>87</td><td>82</td><td>81</td><td>82</td><td>83</td></tr><tr><td>Index</td><td>128</td><td>121</td><td>119</td><td>121</td><td>122</td></tr><tr><td rowspan="2">Passenger Volume (million person-km)</td><td>Actual</td><td>3,321</td><td>3,103</td><td>3,146</td><td>3,147</td><td>3,175</td></tr><tr><td>Index (1990=100)</td><td>119</td><td>112</td><td>113</td><td>113</td><td>114</td></tr></table>								1990	1991	1992	1993	1994	Number of Passengers (million persons)	Actual	68	70	73	78	85	Index	100	103	107	115	125	Passenger Volume (million person-km)	Actual	2,780	2,653	2,613	2,821	3,201	Index (1990=100)	100	95	94	101	115			1995	1996	1997	1998	1999	Number of Passengers (million persons)	Actual	87	82	81	82	83	Index	128	121	119	121	122	Passenger Volume (million person-km)	Actual	3,321	3,103	3,146	3,147	3,175	Index (1990=100)	119	112	113	113	114	<p>Table 1: Number of Passengers and Passenger Volume (2000-2006)</p> <table><tr><th colspan="2"></th><th>2000</th><th>2001</th><th>2002</th><th>2003</th></tr><tr><td rowspan="2">Number of Passengers (million persons)</td><td>Actual</td><td>84.2</td><td>95.6</td><td>106.3</td><td>113.1</td></tr><tr><td>Index</td><td>124</td><td>141</td><td>156</td><td>166</td></tr><tr><td rowspan="2">Passenger Volume (million person-km)</td><td>Actual</td><td>3207.5</td><td>3979.0</td><td>4079.3</td><td>4606.2</td></tr><tr><td>Index</td><td>115</td><td>143</td><td>147</td><td>166</td></tr><tr><td colspan="2">Passenger Income (million rupees)</td><td>740.9</td><td>868.7</td><td>958.4</td><td>976.7</td></tr><tr><th colspan="2"></th><th>2004</th><th>2005</th><th>2006</th><th></th></tr><tr><td rowspan="2">Number of Passengers (million persons)</td><td>Actual</td><td>114.6</td><td>114.4</td><td>105.6</td><td rowspan="2"></td></tr><tr><td>Index</td><td>168</td><td>168</td><td>155</td></tr><tr><td rowspan="2">Passenger Volume (million person-km)</td><td>Actual</td><td>4604.2</td><td>4357.6</td><td>4311.8</td><td rowspan="2"></td></tr><tr><td>Index</td><td>166</td><td>157</td><td>155</td></tr><tr><td colspan="2">Passenger Income</td><td>1266.1</td><td>1478.8</td><td>1826.1</td><td></td></tr></table>								2000	2001	2002	2003	Number of Passengers (million persons)	Actual	84.2	95.6	106.3	113.1	Index	124	141	156	166	Passenger Volume (million person-km)	Actual	3207.5	3979.0	4079.3	4606.2	Index	115	143	147	166	Passenger Income (million rupees)		740.9	868.7	958.4	976.7			2004	2005	2006		Number of Passengers (million persons)	Actual	114.6	114.4	105.6		Index	168	168	155	Passenger Volume (million person-km)	Actual	4604.2	4357.6	4311.8		Index	166	157	155	Passenger Income		1266.1	1478.8	1826.1	
		1990	1991	1992	1993	1994																																																																																																																																										
Number of Passengers (million persons)	Actual	68	70	73	78	85																																																																																																																																										
	Index	100	103	107	115	125																																																																																																																																										
Passenger Volume (million person-km)	Actual	2,780	2,653	2,613	2,821	3,201																																																																																																																																										
	Index (1990=100)	100	95	94	101	115																																																																																																																																										
		1995	1996	1997	1998	1999																																																																																																																																										
Number of Passengers (million persons)	Actual	87	82	81	82	83																																																																																																																																										
	Index	128	121	119	121	122																																																																																																																																										
Passenger Volume (million person-km)	Actual	3,321	3,103	3,146	3,147	3,175																																																																																																																																										
	Index (1990=100)	119	112	113	113	114																																																																																																																																										
		2000	2001	2002	2003																																																																																																																																											
Number of Passengers (million persons)	Actual	84.2	95.6	106.3	113.1																																																																																																																																											
	Index	124	141	156	166																																																																																																																																											
Passenger Volume (million person-km)	Actual	3207.5	3979.0	4079.3	4606.2																																																																																																																																											
	Index	115	143	147	166																																																																																																																																											
Passenger Income (million rupees)		740.9	868.7	958.4	976.7																																																																																																																																											
		2004	2005	2006																																																																																																																																												
Number of Passengers (million persons)	Actual	114.6	114.4	105.6																																																																																																																																												
	Index	168	168	155																																																																																																																																												
Passenger Volume (million person-km)	Actual	4604.2	4357.6	4311.8																																																																																																																																												
	Index	166	157	155																																																																																																																																												
Passenger Income		1266.1	1478.8	1826.1																																																																																																																																												

Item	At Time of Ex-Post Evaluation	At Time of Ex-Post Monitoring				
		(million rupees)				
		Index: 1990=100				
		Source: Sri Lanka Railway				
		<p>The table below shows the number of operating locomotives. It cannot be said that transport capacity has grown since the time of the appraisal (1990), and it is apparent that transport capacity does not meet passenger demand. Meanwhile, the 8 operating diesel hydraulic locomotives in Table 2 are the 8 out of the 10 that were rehabilitated with the loan. Although there is a lack of growth in the transport capacity, it can be seen that the locomotives rehabilitated by this project are contributing to the maintenance of the transport capacity.</p>				
		Table 2: Comparison of Transport Capacity (number of operating locomotives)				
			At time of Appraisal	At time of Ex-Post Monitoring		
				Repairable	Operating	
		Diesel electric locomotives	74	87	47	
		Diesel hydraulic locomotives	41	14	8	
		DMU	38	48	32	
			153	149	87	
		Source: Sri Lanka Railway, JBIC materials				
	(2)Freight volume	(2) Freight volume				
	In contrast to passenger volume, freight volume has been sluggish since the early 1990s. As shown on the table below, freight volume (t/km) is in a downtrend accompanying a decline in average transport distance. At the time of appraisal, the volume and demand for FY1998 were forecast at 2.2 and 374, respectively. Overall, the figures fall far short of the original forecast.	Freight volume is 1.5 times the volume in 2000, but has basically topped out since 2004 like passenger volume. According to Sri Lanka Railway, there is demand for freight transport, but once locomotives are allocated to passenger transport, there are not enough locomotives remaining to meet the demand for freight transport.				
	Table 2: Freight Statistics (Volume and Demand)	Table 3: Freight Volume				
			2000	2001	2002	2003
	Volume	Actual	88.4	108.5	130.5	128.6
	(million-km)	Index	100	123	148	145

Item	At Time of Ex-Post Evaluation							At Time of Ex-Post Monitoring																																				
	Demand (million+-km)	Actual	163.8	169.1	166.0	159.2	154.1	Freight income (million rupees)		165.4	216.4	280.4	266.9																															
		Index (1999=100)	100	103	101	97	94			2004	2005	2006																																
			1995	1996	1997	1998	1999	Freight volume (million t-km)		Actual	134.2	134.8	138.2																															
	Volume (million-km)	Actual	1.2	1.1	1.1	1.3	1.2			Index	152	152	156																															
		Index	86	79	79	93	86	Freight income (million rupees)			319.6	329.1	392.5																															
	Demand (million+-km)	Actual	136.7	107.5	96.4	105.1	94.5	Index: 2000=100																																				
		Index (1999=100)	83	66	59	64	58	Source: Sri Lanka Railway																																				
Source: “Facts and Figures (1990-1999)” (Sri Lanka Railway)							(3) Number of trains operated and operating rate																																					
The figure below illustrates the number of trains operated. The number of trains operated decreased in the middle of the 1990s, mainly due to political instability and the subsequent deterioration of track and shortage of locomotives. The operating rate, however, has consistently exceeded 90%, and the number of passenger trains operated has been increasing since the mid-1990s, possibly because of the addition of 10 rehabilitated locomotives.							Table 4 shows the number of trains operated and operating rate. The planned number of trains in service is peaking just like the transport volume. The planned number of trains in service is not established based on demand forecasts but must be established based on the number of available locomotives, and so naturally the operating rate is high. Furthermore, the reason why the actual number in service exceeded the planned number in 2006 is that there were many extra trains in service.																																					
Figure 1: Number of Passenger Trains Operated and Operating Rate							Table 4: Number of Passenger Trains (planned/actual)																																					
							<table><tr><td></td><td>2001</td><td>2002</td><td>2003</td></tr><tr><td>Planned number of trains in service (trains)</td><td>125116</td><td>125575</td><td>122322</td></tr><tr><td>Actual number of trains in service (trains)</td><td>119951</td><td>119321</td><td>115901</td></tr><tr><td>Operating Rate (%)</td><td>95.9</td><td>95.0</td><td>94.8</td></tr><tr><td>Trains on time (trains)</td><td>50223</td><td>48894</td><td>46859</td></tr><tr><td>Percentage on time (%)</td><td>41.9</td><td>41.0</td><td>40.4</td></tr><tr><td></td><td>2004</td><td>2005</td><td>2006</td></tr><tr><td>Planned number of trains in</td><td>116151</td><td>116024</td><td>106988</td></tr></table>							2001	2002	2003	Planned number of trains in service (trains)	125116	125575	122322	Actual number of trains in service (trains)	119951	119321	115901	Operating Rate (%)	95.9	95.0	94.8	Trains on time (trains)	50223	48894	46859	Percentage on time (%)	41.9	41.0	40.4		2004	2005	2006	Planned number of trains in	116151	116024	106988
	2001	2002	2003																																									
Planned number of trains in service (trains)	125116	125575	122322																																									
Actual number of trains in service (trains)	119951	119321	115901																																									
Operating Rate (%)	95.9	95.0	94.8																																									
Trains on time (trains)	50223	48894	46859																																									
Percentage on time (%)	41.9	41.0	40.4																																									
	2004	2005	2006																																									
Planned number of trains in	116151	116024	106988																																									
Source: Sri Lanka Railway																																												
Note 1) : (operating rate)=(number of trains actually operated)/(number of trains on the books)																																												
Note 2) : Data for 1996 are not available from SLR.																																												

Item	At Time of Ex-Post Evaluation	At Time of Ex-Post Monitoring																																																																					
	(4) Delay conditions The punctuality of train operation, which worsened in the middle of the 1990s, has returned to early-1990s levels as a result of track improvement and rehabilitation. In 2000, nearly half of the trains operated on time (or less than 5 minutes late), and more than 60% of them were 10 minutes or less late.	service (trains)																																																																					
	<p>Figure 2: Time Keeping (delayed trains out of all trains operated)</p> <table><thead><tr><th>Year</th><th>Right time</th><th>6-10 min</th><th>11-30 min</th><th>31-60 min</th><th>over 60 min</th></tr></thead><tbody><tr><td>1991</td><td>36%</td><td>16%</td><td>26%</td><td>12%</td><td>10%</td></tr><tr><td>1992</td><td>43%</td><td>19%</td><td>22%</td><td>9%</td><td>7%</td></tr><tr><td>1993</td><td>50%</td><td>17%</td><td>20%</td><td>7%</td><td>5%</td></tr><tr><td>1994</td><td>48%</td><td>15%</td><td>22%</td><td>8%</td><td>7%</td></tr><tr><td>1995</td><td>44%</td><td>13%</td><td>26%</td><td>10%</td><td>7%</td></tr><tr><td>1996</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>1997</td><td>37%</td><td>14%</td><td>30%</td><td>13%</td><td>7%</td></tr><tr><td>1998</td><td>35%</td><td>14%</td><td>30%</td><td>13%</td><td>7%</td></tr><tr><td>1999</td><td>35%</td><td>14%</td><td>30%</td><td>13%</td><td>7%</td></tr><tr><td>2000</td><td>46%</td><td>15%</td><td>25%</td><td>9%</td><td>5%</td></tr></tbody></table>	Year	Right time	6-10 min	11-30 min	31-60 min	over 60 min	1991	36%	16%	26%	12%	10%	1992	43%	19%	22%	9%	7%	1993	50%	17%	20%	7%	5%	1994	48%	15%	22%	8%	7%	1995	44%	13%	26%	10%	7%	1996						1997	37%	14%	30%	13%	7%	1998	35%	14%	30%	13%	7%	1999	35%	14%	30%	13%	7%	2000	46%	15%	25%	9%	5%	Actual number of trains in service (trains)	108772	106535	108408
		Year	Right time	6-10 min	11-30 min	31-60 min	over 60 min																																																																
		1991	36%	16%	26%	12%	10%																																																																
		1992	43%	19%	22%	9%	7%																																																																
		1993	50%	17%	20%	7%	5%																																																																
	1994	48%	15%	22%	8%	7%																																																																	
	1995	44%	13%	26%	10%	7%																																																																	
	1996																																																																						
	1997	37%	14%	30%	13%	7%																																																																	
1998	35%	14%	30%	13%	7%																																																																		
1999	35%	14%	30%	13%	7%																																																																		
2000	46%	15%	25%	9%	5%																																																																		
Operating Rate (%)	93.6	91.8	101.3																																																																				
Trains on time (trains)	44259	40171	39369																																																																				
Percentage on time (%)	40.7	37.7	36.3																																																																				
Source: Sri Lanka Railway (Continuity with ex-post evaluation data is unconfirmed.)																																																																							
(4) Percentage of trains on time Table 4 above shows the percentage of trains on time. Approximately 40% of the trains are on time (on-time service: a delay of 10 minutes or less). Reasons for delay are train accidents, rolling stock malfunction, and slow speeds due to poor track (bent track, reduced cushion due to lack of ballast (macadam spread under the ties).																																																																							
(5) Train Accidents At the end of the 1990s, a total of around 1,000 trains, or 0.5% of trains operated in Sri Lanka nationwide, derailed. Due to limited data availability, it is difficult to analyze project effectiveness in terms of improved track conditions, and so the effectiveness should be re-evaluated in 2 to 3 years when more data is available.																																																																							
(5) Train Accidents Tables 5 and 6 show the total number of derailling accidents and accidents resulting in injury or death on Sri Lanka Railway. The number of derailling incidents and the percentage of deraillings per the number of trains in operation has been in a slight downtrend since 2000. This is thought to be the result of better understanding of track conditions by drivers and warning signs along the track that remind drivers to be cautious.																																																																							
Table 5: Number of Derailling Accidents																																																																							
	2000	2001	2002	2003																																																																			
Derailling	396	462	351	255																																																																			

Item	At Time of Ex-Post Evaluation	At Time of Ex-Post Monitoring				
		accidents (number)				
		Actual number of trains in service (trains)	107942	119951	119321	115901
		Percent (%)	0.37	0.39	0.29	0.22
			2004	2005	2006	
		Derailing accidents (number)	238	206	228	
		Actual number of trains in service (trains)	108772	106535	108408	
		Percent (%)	0.22	0.19	0.21	
		Source: Sri Lanka Railway				
		The majority of accidents occur due to obstructions on tracks (including suicides). In train stations, the major cause of accidents is the fact that entry onto the tracks, including main lines, by ordinary people is unregulated.				
		Table 6: Railway Accident Resulting in Human Injuries and Deaths (number injured/number of deaths)				
			2000	2001	2002	2003
		Derailings	4/0	31/11	218/15	8/0
		Falls due to derailings	25/13	29/3	21/3	7/0
		Thrown rocks	14/0	4/0	0/0	0/0
		Crossings	25/8	74/19	45/13	35/10
		Falls during operation	0/0	0/0	0/0	0/0
		Obstruction on track	131/148	110/133	98/97	29/58
		Total	199/169	248/166	382/128	79/68
			2004	2005	2006	
		Derailings	8/0	8/0	40/0	
		Falls due to derailings	22/0	22/0	0/0	
		Thrown rocks	23/0	16/0	14/0	
		Crossings	36/6	70/48	33/6	
		Falls during operation	0/0	0/0	5/0	

Item	At Time of Ex-Post Evaluation	At Time of Ex-Post Monitoring				
	(6) Recalculation of EIRR/FIRR Not calculated (due to unavailability of relevant data)	Obstruction on track	40/74	71/85	96/96	
		Total	129/80	187/133	188/102	
		<p>Source: Sri Lanka Railway</p> <p>(6) Condition of rolling stock workshop</p> <p>a) Operating condition of procured facilities and machinery: At the Ratmalana Workshop alone, approximately 150 types of facilities and equipment were procured, and currently around 70% of those are in operation. In addition to those that are unusable due to malfunction, some are not being used because they are not easy to use. So, it appears that the procurement list did not necessarily match the needs in the field. Moreover, one factor that hindered procurement of desired machinery was the fact that changes in procurement items was not easy once they had been decided upon. The reason was that there was indecision over changing the procurement list because the processing inside SLR was complex and it was necessary to receive approval from JBIC (according to interview with SLR personnel). However, as approximately 70% of the machinery and facilities are operating nearly 10 years following the completion of the project, it can be said the effectiveness of the project is being sustained.</p> <p>b) Management condition of the rolling stock workshop: The Ratmalana Workshop rehabilitates diesel electric locomotives, and diesel hydraulic locomotives, which are the target of the project, are rehabilitated at the Dematagoda Workshop. While the organization and management and storage condition of tools and parts at the Dematagoda Workshop is good, the Ratmalana Workshop does not necessarily give the impression that attention is paid to these matters. This may be said to be one reason why transport capacity does not improve, and so improvement of management in the workshop is desirable.</p> <p>As indicated heretofore, there is no major improvement in the operation condition of SLR before and after the project. However, if the project had not been implemented, the decline in transport capacity due to lack of locomotives probably would have been even more striking, and it is likely that inadequate track improvement would have caused derailling accidents and also that delays due to slow driving would have become more frequent. In that sense, a certain amount of effectiveness is being sustained in this project.</p>				

Item	At Time of Ex-Post Evaluation	At Time of Ex-Post Monitoring																																																																	
		(7) Recalculation of EIRR/FIRR Recalculation was not done.																																																																	
Impact	<p>(1) Improvement of relative convenience of railways The table below shows the daily flow of passengers at four points on the Colombo Metropolitan City (CMC) boundaries and modal splits (for FY1995). It is estimated that the railway’s share has not increased since then because the number of trains operated has not increased. It can be observed that the railway’s share in per capital mobility in the Colombo Metropolitan Region has not increased, while that of public buses has been increasing rapidly. The reasons for this phenomenon are as follows:</p> <p>a) Bus services are much more frequent than railway services. (There are several buses per hour in daytime while trains run fewer than 10 times per day.)</p> <p>b) Bus fares are not expensive and are generally more inexpensive than railway fares for intercity connections (e.g., Colombo-Kandy: Rs 72 for Intercity Express trains, Rs 41 for CTB buses).</p> <p>c) Some train stations are far from city centers while bus terminals are usually located in the central areas.</p> <p>Table 3: Daily Flows at the CMC Boundary and Modal Splits 1995</p> <table><tr><th colspan="2" rowspan="2">Location</th><th colspan="4">Passengers per Day</th></tr><tr><th>Public Bus</th><th>Private Vehicle</th><th>Rail</th><th>Total</th></tr><tr><td rowspan="2">Galle Road/Coast Line</td><td>persons</td><td>187,881</td><td>82,154</td><td>61,000</td><td>331,035</td></tr><tr><td>percent</td><td>57%</td><td>25%</td><td>18%</td><td>-</td></tr><tr><td rowspan="2">Negombo Road/Puttalam Line</td><td>persons</td><td>146,019</td><td>82,597</td><td>8,000</td><td>236,616</td></tr><tr><td>percent</td><td>62%</td><td>35%</td><td>3%</td><td>-</td></tr><tr><td rowspan="2">Kandy Road/Main Line</td><td>persons</td><td>205,534</td><td>77,785</td><td>88,000</td><td>371,319</td></tr><tr><td>percent</td><td>55%</td><td>21%</td><td>24%</td><td>-</td></tr><tr><td rowspan="2">Ratnapura Road/ KV Line</td><td>persons</td><td>142,830</td><td>54,981</td><td>8,000</td><td>205,811</td></tr><tr><td>percent</td><td>69%</td><td>27%</td><td>4%</td><td>-</td></tr><tr><td rowspan="2">Total</td><td>persons</td><td>682,264</td><td>297,517</td><td>165,000</td><td>1,144,781</td></tr><tr><td>percent</td><td>60%</td><td>26%</td><td>14%</td><td>-</td></tr></table>	Location		Passengers per Day				Public Bus	Private Vehicle	Rail	Total	Galle Road/Coast Line	persons	187,881	82,154	61,000	331,035	percent	57%	25%	18%	-	Negombo Road/Puttalam Line	persons	146,019	82,597	8,000	236,616	percent	62%	35%	3%	-	Kandy Road/Main Line	persons	205,534	77,785	88,000	371,319	percent	55%	21%	24%	-	Ratnapura Road/ KV Line	persons	142,830	54,981	8,000	205,811	percent	69%	27%	4%	-	Total	persons	682,264	297,517	165,000	1,144,781	percent	60%	26%	14%	-	<p>(1) Improvement of relative convenience of railways There are bus terminals in the center of major cities. In Colombo, there are private and public (Sri Lanka Transportation Board (SLTB)) bus terminals near Colombo Fort.</p> <p>a) Convenience: Buses are overwhelmingly more convenient. Destinations: From Colombo, there is bus service to every place in the country, and from regional cities, there is service to Colombo and the surrounding cities. Depending on passenger demand, from 2 to 20 operators are in competition, and buses are available every 15 minutes to 1 hour, from 4 am until late at night.</p> <p>b) Speed: Most regional roads in Sri Lanka are narrow. On these narrow roads, people, motorbikes, three-wheeled vehicles with engines called three-wheelers/Bajaj, passenger cars, small and large buses, and trucks are crowded together. So, bus speed is not high, and there is no difference between bus and rail in time required to reach a destination. Since passengers can get on and off at bus stops along the road, it is faster for residents living far from train stations to use buses.</p> <p>c) Economy: Railways are cheaper by far (the comment (at left) at the time of the ex-post evaluation is an error). An ordinary third-class rail ticket is half the price of a bus ticket without air conditioning. Second-class rail tickets are almost the same price as a bus ticket without air conditioning. The price for a bus ticket with air conditioning is generally double the price for one without. (From Colombo to Galle, a second-class rail ticket is Rs. 110 and a third-class rail ticket is Rs. 59, whereas a bus ticket with air conditioning is Rs. 175, and a bus ticket without air conditioning is Rs. 86.) The railway is economically superior for commuting (daily) and long-distance trips.</p> <p>d) Comfort and safety: Comfort correlates with fare, in the case of both bus and train. There are no safety statistics, but it is known that both buses and trains have accidents. No judgment can be made concerning whether the railway is superior in terms of comfort and safety.</p>
Location				Passengers per Day																																																															
		Public Bus	Private Vehicle	Rail	Total																																																														
Galle Road/Coast Line	persons	187,881	82,154	61,000	331,035																																																														
	percent	57%	25%	18%	-																																																														
Negombo Road/Puttalam Line	persons	146,019	82,597	8,000	236,616																																																														
	percent	62%	35%	3%	-																																																														
Kandy Road/Main Line	persons	205,534	77,785	88,000	371,319																																																														
	percent	55%	21%	24%	-																																																														
Ratnapura Road/ KV Line	persons	142,830	54,981	8,000	205,811																																																														
	percent	69%	27%	4%	-																																																														
Total	persons	682,264	297,517	165,000	1,144,781																																																														
	percent	60%	26%	14%	-																																																														

Item	At Time of Ex-Post Evaluation	At Time of Ex-Post Monitoring
	<p>Source: Colombo Urban Transport Study Stage 2: Working Paper 25.</p> <p>(2) Economic development No information or data.</p> <p>(3) Impact on environment The development of the railway may have reduced to a certain extent CO₂ and NO_x that would have otherwise been emitted from road traffic.</p>	<p>(2) Economic development The railway's modal share is 6% for passengers and 2% for freight. The leading mode of transport is road transport. However, rail is still used as an inexpensive method of commuting to work and school and is used for commuting to regional cities such as Galle and Kandy. Rail is also used by people from the countryside who are working in Colombo for long-distance trips home. In that sense, it appears that the railway is contributing to a degree to the economic maintenance and development of Sri Lanka. The government's goal is to raise the modal share of railways by 10% for both passengers and freight by 2010, and so the government expects railways to contribute as a mode of transportation. In recent years, it has been noted that railways cause less air pollution than cars when used for mass passenger transport and so are gentler on the environment, and there are signs of change in Sri Lanka's development policy which has been totally committed to roads heretofore.</p> <p>(3) Environmental impact The project is producing no negative impact on the environment.</p>
Sustainability	<p>(1) Technical capacity The executing agency (Sri Lanka Railway (SLR)) has inadequate human resources for ensuring technological sustainability. In particular, SLR reports that the lack of skilled workers is impacting on work results and is causing large delays in rehabilitation. Furthermore, because almost none of the necessary repair parts are produced domestically, more time is required for locomotive repairs when delays in imports occur. All in all, there is concern about the technical capacity.</p>	<div data-bbox="1263 874 2060 1040" style="border: 1px solid black; padding: 5px;"> <p>Concerns are growing over SLR's technical capacity and financial status. Lack of operation and maintenance funds is impacting on the securing of transport capacity, parts procurement, and staff training. First, it is necessary to secure budget funds in order to maintain sustainability.</p> </div> <p>(1) Technical capacity The problems at the time of the ex-post evaluation continue, and the lack of skilled workers has not been resolved. In particular, locomotive repair technology lags behind the modern technological level. Since many parts must be imported, time is required for procurement. There is an inadequate supply of necessary parts due to lack of budget. The technological level seems to have declined since the evaluation because skilled workers have retired and training programs have been cancelled, etc.</p>

Item	At Time of Ex-Post Evaluation	At Time of Ex-Post Monitoring																																																																																																																																
	<p>(2) O&M system Sri Lanka Railways (SLR) is under the supervision of the Ministry of Transport. With a General Manager and three Additional General Managers at the top, there are 12 subdepartments and 18,632 staff members. The Chief Mechanical Engineer Department and Chief Engineer (Way & Works) Department, with a total of 9,495 staff members, are responsible for operation and maintenance (O&M), with additional support from the Chief Engineer (Motive Power) Department. However, there are nearly 2,500 vacancies in these departments.</p> <p>(3) Financial status As shown on the table below, despite a gradual increase in revenue, operating losses have risen mainly because of increases in personal emoluments and fuel costs, 1.3 times and 1.7 times respectively, over the five years from 1995 to 1999. Combined with rapidly increasing expenses of annuities and interest payments, the overall losses in 1999 reached approximately Rs 7,000 million. As a countermeasure, SLR is planning to cut costs by closing down uneconomical services and not filling vacant posts.</p> <p>Table 4: Details of Revenues and Expenditures 1995-1999 (Rs mil)</p> <table><tr><th>Classification</th><th>1995</th><th>1996</th><th>1997</th><th>1998</th><th>1999</th></tr><tr><td>Revenue</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>-Passenger</td><td>593.5</td><td>622.0</td><td>657.7</td><td>682.1</td><td>678.5</td></tr><tr><td>-Freight</td><td>190.2</td><td>174.6</td><td>152.3</td><td>179.4</td><td>209.6</td></tr><tr><td>-Parcels & mail</td><td>39.5</td><td>37.9</td><td>38.0</td><td>42.0</td><td>39.4</td></tr><tr><td>-Miscellaneous</td><td>122.2</td><td>103.9</td><td>181.7</td><td>286.7</td><td>110.9</td></tr><tr><td>Total</td><td>947.2</td><td>938.4</td><td>1,029.8</td><td>1,190.2</td><td>1,038.4</td></tr><tr><td>Recurrent Expenditure</td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>-Personal emoluments/salaries</td><td>1,348.7</td><td>1,394.9</td><td>602.1</td><td>1,639.2</td><td>1,751.7</td></tr><tr><td>-Fuel</td><td>410.9</td><td>537.1</td><td>477.9</td><td>280.4</td><td>691.6</td></tr><tr><td>-Stores materials</td><td>488.8</td><td>477.9</td><td>0.62</td><td>155.7</td><td>129.8</td></tr><tr><td>-Other</td><td>131.2</td><td>148.0</td><td>568.8</td><td>161.9</td><td>312.5</td></tr></table>	Classification	1995	1996	1997	1998	1999	Revenue						-Passenger	593.5	622.0	657.7	682.1	678.5	-Freight	190.2	174.6	152.3	179.4	209.6	-Parcels & mail	39.5	37.9	38.0	42.0	39.4	-Miscellaneous	122.2	103.9	181.7	286.7	110.9	Total	947.2	938.4	1,029.8	1,190.2	1,038.4	Recurrent Expenditure						-Personal emoluments/salaries	1,348.7	1,394.9	602.1	1,639.2	1,751.7	-Fuel	410.9	537.1	477.9	280.4	691.6	-Stores materials	488.8	477.9	0.62	155.7	129.8	-Other	131.2	148.0	568.8	161.9	312.5	<p>(2) O&M system SLR’s system has not changed. Currently, the full number of staff is 22,500, but there are only 15,600 actual staff members. The difference of 6,900 is the number of job vacancies. Staff reductions have increased since the time of the evaluation.</p> <p>(3) Financial status Recurrent expenditures consistently exceed revenue, and ordinary loss in 2006 was 4 billion rupees (4.4 billion yen). Commercially and corporately, SLR is not making a profit. The ratio of 1 to 2.5 or above for revenue/expenditure has not changed greatly since the evaluation. The main reasons structurally for the continued posting of ordinary losses are that fares are set low out of consideration for railway users and revision (raising) of fares is not easy. Under these conditions, aiming for increased revenue, SLR’s plan for reducing ordinary losses is to increase the number of air-conditioned train cars, increase the number of trains chartered for tourism, and relax the preferential treatment provided for commuters’ passes, which receive excessive preferential treatment. The percentage of personnel expenses out of total expenses has further increased since the time of the appraisal, to 65%-70% during 2000 to 2006. One reason for this is that the average age of the staff is rising because of the halt on new hiring. With regard to operation and maintenance expenses, the perception in the field is that further cost reduction is difficult because of inadequate parts procurement</p> <p>Table 7: Details of Revenues and Expenditures (Rs mil)</p> <table><tr><th></th><th>2000</th><th>2001</th><th>2002</th><th>2003</th><th>2004</th><th>2005</th><th>2006</th></tr><tr><td>Revenue</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td>-Passenger</td><td>741</td><td>870</td><td>958</td><td>977</td><td>1,266</td><td>1,479</td><td>1,826</td></tr><tr><td>-Freight</td><td>165</td><td>216</td><td>280</td><td>267</td><td>320</td><td>329</td><td>393</td></tr><tr><td>-Other</td><td>107</td><td>116</td><td>124</td><td>77</td><td>92</td><td>150</td><td>273</td></tr><tr><td>Total</td><td>1,014</td><td>1,201</td><td>1,362</td><td>1,320</td><td>1,678</td><td>1,958</td><td>2,491</td></tr><tr><td>Recurrent</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>		2000	2001	2002	2003	2004	2005	2006	Revenue								-Passenger	741	870	958	977	1,266	1,479	1,826	-Freight	165	216	280	267	320	329	393	-Other	107	116	124	77	92	150	273	Total	1,014	1,201	1,362	1,320	1,678	1,958	2,491	Recurrent							
Classification	1995	1996	1997	1998	1999																																																																																																																													
Revenue																																																																																																																																		
-Passenger	593.5	622.0	657.7	682.1	678.5																																																																																																																													
-Freight	190.2	174.6	152.3	179.4	209.6																																																																																																																													
-Parcels & mail	39.5	37.9	38.0	42.0	39.4																																																																																																																													
-Miscellaneous	122.2	103.9	181.7	286.7	110.9																																																																																																																													
Total	947.2	938.4	1,029.8	1,190.2	1,038.4																																																																																																																													
Recurrent Expenditure																																																																																																																																		
-Personal emoluments/salaries	1,348.7	1,394.9	602.1	1,639.2	1,751.7																																																																																																																													
-Fuel	410.9	537.1	477.9	280.4	691.6																																																																																																																													
-Stores materials	488.8	477.9	0.62	155.7	129.8																																																																																																																													
-Other	131.2	148.0	568.8	161.9	312.5																																																																																																																													
	2000	2001	2002	2003	2004	2005	2006																																																																																																																											
Revenue																																																																																																																																		
-Passenger	741	870	958	977	1,266	1,479	1,826																																																																																																																											
-Freight	165	216	280	267	320	329	393																																																																																																																											
-Other	107	116	124	77	92	150	273																																																																																																																											
Total	1,014	1,201	1,362	1,320	1,678	1,958	2,491																																																																																																																											
Recurrent																																																																																																																																		

Item	At Time of Ex-Post Evaluation						At Time of Ex-Post Monitoring							
	expenditures						expenditure							
	Total	2,379.6	2,557.9	2,731.3	2,630.6	2,885.6	-Personal emoluments/ salaries	1,777	2,099	2,323	2,372	2,713	3,544	4,403
	Annuities and interest	2,344.3	2,731.3	3,242.5	3,712.1	4,140.8	-Fuel	539	531	564	581	1,167	1,432	1,500
Source: Facts and Figures 1990 to 1999 (SLR)							-Store/materials	370	390	442	430	448	536	570
<p>Moreover, in order to reduce financial constraints, SLR has been cutting the number of employees, but overall personnel costs are rising. The percentage of recurrent expenditure filled by personnel costs was 55.6% in 1990 but rose to 60.7% in 1999.</p> <p>(4) O&M status</p> <p>In interviews, SLR staff commented that facilities are not well maintained since the number of technicians is insufficient. Moreover, there is concern about the O&M status because there is a lack of parts necessary for repairs.</p>							Total	2,686	3,020	3,328	3,383	4,328	5,512	6,473
							Ordinary losses	-1,672	-1,819	-1,966	-2,063	-2,650	-3,554	-3,981
							Expenditures /Revenue	2.65	2.51	2.44	2.56	2.58	2.81	2.59
							Source: Sri Lanka Railway							
							(4) O&M status							
							The O&M status has not altered since the ex-post evaluation. The number of technicians is insufficient, and it is difficult to procure the spare parts necessary for operation and maintenance.							
							<p>-Locomotives:</p> <p>Maintenance of the W3 class locomotive which was targeted by this project is handled by the Motive Power Sub Department (Hydraulic Loco). The maintenance staff numbers 195 persons. Engineers undergo 5 years of training. There is no particular training program in place for repair personnel. Previously, there were training programs at the railway schools in Lahore, Pakistan, and India, but they have been discontinued due to lack of budget.</p> <p>The problem in rolling stock repair overall is that spare parts are not supplied in a timely manner. In the case of locomotive repair, in addition to the problem of spare parts, raising of the technological level is indispensable. Electronically controlled engines (using computers) are increasing, but SLR does not have the operation and maintenance technology to cope with these engines.</p> <p>-Tracks: The Way & Works Department is in charge of tracks. One gang is in charge of each 5 km of track repair. One gang is composed of 10 members consisting of a gang chief, assistant chief, and 8 workers. When</p>							

Item	At Time of Ex-Post Evaluation	At Time of Ex-Post Monitoring
		<p>large repairs are needed such as for derailings, surrounding gangs are called to assist.</p> <p>The most serious issue in track maintenance is lack of ballast. There is no problem in the supply of ballast itself, but there are no locomotives for hauling ballast. The department in charge also recognizes the need for welding of rails and replacement of ties in the stations, particularly at the switches.</p> <p>-O&M budget: The O&M budget is less than 10% of total expenditures. There is a constant shortage.</p>
<p>Lessons Learned, Recommendations, Information Resources, and Monitoring Methods</p> <p>(1) Follow-up on lessons learned and recommendations made in ex-post evaluation report or in later evaluations</p> <p>(2) Proposals for securing sustainability and instructions</p>	<p>(1) Lessons learned: none</p> <p>(2) Recommendations for ensuring sustainability</p> <p>Some of the equipment procured during the project implementation was abandoned after it broke down because there were no technicians to make repairs, while no advanced technology was employed in this project. It is recommended that the executing agency conduct human resources training based on a realistic development plan. For instance, project sustainability can probably be enhanced by providing sufficient training on equipment repairs and other necessary work.</p>	<div data-bbox="1265 582 2063 686" style="border: 1px solid black; padding: 5px;"> <p>It is necessary to increase the technological level, but this increase has not yet been actualized. It is to be hoped that SLR's efforts to increase income will secure O&M budget funds.</p> </div> <p>(1) Condition of lessons learned, recommendations, and follow-up: Training of technicians is not progressing, but SLR has the technology to operate and maintain most of the machinery currently in use. When it is impossible to make repairs on SLR's own, the main reason is due to delays in procurement of spare parts.</p> <p>(2) Lessons learned and recommendations at time of ex-post monitoring</p> <p>-Lessons learned:</p> <p>a) Mismatch of procured machinery: Facilities and equipment that were necessary on site were not procured. Communication between the workshop floor and management was not necessarily good. Flexibility should be granted so that items on the procurement list can be changed.</p> <p>b) Improvement of locomotive O&M technology: Locomotive O&M technology is inadequate. When locomotives are re-engined or newly procured, it is necessary to select those that match the level of Sri Lanka's O&M and specifications or to ensure that sufficient operation and maintenance technology is acquired.</p> <p>-Recommendations:</p> <p>a) The most serious problem is the lack of operation and maintenance budget funds. It is necessary to increase the government allocation and for SLR itself to endeavor to increase income.</p>

Item	At Time of Ex-Post Evaluation	At Time of Ex-Post Monitoring
given at time of ex-post monitoring		b) At the Ratmalana Workshop, it is desirable to implement efficient workshop management through proper organization of the interior of the workshop and improvement of the management and storage of tools and parts.