CHAPTER 3 ROUTE SELECTION FOR PRELIMINARY SURVEY

3.1 General

This chapter discusses the past development of road network and the current status of major projects and plans to be taken by RDA. Urban centers, with scale and growth are studied with the road network formation. And priority routes determined for preliminary bridge survey in this master plan study are shown.

3.2 Road Network Development

3.2.1 Categorization of Road Network

A main road network in Sri Lanka has been developed in radial direction from Colombo. The country has a dense network of roads and almost every part of the country is accessible by road. The total length of the road network, as assessed in 1992, is 96,568 kilometers(see Table 3.1), and the average density of road network exceeds 1.5 km/sq. km.

The classified roads have a hierarchical system designated as A, B, C, D and E class roads. Class A represents the primary/trunk roads, and the main roads are categorized as B class roads. C, D and E represent the lower order roads in the system, which are essentially link roads, connecting the A and B system. Some of these, however, are access roads.

In January 1990, the C, D and E class roads were handed over to the newly established Provincial Councils, and the A and B class roads along with a selected set of roads providing access to places of national importance were categorized as National Highway.

Presently, the newly formed Road Development Authority(RDA), who is the successor of the previous Department of Highways(DOH), manages these National Highways and they add up to a total kilometers of 10,964.

Table 3.1 Categorization and Management of Road Network

Category and Management	Length
National Highways managed by the Road Development Authority	10,964
Provincial roads managed by the Provincial Councils	14,916
Roads managed by the Municipal Councils, Urban Councils, Pradeshiya Sabhas etc.	52,521
Roads managed by the Agencies, such as Irrigation, Forestry and plantations	13,167
Total	96,568

Table 3.2 Length Distribution of National Highways by Category

Classification	Length (Km)						Surface Condition	
	Total Length	1 Lane 4.0 m	Inter-mediate 4.0-5.5 m	2 Lane 5.5-7 m	Inter-mediate 7-12 m	4 Lane or 12.0 m	Paved	Un-paved
1. Primary/Trunk Routes	3,807	535	1,655	1,255	297	94	3,007	
2. Secondary Routes	6,339	2,717	3,158	412	42	-	6,339	
3. Access to places of national importance and other roads	818	355	135	53	36	20	770	48
Total	10,964	3,607	4,948	1,690	375	114	10116	48

3.2.2 Classification of National Highways

The National Highways are classified into the following categories depending on their functions:

(a) Primary routes

The highways that connect the provincial capitals (9 in number), and the District centers (25 in number), are considered as primary routes. They are also referred to as Trunk routes. They are essentially the A routes of the formally classified roads.

(b) Secondary routes

As secondary routes are classified the routes that connect up the A routes, and also those connect up other important townships/population centers. They are essentially the previously classified B routes.

(c) Access roads

The third category is the access roads which provide access from the Primary routes and Secondary routes to places of national importance - strategic, religious, cultural, etc.

The National Road Network is categorized according to road width/number of lanes and surface type, and the distribution by these road category is summarized as shown in Table 3.2.

3.2.3 Road Network Development Plans

During the last decades major roads in the country have been developed with such external assistance as the Asian Development Bank, the World Bank, OECF and other bilateral technical and financial aids. In the early stage of the development, the financial aids were mainly drawn to the maintenance and rehabilitation of roads.

Highway development project groups are listed in Table 3.3 for those implemented since 1980s and others being underway at present, while their Route-A sections are presented in Figure 3.1 and Projects on Routes B highways are in Appendix D3.

Improvements of the existing Baseline Road and its southwards extension project is now underway. The first stage consists of the detailed engineering design from New Kelani Bridge(NKB) roundabout to High Level Road junction at Kirillapone and widening and construction of the Baseline Road from NKB roundabout to Kanatta Junction. The widening and construction of Baseline Road are planned to continue in the second and third stages that cover the extension from Kanatta Roundabout to High Level Road junction and from High Level Road to Galle Road at Ratmalana.

A detailed design of Colombo - Katunayake Expressway has been finished already, and a count of the affected persons, families, etc., was carried out with the assistance of the National Housing Development Authority (NHDA). Efforts to resettle the affected persons have been rendered continuously to acquire the land for the project implementation.

Table 3.3 Highway Development Projects in the Last Decades

WB 1st	1980s Completed	Rehabilitation, 200 km Periodic Maint, 200 km Bridge replace: 40 bridges
ADB 1st	1980s Completed	Improve: 228 km Bridge replace: 4
WB 2nd	1980s Completed	Improve: 292 km Bridge replace: 22
ADB 2nd	1990 - 95 Ongoing	Improve: 145 km Bridge replace: 6
WB 3rd	1990 - 98 Ongoing	Improve: 402 km Bridge replace: 20
ADB 3rd	1994 Ongoing	Improvement 175 km Bridge replace: 19
WB 4th	1995- Starting soon	Rehabili. 7,000 km Bridges not finalized
OECFJ	1996- Start soon	Baseline Rd. F/S by ODA (UK) '91 DD ongoing
Kwuait	1995- Start soon	Improvement 28 bridges
JICA	1995- Start soon	2nd phase of Victoria Br. Replacement
KOREA	1995-	F/S & DD, ongoing for Katunayake - Anuradapura highway

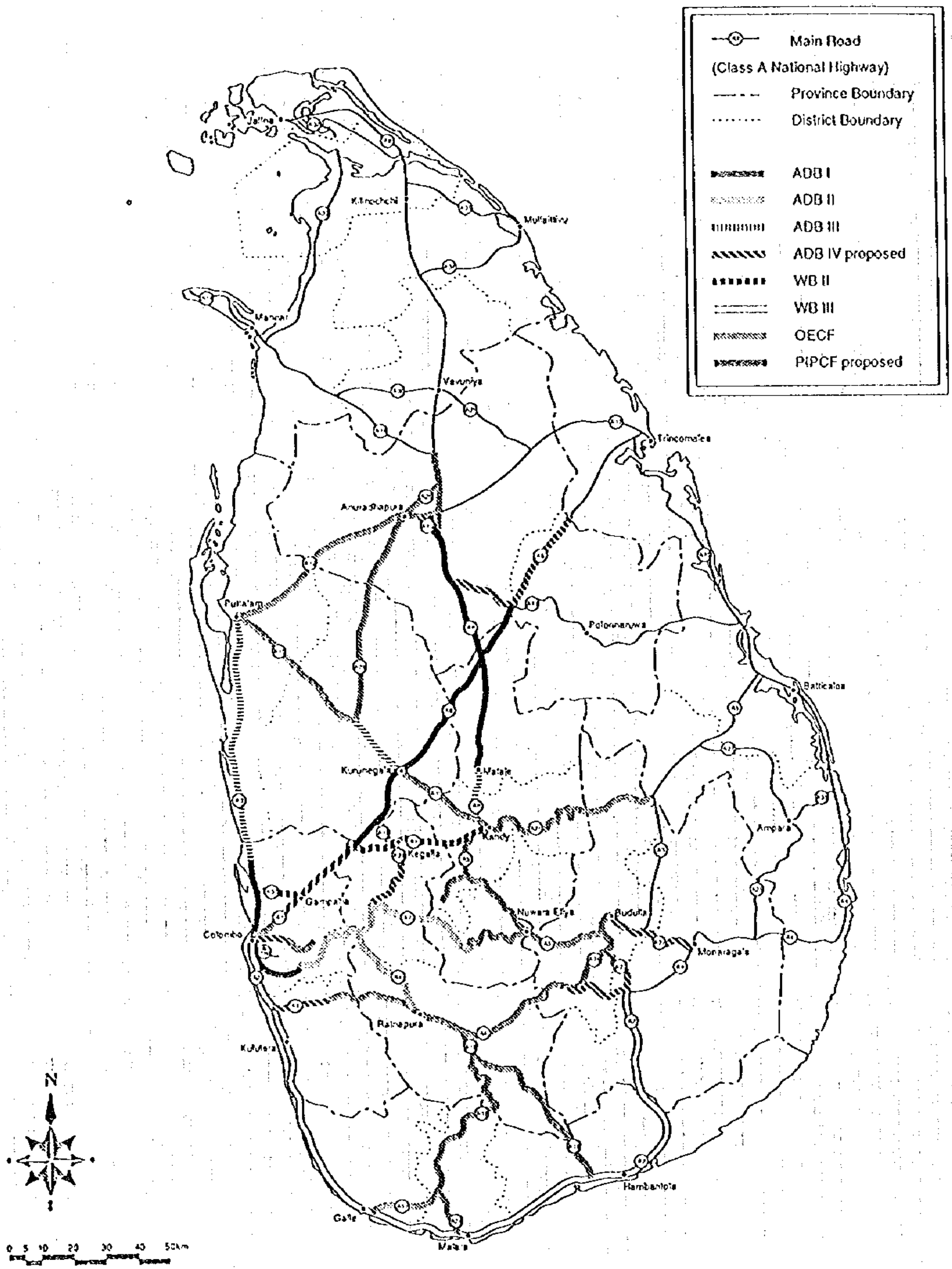

Figure 3.1 Locations of the Highway Development Projects in the Last Decades

Several new highways and circular roads have been planned to meet the increasing demand. The following eight highways were identified as the priority projects and they are at various stages of studies and implementation. Locations of those projects are presented in Figure 3.2

a) Improvements of Baseline Road and extension southwards - Inner Circular Highway to Colombo;

b) Colombo - Katunayake Expressway (CKE);

c) Outer Circular Highway (OCH) to city of Colombo;

d) Southern Highway from Colombo (OCH) to Galle and Matara;

e) Highway from Colombo to Ambepussa via CKE;

f) Highway from Colombo (OCH) to Ratnapura via Ingiriya;

g) Highway from Colombo to Padeniya via CKE; and

h) Highway from Colombo to Chilaw via CKE and "Rata Meda Para"

3.3 Urban Sector Development

3.3.1 Urban Sector Administration

There are 53 Urban Local Authorities consisting of 12 Municipal Councils and 41 Urban Councils as shown in Figure 3.3. Sri Lanka has always had a greater number of small and medium size. The slow rate of development of towns of larger size is evident from the fact that the number of towns with population greater than 50, 000 has increased only from five in 1946 to nine in 1981, while the number of towns with populations between 5,000 and 50,000 has increased from 25 to 94.

3.3.2 Spatial Distribution of Urban Population

Urban centers with 1981 population over 25,000 are concentrated in the suburbs of Colombo as presented in Figure 3.4. Colombo had the largest urban population of 587,647 in 1981 followed by Dehiwela-Mt. Lavinia, 173,529, and Moratuwa, 134,826 as listed in Table 3.5, and the urban population distribution is exhibited in Figure 3.5.

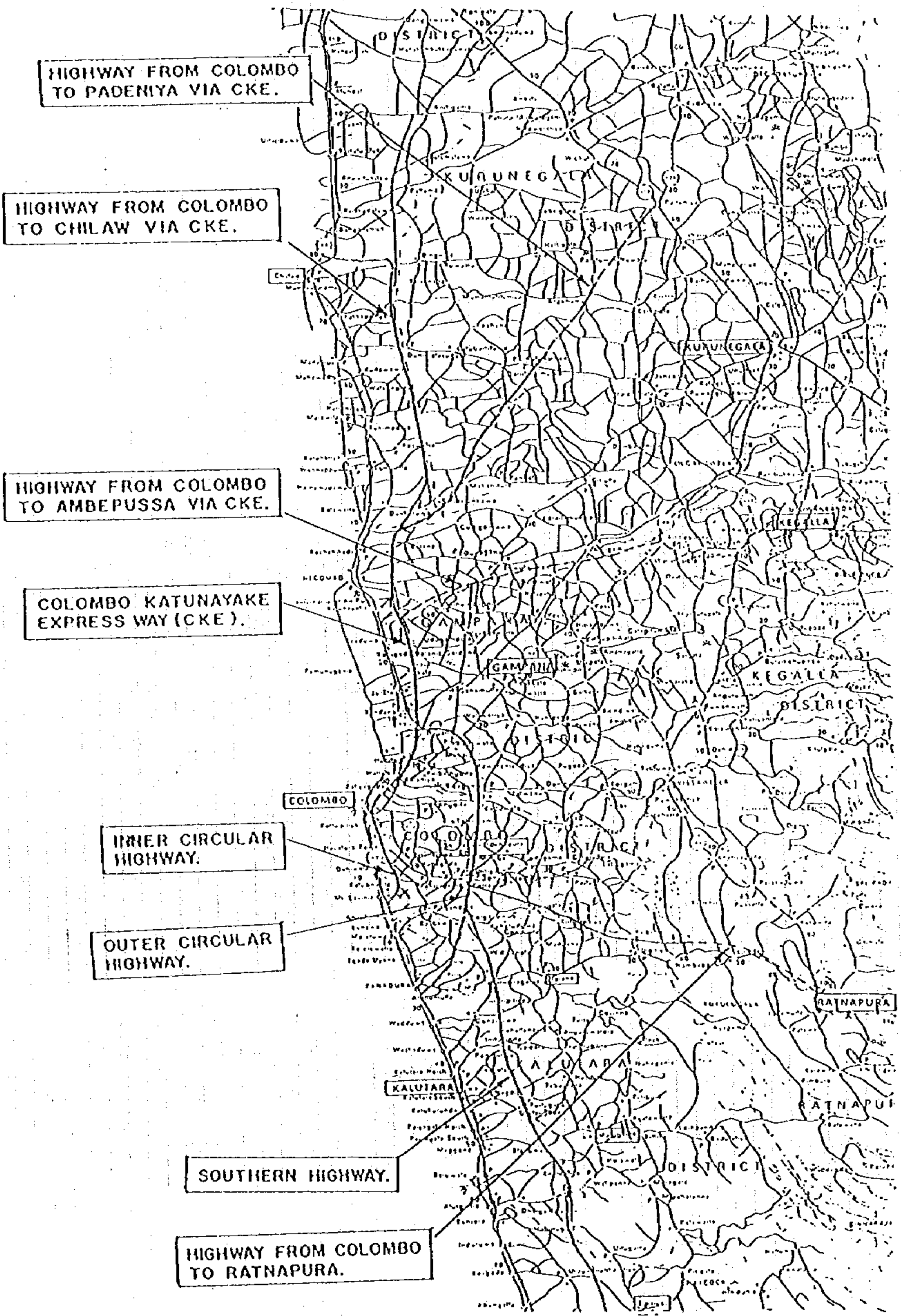

Figure 3.2 Locations of Priority Highway Plans

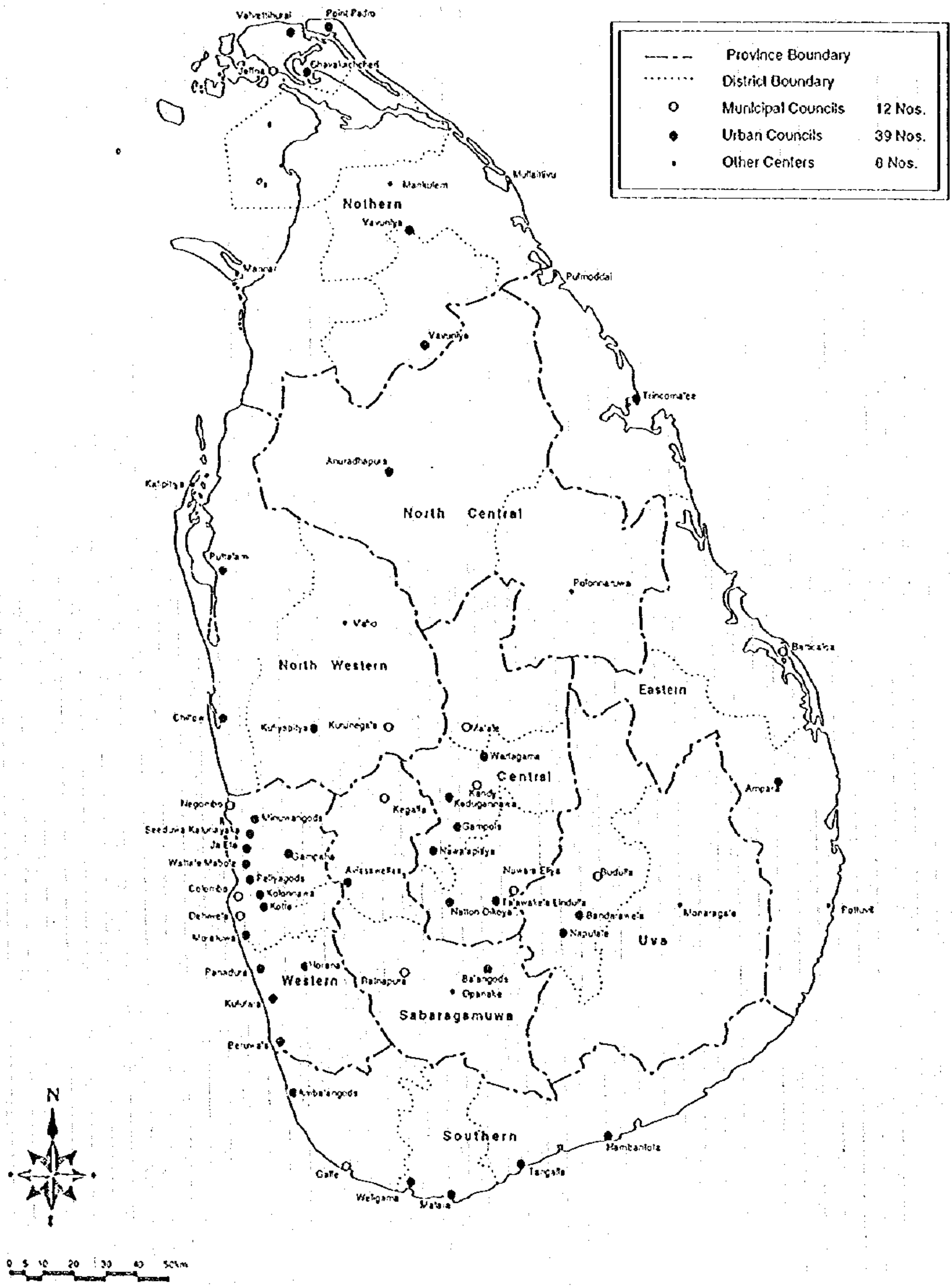

Figure 3.3 Urban Local Authorities in Sri Lanka

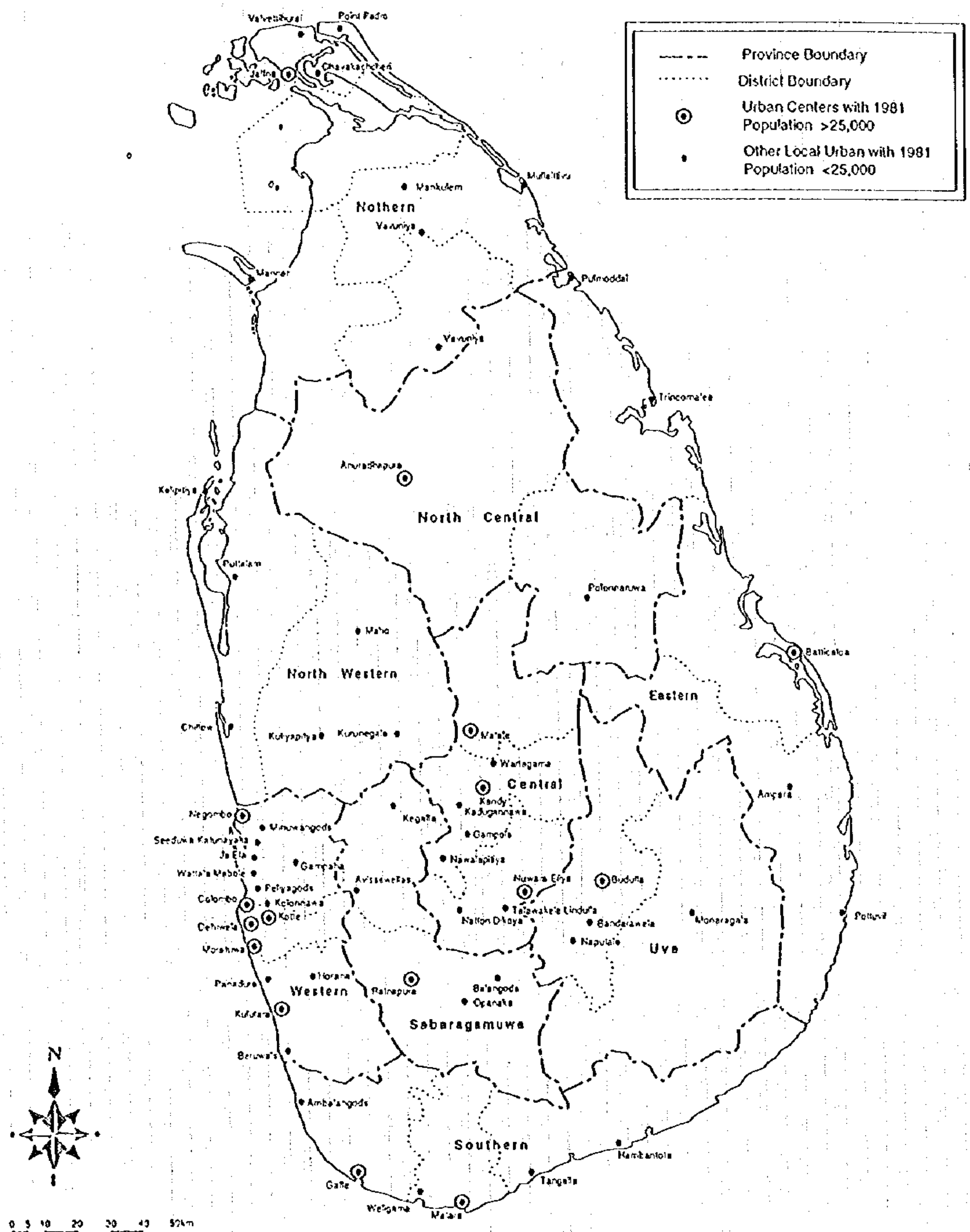

Figure 3.4 Locations of Urban Centers with Population More Than 25,000 (1981 Census)

Table 3.5 Urban Population of Principal Towns in 1981

Principal Town	1971	1981	1981/71 Ratio	25,000 <* Population
Total	2,494,875	2,736,832	1,096	
Colombo	562,420	587,647	1,045	*
Dehiwela - Mt. Lavinia	154,194	173,529	1,125	*
Negombo	56,795	60,762	1,070	*
Moratuwa	96,267	134,826	1,401	*
Kotte	93,680	101,039	1,079	*
Kalutara	28,634	31,503	1,100	*
Kandy	93,303	97,872	1,049	*
Matele	30,065	29,752	0,990	*
Nuwara - Eliya	17,288	20,471	1,184	
Galle	71,266	76,863	1,079	*
Matara	36,554	38,843	1,063	*
Hambantota	6,895	8,577	1,244	
Jaffna	107,184	118,224	1,103	*
Mannar	11,095	13,931	1,256	
Vavuniya	15,720	18,512	1,178	
Batticaloa	36,696	42,963	1,171	*
Trincomalee	40,592	44,313	1,092	*
Kurunegala	24,357	26,198	1,076	*
Puttalam	18,167	21,586	1,188	
Chilaw	17,608	20,810	1,182	
Anuradhapura	34,734	35,981	1,036	*
Badulla	35,470	33,068	0,932	*
Ratnapura	10,614	37,497	3,533	*
Kegalle	13,305	15,016	1,129	

Source : Dept. of Census & Statistics, 1984
* : More than 25,000 in population 1981

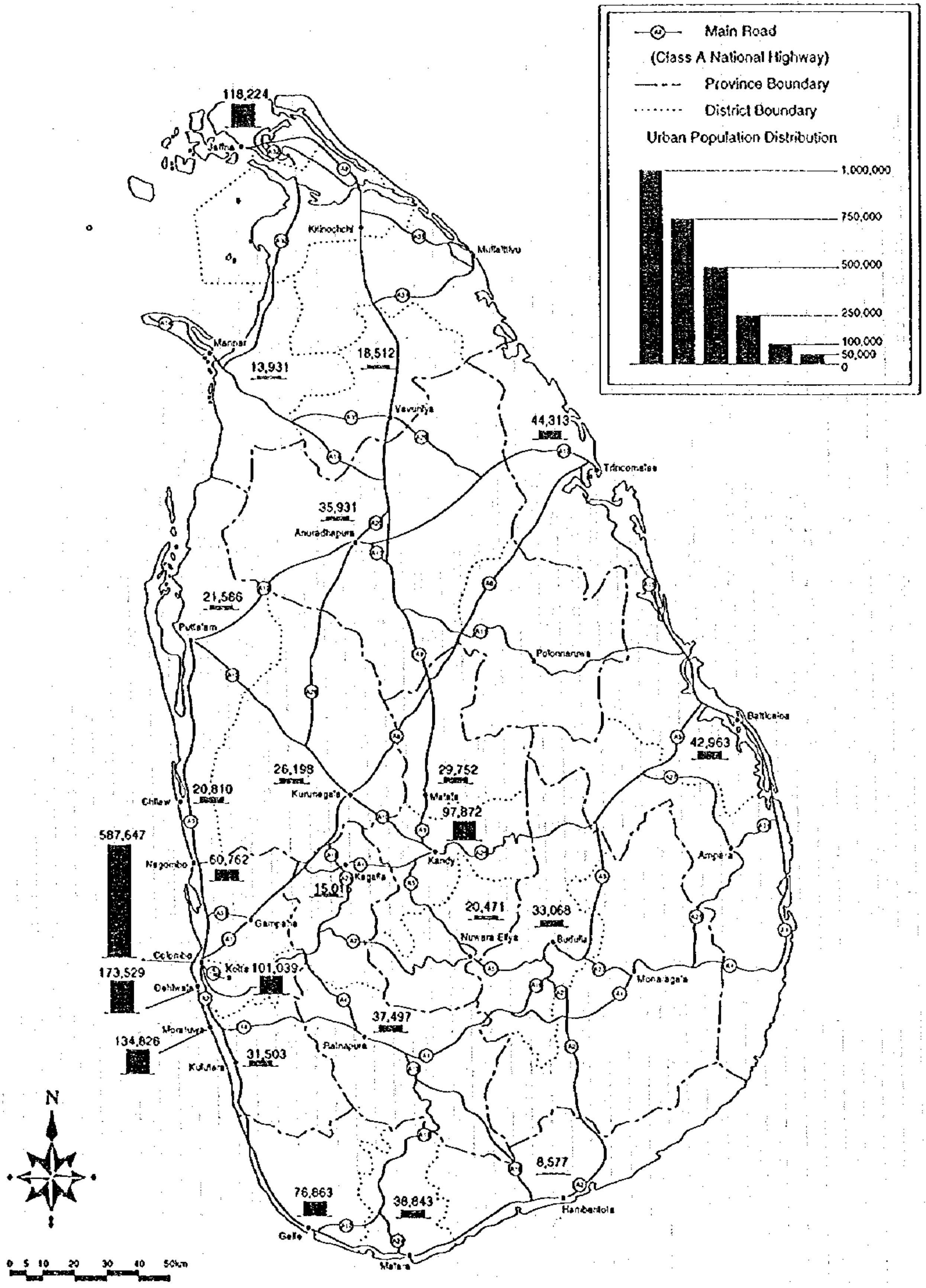

Figure 3.5 Distribution of Urban Population in Principal Towns in 1981

3.4 Priority Routes for Preliminary Bridge Survey

3.4.1 Priority Criteria

The study covers all the Class A roads and Class B roads which were selected by RDA for urgent requirements of bridge rehabilitation and improvement. Both Class A and B roads are National Highways and the former is categorized as the primary routes that connect the provincial capitals (9) and District Centers (25), and the latter is categorized as the secondary routes that connect up the A routes, and also those connect up other important townships/population centers. Other than the primary and secondary routes, there are national highways categorized as access roads which provide access from the primary routes and secondary routes to places of national importance - strategic, religious, cultural, etc.

The National Highways are thus classified by RDA. However, from the viewpoint of urban sector administration there is an another urban system in Sri Lanka, that is the Urban Local Authorities comprising of 12 municipal councils and 41 urban councils, which covers more extensive urban area than the Provincial and District Centers system.

In order to identify priority road sections for the bridge rehabilitation and improvement a broader concept of urban functions (i.e. municipal and urban councils) and the traffic demand on roads were adopted in the following ranking method:

Priority Ranking	Description
1st	Roads with ADT>=5000
2nd	Roads with ADT>=3000, or those connecting Municipal Councils and important sea ports in a minimal network
3rd	Roads with ADT>=2000, or those connecting neighboring Municipal Councils, orthose that ensure at least one access from one Urban Council to the nearest Municipal Council.
4th	Roads with ADT>=1000
5th	Roads with ADT<1000

3.4.2 Delineation of Priority Routes

Based on the previously mentioned criteria, priority road sections were selected in the order of five ranking groups. The road sections selected for a certain priority group are not necessarily connected in a reasonable manner. In order to delineate a meaningful route (road sections continuously connected), road sections that should be grouped into a lower ranking might be upgraded to form a coherent route. As the consequence, the priority routes for the preliminary survey (for bridge rehabilitation and improvement) were selected as presented in Figure 3.6.

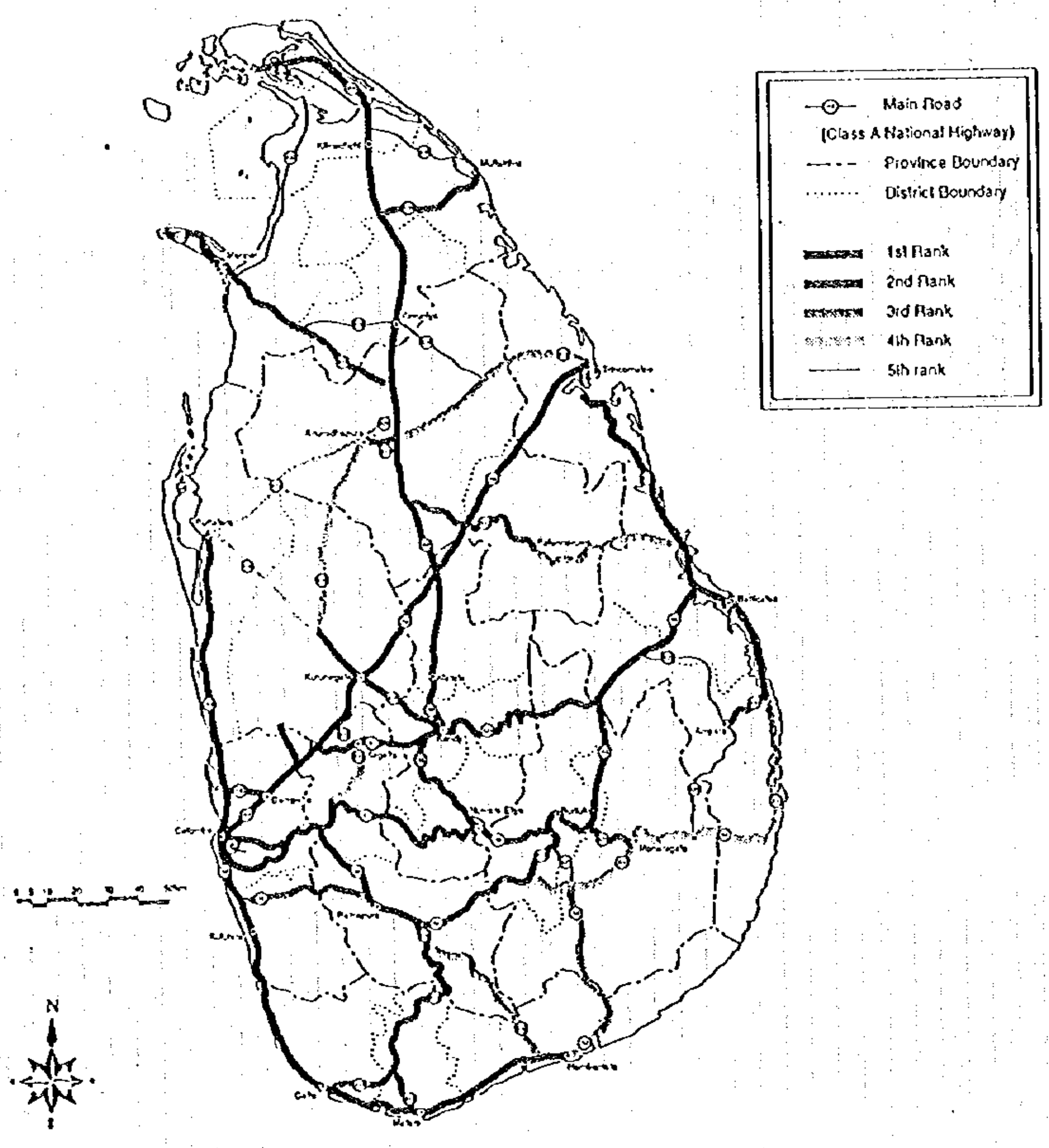

Figure 3.6 Priority Routes for Preliminary Bridge Survey
(National Highways class A)

CHAPTER 4 SELECTION OF 100 BRIDGES FOR PRELIMINARY INSPECTION

4.1 General

The one of objectives of the Study is to formulate a Master Plan for improvement and rehabilitation of all bridges on A routes and some selected bridges on B routes which would be found the necessity of their urgent rehabilitation. As for the breakout of these bridges, 1713 nos. are on A-route, 2717 nos. are on B-route and there are 86 nos. of A-route bridge and 120 nos. of B-route bridge in the list of 206 Bridges to be required urgent rehabilitation made by RDA.

And the final bridge list on 4430 bridges was not completed at the time when this stage was commenced, therefore the Study Team selected 100 bridges out of the List of 206 Bridges prepared by RDA. the specific number of bridges was set up as about 100 for preliminary inspection and 10 out of these 100 bridges for detailed survey and preliminary design.

Accordingly, the main purpose of this chapter is to select 100 typical bridges for preliminary inspection which could be the representatives of all the study bridges. The inspection results on these selected bridges were used to establish a selection criteria for 10 bridges and to reflect in formulating a maintenance and rehabilitation program of these 100 bridges.

4.2 Selection Procedure

In order to achieve the objectives of the Study, the study bridges shall be selected through the following procedures:

- Establishment of Socio-Economic Frame
- Traffic Demand Estimate and Analysis
- Investigation of Rehabilitation Priority of Routes
- Classification in various items (completed year, type of construction, type of defect, type of proposed treatment)

4.3 Selection of the Bridges from Road Functional Viewpoint

The results are shown in Table 4.1 & 4.2 and the outline of each table is as follows:

a) Table 4.1 (SORTED BY 1995 TRAFFIC VOLUMES)

Routes are shown in big volume order, which are AA001 to AA035 and AB001 to AB045. Bridges on AA class roads and AB class roads selected from the list of 206 bridges (RDA) were added to this table, and the table was useful information for selecting 100 bridges for the Study.

b) Table 4.2 (SORTED BY 1995 TRAFFIC VOLUMES)

Routes are shown in big volume order, which are only B class roads from the list.

And the statistics of these bridges by priority ranking of route is shown in Table 4.1 and 4.2.

Table 4.1 A Class Road Sorted by 1995 Traffic Volume

Ser No.		Route No.	Road Name	Length of Road (km)	Prov.	Location (km)	1995
79	43.2 k	AA003	Peliyagoda - Puttalam	126.30	West	39	17,600
84	110.2 k	AA001	Colombo - Kandy	115.84	Cent	111	16,100
1	61/1 m	AA002	Colombo - Galle - Hambantota - Wellawaya	317.77	West	51	8,900
75	62/2 k	AA002	Colombo - Galle - Hambantota - Wellawaya	317.77	West	51	8,900
76	62/1 k	AA002	Colombo - Galle - Hambantota - Wellawaya	317.77	West	51	8,900
108	16/7	AA033	Ja-Ela - Ekala - Gampaha - Yakkala	17.02	West	15	7,700
85	91.2 k	AA001	Colombo - Kandy	115.84	Sab	91	7,100
29	72/3 k	AA002	Colombo - Galle - Hambantota - Wellawaya	317.77	Sout	74	6,700
27	87/1 k	AA002	Colombo - Galle - Hambantota - Wellawaya	317.77	Sout	105	6,700
28	81/1 k	AA002	Colombo - Galle - Hambantota - Wellawaya	317.77	Sout	105	6,700
99	5/1 k	AA009	Kandy - Jaffna	320.99	Cent	7	6,200
95	3/2 k	AA006	Ambepussa - Kurunegala - Trincomalee	198.72	Sab	4	5,900
96	8/1 k	AA006	Ambepussa - Kurunegala - Trincomalee	198.72	Sab	4	5,900
175	1/2 m	AB027	Old Colombo - Galle Road, Panadura	1.90	West	0.4	5,200
93	21/4 k	AA005	Peradeniya - Badulla - Chenkaladi	279.29	Cent	15	5,000
203	71/3 k	AA006	Ambepussa - Kurunegala - Trincomalee	198.72	Nwp	57	3,800
102	25/2 k	AA010	Katugastota - Kurunegala - Puttlam	124.59	Nwp	30	3,600
86	199/3 k	AA002	Colombo - Galle - Hambantota - Wellawaya	317.77	Sout	180	3,400
174	86/1 k	AA006	Ambepussa - Kurunegala - Trincomalee	198.72	Cent	81	3,400
48	25/4 k	AA008	Panadura - Nambapana - Ratnapura	67.77	West	22	3,400
49	25/3 k	AA008	Panadura - Nambapana - Ratnapura	67.77	West	22	3,400
50	24/1 k	AA008	Panadura - Nambapana - Ratnapura	67.77	West	22	3,400
51	35/1 k	AA008	Panadura - Nambapana - Ratnapura	67.77	West	22	3,400
36	48/1 k	AA010	Katugastota - Kurunegala - Puttlam	124.59	Nwp	50	3,300
11	133/1 k	AA005	Peradeniya - Badulla - Chenkaladi	279.29	Uva	138	2,800
212	138/1 k	AA002	Colombo - Galle - Hambantota - Wellawaya	317.77	West	177	2,800
80	96/2 k	AA003	Peliyagoda - Puttalam	126.30	Nwp	90	2,600
120	12/2 k	AB029	Pasyala - Giriulla	19.31	West	16	2,200
77	3/2 k	AA019	Polgahawela - Kegalle	11.66	Sab	6	2,100
12	49/6 k	AA008	Panadura -Nambapana - Ratnapura	67.77	Sab	52	1,900
97	58/2 k	AA008	Panadura -Nambapana - Ratnapura	67.77	Sab	52	1,900
98	59/2 k	AA008	Panadura -Nambapana - Ratnapura	67.77	Sab	52	1,900
161	50/4	AA011	Maradankadawela Habarana Tirikkondiadimadu	129.36	Ncp	40	1,700
65	24/3 k	AA011	Maradankadawela Habarana Tirikkondiadimadu	129.36	Ncp	40	1,700
87	256/1 k	AA002	Colombo - Galle - Hambantota - Wellawaya	317.77	Sout	256	1,600
46	73/5	AA007	Avissawella - Hatton - Nuwara Eliya	118.69	Cent	91	1,500
47	70/8	AA007	Avissawella - Hatton - Nuwara Eliya	118.69	Cent	91	1,500
3	25/5 k	AA017	Galle - Deniyaya - Madampe	143.93	Sout	22	1,400
52	2/2 k	AA017	Galle - Deniyaya - Madampe	143.93	Sout	22	1,400
106	69/1 k	AA026	Kandy - Mahiyangana - Padiyatalawa	80.73	Uva	75	1,400
160	115/5	AA009	Kandy - Jaffna	320.99	Ncp	110	1,300
179	38/1 k	AA017	Galle - Deniyaya - Madampe	143.93	Sout	42	1,300
2	75/1 k	AA010	Katugastota - Kurunegala - Puttlam	124.59	Nwp	70	1,200
89	163/9 k	AA004	Colombo - Ratnapura - Wellawaya - Batticaloa	430.57	Uva	180	1,100
91	169/9 k	AA004	Colombo - Ratnapura - Wellawaya - Batticaloa	430.57	Uva	180	1,100
103	16/1 k	AA012	Puttalam - Trincomalee	176.99	Nwp	15	700
53	36/3 k	AA021	Kegalle - Bulathkohupitiya - Karawanella	42.12	Sab	35	700
178	192/2 k	AA004	Colombo - Ratnapura - Wellawaya - Batticaloa	430.57	Uva	193	300

Ser No.		Route No.	Road Name	Length of Road (km)	Prov.	Location (km)	1,995
44	196/7 k	AA004	Colombo - Ratnapura - Wellawaya - Batticaloa	430.57	Uva	193	300
90	199/2 k	AA004	Colombo - Ratnapura - Wellawaya - Batticaloa	430.57	Uva	193	300
43	206/9 k	AA004	Colombo - Ratnapura - Wellawaya - Batticaloa	430.57	Uva	206	300
45	206/10 k	AA004	Colombo - Ratnapura - Wellawaya - Batticaloa	430.57	Uva	206	300
81	242/2 k	AA005	Peradeniya - Badulla - Chenkaladi	279.29	Uva	220	
82	242/1 k	AA005	Peradeniya - Badulla - Chenkaladi	279.29	Uva	220	
189	249/1 k	AA005	Peradeniya - Badulla - Chenkaladi	279.29	Uva	220	
164	14/2 k	AA027	Ampara - Uhana - MahaOya	57.92	NorEa	not fix	
165	17/3 k	AA029	Vavuniya - Horowopotana	46.01	Ncp	not fix	
113	32/1	AB001	Ampara - Inginiyagala	19.79	NorEa	not fix	
114	33/5	AB001	Ampara - Inginiyagala	19.79	NorEa	not fix	
119	2/4 m	AB026	Matale - Udupihilla	6.03	Cent	not fix	
			Total 60				

Table 4.2 B Class Road Sorted by 1995 Traffic

Ser No.		Route No.	Road Name	Length of Road (km)	Prov.	Location (km)	1,995
23	9/1 k	B435	Urugodawatte - Ambatale	8.00	West	3	10,900
204	9/2 k	B435	Urugodawatte - Ambatale	8.00	West	3	10,900
205	9/3 k	B435	Urugodawatte - Ambatale	8.00	West	3	10,900
206	11/1 k	B435	Urugodawatte - Ambatale	8.00	West	3	10,900
207	11/2 k	B435	Urugodawatte - Ambatale	8.00	West	3	10,900
195	10/2 k	B288	Minuwangoda - Gampaha - Miriswatte	13.00	West	13	10,800
197	10/3k	B288	Minuwangoda - Gampaha - Miriswatte	13.00	West	13	10,800
201	10/5k	B288	Minuwangoda - Gampaha - Miriswatte	13.00	West	13	10,800
70	3/6 k	B295	Moratuwa - Pilivandala	5.00	West	1	10,700
16	24/5 k	B084	Colombo - Horana	28.00	West	24	8,100
37	26/3 k	B084	Colombo - Horana	28.00	West	24	8,100
54	31/4 k	B084	Colombo - Horana	28.00	West	24	8,100
124	36/2 k	B084	Colombo - Horana	28.00	West	24	8,100
125	27/7 k	B084	Colombo - Horana	28.00	West	24	8,100
126	34/1 k	B084	Colombo - Horana	28.00	West	24	8,100
5	14/7 m	B240	Kotte - Bope	29.00	West	16	7,100
66	7/1 k	B111	Ekala - Kotadeniyawa	27.00	West	12	6,700
151	9/3 m	B445	Veyangoda - Ruwanwella	32.00	West	7	4,300
154	9/4	B445	Veyangoda - Ruwanwella	32.00	West	7	4,300
6	38/3 k	B322	Negombo - Giriulla	38.00	West	24	3,800
158	3/2	B473	Wennappuwa - Kirimetiyana	6.00	Nwp	2	3,600
72	6/6 m	B248	Labuduwa - Wandurambe - Sandarawela	22.00	Sout	5	2,700
147	31/2 m	B419	Thoppu - Madampe	27.00	Nwp	12	2,400
148	42/2 m	B419	Thoppu - Madampe	27.00	Nwp	12	2,400
192	3/2 m	B272	Marawila - Udubaddawa	20.00	Nwp	5	2,200
202	14/5 k	B304	Nagoda - Kalawella - Bellapitiya	56.00	West	11	2,100
78	5/5 k	B199	Karandupona - Rambukkana	9.00	Sab	6	2,000
123	23/2 m	B079	Chilaw - Wariyapola	51.00	Nwp	14	1,900
30	5/5 m	B014	Ambalangoda - Elpitiya - Pitipala	29.00	Sout	10	1,800
136	9/4 m	B272	Marawila - Udubaddawa	20.00	Nwp	16	1,700
20	16/6	B264	Mallawapitiya - Rambodagalla - Keppetigala	35.00	Nwp	8	1,700
34	5/1	B264	Mallawapitiya - Rambodagalla - Keppetigala	35.00	Nwp	8	1,700
188	3/4 m	B472	Weliweriya - Kirindiwela	13.00	West	7	1,700
7	20/4 k	B425	Tudella - Pamunugama - Talahena - Negombo	20.00	West	17	1,600
42	3/3 m	B464	Weerawila - Tissa - Kataragama	24.00	Sout	2	1,600
40	66/2 k	B421	Tiruwanaketiya - Agalawatte	68.00	West	57	1,600
149	50/2 k	B421	Tiruwanaketiya - Agalawatte	68.00	West	57	1,600
132	18/4 m	B129	Galle - Udugama	37.00	Sout	13	1,600
18	11/1 m	B158	Horawela - Pelawatte - Pitigala	26.00	West	9	1,400
39	30/2 k	B349	Palavi - Kalpitiya	40.00	Nwp	16	1,400
145	21/3	B409	Talgodapitiya - Yatawatte - Dombawala	29.00	Nwp	8	1,400
198	2/4 k	B409	Talgodapitiya - Yatawatte - Dombawala	29.00	Nwp	8	1,400
26	10/1 k	B462	Wattegama - Matale	13.00	Cent	7	1,200
129	2/7 k	B127	Galigomuwa - Ruwanwella	23.00	Sab	10	1,200
130	7/1 k	B127	Galigomuwa - Ruwanwella	23.00	Sab	10	1,200
131	1/2 k	B127	Galigomuwa - Ruwanwella	23.00	Sab	10	1,200
182	1/2 k	B444	Veyangoda - Kaleliya	7.00	West	3	1,200
150	4/5 k	B444	Veyangoda - Kaleliya	7.00	West	3	1,200

Ser No.		Route No.	Road Name	Length of Road (km)	Prov.	Location (km)	1,995
19	6/10 m	B207	Katukurunda - Neboda	16.00	West	7	1,200
33	12/3 k	B157	Horena - Anguruwatot - Aluthgama	54.00	West	10	1,000
58	44/3 k	B157	Horena - Anguruwatot - Aluthgama	54.00	West	46	1,000
59	43/4 k	B157	Horena - Anguruwatot - Aluthgama	54.00	West	46	1,000
21	8/1 k	B421	Tiruwanaketiya - Agalawatte	68.00	Sab	32	900
78	5/5 k	B188	Kaluaggala - Labugama	14.00	West	6	900
68	1/5	B164	Jaffna Junction - Sri Maha Bodhi	2.00	Ncp	2	900
55	8/10 k	B093	Dehiowita - Deraniyagala - Noori	28.00	Sab	13	900
56	3/7 k	B093	Dehiowita - Deraniyagala - Noori	28.00	Sab	13	900
127	13/2 k	B093	Dehiowita - Deraniyagala - Noori	28.00	Sab	13	900
60	10/3	B300	Muttetugala - Hiripitiya	19.00	Nwp	9	900
13	4/5	B056	Bibile - Medagama - Nakkala	34.00	Uva	8	800
14	10/5	B056	Bibile - Medagama - Nakkala	34.00	Uva	8	800
74	6/5 k	B466	Weligama - Telijjawila	11.00	Sout	5	800
67	23/2 k	B157	Horena - Anguruwatot - Aluthgama	54.00	West	20	700
8	12/3	B427	Udawalawe - Tanamalwila	35.00	Uva	8	600
31	3/3 m	B114	Elpitiya - Opatha - Avittawa	4.00	Sout	2	600
194	13/1	B019	Anamaduwa - Uswewa - Galgamuwa	39.00	Nwp	9	600
22	2/3 k	B431	Ulapane - Pusseliawa	23.00	Cent	4	600
15	7/8 m	B057	Bibile - Uraniya - Mahiyangana	40.00	Uva	21	500
24	12/4 m	B454	Wandurambe - Ethumale - Yakkatuwa	36.00	Sout	10	500
25	4/9 m	B454	Wandurambe - Ethumale - Yakkatuwa	36.00	Sout	10	500
35	2/16 m	B454	Wandurambe - Ethumale - Yakkatuwa	36.00	Sout	10	500
41	10/3 m	B454	Wandurambe - Ethumale - Yakkatuwa	36.00	Sout	10	500
140	23/3 k	B332	Nuwara Eliya - Uda Pussellawa	46.00	Cent	20	500
62	29/3 k	B423	Tonigala - Kalawewa - Galewela	46.00	Ncp	14	500
63	27/2 k	B423	Tonigala - Kalawewa - Galewela	46.00	Ncp	14	500
73	28/2 k	B423	Tonigala - Kalawewa - Galewela	46.00	Ncp	14	500
139	25/1 k	B312	Naula - Elahera - Kaluganga	33.00	Cent	14	400
181	11/5 k	B312	Naula - Elahera - Kaluganga	33.00	Cent	14	400
196	13/3 m	B312	Naula - Elahera - Kaluganga	33.00	Cent	14	400
135	5/9 k	B249	Lady Macallums Drive	6.00	Cent	1	400
208	10/4 k	B172	Kadugannawa - Gampola	17.00	Cent	16	400
71	1/5 m	B227	Kiriyankalli - Andigama	14.00	Nwp	6	300
10	4/2 m	B478	Wilakatupotha - Ganewatha - Kumbukgete	22.00	Nwp	11	300
200	6/6 m	B478	Wilakatupotha - Ganewatha - Kumbukgete	22.00	Nwp	11	300
128	15/4 k	B097	Demodera - Spring Valley - Badulla	21.00	Uva	4	100
57	2/2 m	B116	Embilimeegama - Daulagala - Peradeniya	11.00	Cent	not fix	
17	2/3 m	B137	Ginoya - Bolawatte - Dankotuwa	5.00	Nwp	not fix	
32	2/1 k	B137	Ginoya - Bolawatte - Dankotuwa	5.00	Nwp	not fix	
38	8/1 k	B265	Malwala - Caney	14.00	Sab	not fix	
141	1/1 k	B344	Padiruppu - Vellaveli	6.00	NorEas	not fix	
143	3/3 k	B374	Potuvil - Panama	18.00	NorEas	not fix	
186	16/4	B374	Potuvil - Panama	18.00	NorEas	not fix	
193	5/2	B379	Puttalam - Marichchikadai	66.00	Nwp	not fix	
172	13/1	B424	Trincomalee - Pulmoddai	55.00	NorEas	not fix	
9	8/7 m	B471	Welimada - Kirklees	18.00	Uva	not fix	

And the statistics of these bridges by priority ranking of route is shown in Table 4.3.

Table 4.3 Bridge Classification based on Road Function

Roads by Priority		Bridge Number	Total Nat. A	Nat. B	Total
1st Priority	Nat.A	84 85 1 27 75 76 108 120 79 99 175 29 28 95 96	15	17	32
	Nat.B	195 197 201 70 66 16 37 54 124 125 126 5 23 204 205 206 207			
2nd Priority	Nat.A	86 93 46 47 36 106 212 119 102 203 174 48 49 50 51 12 97 98	18	8	26
	Nat.B	123 202 17 32 151 154 158 6			
3rd Priority	Nat.A	80 89 91 65 77 52 11 161 3	9	9	18
	Nat.B	78 138 173 147 148 209 210 211 192			
4th Priority	Nat.A	103 2 178 43 87 44 45 90 160 179	10	26	36
	Nat.B	30 57 129 130 131 33 58 59 18 19 135 20 34 136 39 40 7 26 42 150 188 149 132 145 198 182			
5th Priority	Nat.A	53 81 82 189 164 165 113 114	8	45	53
	Nat.B	122 55 56 127 128 31 67 68 208 69 133 71 72 38 60 139 61 144 21 62 63 73 22 24 25 35 41 74 78 13 14 8 194 15 140 181 196 10 200 141 143 186 193 172 9			
Total			60	105	165

4.4 Classification of Study Bridges

4.4.1 Classification under Type of Bridge

As part of preparatory study all the bridges were grouped into different types of bridges. The followings are the types of bridges in the list of 206 bridges prepared by RDA. Table 4.4 shows classification under the type. Their practice of classification is different from the Japanese one (material used, no. of span, structural type), but it states the construction method only.

Type of Bridge

- RCS : Reinforced Concrete Slab
- RCB : Reinforced Concrete Beam
- PSC / PRE : Prestressed Pretensioned Beam
- PSC / POS : Prestressed Posttensioned Beam
- ARCH / BR : Brick Arch Bridge
- ARCH / ST : Stone Arch Bridge
- ARCH / CO : Concrete Arch Bridge
- STONE : Stone Bridge
- TIMBER : Timber Bridge
- ST. TR / T : Steel Through Trusses
- ST. TR / D : Steel Deck Trusses
- RSJ / RCS : R/C Slab Over Steel Girder
- RSJ / BUC : Buckle Plate Over Steel Girder
- RSJ / COR : Corrugated Plate Over Steel Girder
- RSJ / T : Timber Deck Over RSJ
- Stl. Grd (SG) : Steel Girder
- Stl. Trs : Steel Truss
- RCC : Reinforced Concrete

Table 4.4 List of Bridges Classified under Types

	A-Route	B-Route	Σ
ST. TR /	14	8	22
ST. TR / T	2	2	4
ST. TR / RCS	1	-	1
ST. TR / H	-	3	3
ST. TR / COR	-	2	2
RSJ / RCS	13	16	29
RSJ / CON	-	1	1
RSJ / BUC	8	16	24
ARCH / RSJ	1	-	1
RSJ / COR	2	6	8
RSJ	12	16	28
RSJ / C	-	1	1
RSJ / T	3	7	10
ST · G	1	-	1
BAILEY	2	13	15
ARCH / BR	1	1	2
ARCH / ST	5	2	7
ARCH / CC	-	1	1
RCS	12	7	19
RCB	1	1	2
RCB / RCS	2	1	3
PSC	2	2	4
PSC / PRE	1	3	4
CAUSEWAY	-	10	10
TIMBER	1	-	1
MASONRY	1	-	1
N.A. (not applicable)	1	1	2
Σ	86	120	206

4.4.2 Classification under Completed Year

The classification in completed year is important in order to know the relevant design standard in Sri Lanka at that time. However, only 49 nos. (23.7%) were found from the List of 206 Bridges. The result is shown in Table 4.5.

Table 4.5 List of Bridges Classified under Completed Year

Completed Year	SER No.	Type	Route	Existing Defects
1860	99	ST.TR/DE	AA 009	Narrow
1869	77	ST.TR	AA 019	Narrow
1880	139	CAUSEWAY	B 312	Weak/Narrow
1889	9	ST.TR/COR	B 471	Narrow
1890	19	ST.TR/H	B 207	Weak/Narrow

Completed Year	SBR No.	Type	Route	Existing Defects
1894	85	ARCH/BR	AA 001	Narrow. Poor
1898	27	ARCH/ST	AA 002	Weak/Narrow
1898	80	RSJ/BUC	AA 003	Weak/Narrow
1898	23	ST.TR/	B 435	Narrow
1899	53	ST.TR/	AA 021	Narrow
1900	97	RSJ/	AA 008	Narrow
1900	129	ARCH/B	B 127	Weak/Narrow
1900	131	RSJ/RCS	B 127	Weak
1905	11	ST.TR	AA 005	Weak/Narrow
1917	130	ST.TR	B 127	Weak
1918	79	RSJ/RCS	AA 003	Weak/Narrow
1918	78	RSJ/BUC	B 199	Narrow
1920	12	ST.TR	AA 008	Narrow
1924	59	RSJ/	B 157	Narrow
1924	41	RCS/	B 454	Narrow
1926	93	ST.TR/	AA 005	Narrow
1927	39	RSJ/C	B 349	Weak/Narrow
1929	29	RCS	AA 002	Narrow
1929	48	ST.TR/	AA 008	Narrow
1929	51	ST.TR/	AA 008	Narrow
1930	49	ST.TR/	AA 008	Narrow
1930	66	RSJ	B 111	Poor Alignment
1930	58	RSJ/RCS	B 157	Weak/Narrow
1930	21	ST.TR/H	B 421	Narrow
1930	40	RSJ	B 421	Weak/Narrow
1930	200	ST.TR/H	B 478	Narrow
1932	28	ST.TR/	AA 002	Weak/Narrow
1933	84	ST.TR/	AA 001	Narrow
1940	50	ST.TR/	AA 008	Narrow
1940	98	RSJ/RCS	AA 008	Narrow
1940	173	RSJ/BUC	B 304	Weak
1940	74	RSJ/BUC	B 466	Narrow
1945	35	PSC/PRE	B 454	Narrow
1960	67	RSJ	B 157	Narrow
1960	70	RSJ/RCS	B 295	Narrow
1960	181	RSJ/RCS	B 312	Narrow
1963	205	RCS	B 435	Narrow
1963	206	RCS	B 435	Narrow
1964	42	RSJ/RCS	B 464	Narrow
1965	140	RSJ/RCS	B 332	Weak/Narrow
1965	143	ST.R/	B 374	Corroded
1967	65	RSJ	AA 011	Weak/Narrow
1970	149	RCS	B 421	Narrow
1993	202	BAILEY	B 304	Damaged

4.5 Selection Results of the 101 Bridges for Preliminary Inspection

Considering road functional viewpoint which is shown in Table 4.3, the representative bridges which cover all types of structures and defects were selected based on the above criteria.

A list of 101 bridges which presents the selection procedure is shown in Table 4.6.

Table 4.6 Selection Results on the 101 Bridges for Preliminary Inspection

(A—ROUTE) — (1)

SER No	ROUTE No	BRIDGE No	TRAFFIC VOLUME	YEAR OF CONST	TYPE OF BRIDGE	LENGTH EXST	LENGTH PROP	EXISTING WIDTH CARR	EXISTING WIDTH OVRAL	PROP WIDTH CARR	PROP WIDTH OVRAL	EXISTING DEFECTS	INVENTORY & INSPECTION SHEET	UNDER CONSTRUCTION	SECURITY PROBLEM	LESS TRAFFIC VOLUME & LIGHT DEFECT	KUWAIT FUND	EVALUATION
84	AA001	110/ 2 K	16.100	1933	ST. TR/	68.50	80.00	5.50	8.30	7.40	12.00	Narrow					○(F.S)	○
85	AA001	91/ 2 K	7.100	1894	ARCH/BR	71.60	75.00	6.40	7.50	7.40	10.00	Narrow, Poor Aline					○(F.S)	○
0	AA002	104/ 1 K		1933	RCB/RCS	57.70		5.49	5.79				—					—
1	AA002	61/ 1 M	6.700		RCB/RCS	29.70	30.00	7.30	9.50	7.40	10.40	Narrow, Damage						○
27	AA002	87/ 1 K	6.700	1898	ARCH/ST	33.40	33.00	6.70	6.70	7.40	9.80	Narrow, Weak					○	○
28	AA002	81/ 1 K	6.700	1932	ST. TR/	46.00	54.40	5.50	5.50	7.40	11.40	Narrow, Weak					○	—
29	AA002	72/ 3 K	6.700	1929	RCS	7.60	16.28	5.40	5.50	7.40	10.40	Narrow					○	—
75	AA002	62/ 2 K	8.900		ST. TR/	40.50		5.35	5.65	7.40	12.00	Weak					○(F.S)	○
76	AA002	62/ 1 K	8.900		RSJ/RCS	91.30		5.80	6.00	7.40	12.00	Weak					○(F.S)	○
86	AA002	199/ 3 K	3.400		PSC/	7.40		8.30	10.00			Sett Lcd						○
87	AA002	256/ 1 K	1.600		PSC	4.90		5.00	5.60			Narrow						○
79	AA003	43/ 2 K	17.600	1918	RSJ/RCS	69.60	70.00	4.92	6.25	7.40	10.40	Narrow						○
80	AA003	96/ 2 K	2.600	1898	RSJ/BUC	104.00	112.80	4.30	5.50	7.40	9.80	Narrow, Weak						○
83	AA003	JFB			ST. TR/	228.00		7.40	9.50			Weak	—					—
43	AA004	206/ 9 K	300		ARCT/ST	34.00	34.00	4.90		7.40	9.80	Narrow						○
44	AA004	196/ 7 K	300		RSJ/RCS	30.90	33.00	4.60	4.60	7.40	9.80	Narrow						○
45	AA004	206/10 K	300		ARCH/ST	38.90	37.00	4.25	4.25	7.40	9.80	Narrow						○
88	AA004	371/ 1			PSC/PRE	78.94		3.84	4.27			Corrd				○		—
89	AA004	163/ 9 K	1.100		PSJ/RCS	4.80		4.20	4.50			Narrow						○
90	AA004	199/ 2 K	300		RSJ/RCS	6.90	7.00	5.20	5.65	7.40	9.80	Weak, Damage				○		—
91	AA004	169/ 9 K	1.100		RCS	13.80	13.80	6.80	7.10	7.40	9.80	Sett Lcd						○
92	AA004	427/ 1 K			ST. TR/	289.00		4.60	5.60			Damage			○			—
159	AA004	427/ 1 K			ST. TR/	292.00		4.50	4.50			Weak			○			—
178	AA004	192/ 2 K	300		RSJ/BUC	44.40	48.00	4.65	4.65	7.40	9.80	Narrow						○
183	AA004	361/ 1 C											—	○		○		—
11	AA005	133/ 1 K	2.800	1905	ST. TR/	48.40	48.00	4.30	4.30	7.40	11.70	Narrow, Weak		○				—
81	AA005	242/ 2 K			RSJ/BUC	21.20	20.00	4.50	4.80	7.40	9.80	Narrow, Weak				○		—
82	AA005	242/ 1 K			RSJ/BUC	65.00	65.00	3.80	4.00	7.40	9.80	Narrow, Weak				○		—
93	AA005	21/ 4 K	5.000		ST. TR/	98.20	100.00	4.90	4.90	7.40	12.00	Narrow						○
94	AA005	283/ 7 K			RCS	36.50		4.70	5.60			Damage			○			—
189	AA005	249/ 1 K			BAILEY	21.35						Weak				○		—
95	AA006	3/ 2 K	5.900		RSJ/RCS	11.50	12.00	5.50	6.00	7.40	10.00	Narrow					○	—
96	AA006	8/ 1 K	5.900		ST. TR/RCS	97.80	99.00	5.50	7.10	7.40	12.00	Narrow					○	—
174	AA006	86/ 1 K	3.400		RCS	10.40	16.23	6.10	7.35	7.40	9.80	Poor Aline					○	—

SER No	ROUTE No	BRIDGE No	TRAFFIC VOLUME	YEAR OF CONST	TYPE OF BRIDGE	LENGTH EXST	LENGTH PROP	EXISTING WIDTH CARR	EXISTING WIDTH OVRAL	PROP WIDTH CARR	PROP WIDTH OVRAL	EXISTING DEFECTS	INVENTORY & INSPECTION SHEET	UNDER CONSTRUCTION	SECURITY PROBLEM	LESS TRAFFIC VOLUME & LIGHT DEFECT	KUWAIT FUND	EVALUATION
203	AA006	71/ 3 K	3,800		RCS	5.80		6.50				Damage					○	–
46	AA007	73/ 5	1,500	-	ARCH/ST	12.20	13.00	6.20	6.50	6.80	9.20	Narrow						○
47	AA007	70/ 8	1,500		ARCH/ST	12.20	13.00	5.20	6.00	6.80	9.20	Narrow						○
12	AA008	49/ 6 K	1,900	1920	ST. TR/	13.80	14.00	3.15	3.60	7.40	10.60	Narrow					○	–
48	AA008	25/ 4 K	3,400	1929	ST. TR/	22.90	28.00	5.50	6.50	7.40	9.80	Narrow					○	–
49	AA008	25/ 3 K	3,400	1930	ST. TR/	13.60	13.00	4.30	4.80	7.40	9.80	Narrow					○	–
50	AA008	35/ 1 K	3,400	1940	ST. TR/	38.20	33.00	3.90	3.90	7.40	9.80	Narrow					○	–
51	AA008	24/ 1 K	3,400	1925	ST. TR/	13.60	13.00	5.40	6.00	7.40	9.80	Narrow					○	–
97	AA008	58/ 2 K	1,900	1900	RSJ/	8.80	8.60	4.55	4.55	7.40	9.80	Narrow		○				–
98	AA008	59/ 2 K	1,900	1940	RSJ/RCS	8.90	8.00	3.60	3.80	7.40	9.80	Narrow					○	–
99	AA009	5/ 1 K	6,200	1860	ST. TR/	137.40	140.00	6.70	9.70	7.40	12.00	Narrow						○
100	AA009	161/ 2 M			RCS	6.10		6.10	10.30			Damage			○			–
101	AA009	200/ 1			MASONRY	17.00		11.50	12.50			Damage			○			–
160	AA009	115/ 5 M	1,300		RSJ/RCS	19.20	20.00	4.80	6.40	7.40	9.80	Dadly Dam			○			–
2	AA010	75/ 1 K	1,200		RSJ/COR	122.40	120.00	5.60	5.60	6.80	9.20	Narrow						○
36	AA010	48/ 1 K	3,300		RSJ/BUC	31.20	32.00	5.20	5.40	7.40	10.40	Narrow, Weak						○
102	AA010	25/ 2 K	3,600		RSJ/COR	17.20	17.00	5.60	5.80	7.40	9.80	Narrow, Weak						○
65	AA011	24/ 3 K	1,700	1967	RSJ/RCS	9.75	11.00	5.64	5.64	7.40	9.80	Narrow, Weak						○
161	AA011	50/ 4	1,700		RSJ/	290.00		4.70	6.00	7.40	9.80	Narrow	–					–
103	AA012	16/ 1 K	700		RCS	5.20		7.90	7.90			Weak						○
162	AA014	147/ 3			ST. TR/	122.00		4.20		7.40	9.80	Narrow, Weak			○			–
163	AA014	114/ 3			RSJ/T	31.10	31.00	4.57	4.70	6.80	9.20	Damage			○			–
104	AA015	1/ 1			RSJ/RCS	14.60		9.20	12.20			Narrow			○			–
105	AA015	25/ 2 K			RSJ	8.50		6.80	7.50			Narrow			○			–
3	AA017	25/ 5 K	1,400		RSJ/	10.50	11.00	3.50	3.55	7.40	9.80	Narrow, Weak						–
52	AA017	2/ 2 K	1,400		RSJ/T	10.40	10.00	4.30	4.40	6.80	9.20	Narrow, Damage						○
179	AA017	38/ 1 K	1,300		RSJ/T	16.40		4.55	4.55			Narrow, Weak	–	○				–
77	AA019	3/ 2 K	2,100	1869	RSJ/RCS	120.35		5.30	5.70	7.40	9.80	Narrow						○
53	AA021	36/ 3 K	700	1899	ST. TR/	38.50	40.00	3.38	6.05	7.40	9.80	Narrow						○
106	AA026	69/ 1 K	1,400		RSJ/RCS	14.30	15.60	3.50	4.70	7.40	9.40	Narrow						○
164	AA027	14/ 2 K			RCB	47.00	47.30	7.30	7.80	7.40	9.80	Weak	–					–
165	AA029	17/ 3 K			RCS	10.60	11.00	3.00	4.20	6.80	9.20	Narrow, Damage			○			–
166	AA029	1/ 7 M			RSJ	3.90	5.00	3.90	4.26	6.80	9.20	Damage			○			–
107	AA032	30/ 2			RSJ/RCS	5.00		3.00	5.50			Corrd			○			–

SSR No.	ROUTE No.	BRIDGE No.	TRAFFIC VOLUME	YEAR OF CONST	TYPE OF BRIDGE	LENGTH EXST	LENGTH PROP	EXISTING WIDTH CARR	EXISTING WIDTH OVRAL	PROP WIDTH CARR	PROP WIDTH OVRAL	EXISTING DEFECTS	INVENTORY & INSPECTION SHEET	UNDER CONSTRUCTION	SECURITY PROBLEM	LESS TRAFFIC VOLUME & LIGHT DEFECT	KUWAIT FUND	EVALUATION
167	AA032	25/ 2			RSJ/BUC	17.00	18.00	3.38	6.00	6.80	9.20	Weak			○			–
108	AA033	16/ 7	7.700		RSJ/BUC	5.90		3.75	3.95	6.80	6.80	Narrow, Corrd						○
168	AA034	2/ 4			TIMBER	31.00	32.00	3.80	4.00	6.80	9.20	Weak			○			–
109	AA035	1/ 2			RSJ	4.25		3.60	9.75			Damage			○			–
110	AA035	4/ 2			RSJ	10.00		3.00	4.00			Damage			○			–
111	AA035	5/ 6			RSJ	10.00		3.00	4.20			Damage			○			–
112	AA035	1/ 1			RSJ	14.60		3.60	9.75			Damage			○			–
169	AA035	6/ 1			RSJ	40.00	45.00	2.70	3.00	7.40	9.80	Narrow, Weak			○			–
113	AB001	32/ 1 K			RSJ	8.70		5.80	5.90			Damage			○			–
114	AB001	33/ 5 K			BAILEY	20.00		5.40	5.90						○			–
115	AB019	1/ 1			RSJ	13.70		3.65	5.50			Damage			○			–
116	AB021	13/ 3			RCS	245.00		4.50	7.50			Damage			○			–
117	AB021	17/ 4			RCS							Damage			○			–
118	AB021	3/ 2			RCS	7.50		7.50	8.25			Damage			○			–
170	AB021	27/ 1			RCS	114.50		5.50	6.50			Damage			○			–
119	AB026	2/ 4 M			ARCH/RSJ	14.30	10.00	4.40	4.40	6.80	9.20	Weak						○
175	AB027	1/ 2 M	5.200		ST. G	4.32		8.00				Corrd						○
120	AB029	12/ 2 K	2.200		RSJ/BUC	4.90		4.40	4.55	7.40		Narrow, Corrd						○
																		33
212	AA002	138/ 1 K	4.300	1975	RSC/PRE	62.48		10.40	11.90									○
																		34
		Total	87															

SER No.	ROUTE No.	BRIDGE No.	TRAFFIC VOLUME	YEAR OF CONST	TYPE OF BRIDGE	LENGTH EXST	LENGTH PROP	EXISTING WIDTH CARR	EXISTING WIDTH OVRAL	PROP WIDTH CARR	PROP WIDTH OVRAL	EXISTING DEFECTS	INVENTORY & INSPECTION SHEET	UNDER CONSTRUCTION	SECURITY PROBLEM	LESS TRAFFIC VOLUME & LIGHT DEFECT	KUWAIT FUND	EVALUATION
30	B 014	5/ 5 M	1.820		RSJ/BUC	20.60		5.50	5.65			Weak						○
194	B 019	13/ 1			CAUSEWAY								–					–
180	B 027	1/ 1 K			RCS	16.90		5.30	5.30				–					–
121	B 033	2/ 2 K			RCS	4.80		4.80	5.00			Damage			○			–
4	B 039	7/ 7 M			BAILEY	15.50	16.00	3.20		6.20	8.60					○		–
122	B 045	19/ 1 K	760		RSJ/RCS	18.50		3.45	5.00			Narrow, Weak						○
13	B 056	4/ 5	780		CAUSEWAY	53.30	40.50	5.50	5.50	6.80	9.20	Submersib		○				–
14	B 056	10/ 5	780		CAUSEWAY	30.50	60.00	5.50	5.50	7.40	10.40	Submersib	–	○				–
15	B 057	7/ 2 M	530		CAUSEWAY	16.76	27.00	5.80	5.80	6.80	9.20	Narrow, Submersib	–	○				–
123	B 079	23/ 2 M	1.880		PSC/PRE	12.00	12.00	3.65	4.25	7.40	11.00	Narrow						○
16	B 084	24/ 5 K	8.060		RSJ/	9.70	9.83	4.50	4.50	7.40	9.80	Narrow, Weak	–				○	–
37	B 084	26/ 3 K	8.060		BAILEY	21.70	10.74	4.20	4.20	7.40	9.80	Narrow					○	–
54	B 084	31/ 4 K	8.060		RSJ/RCS	10.80	11.00	5.50	5.50	7.40	11.00	Narrow					○	–
124	B 084	36/ 2 K	8.060		RSJ/BUC	4.70	4.70	4.60	4.60	7.40	11.00	Narrow					○	–
125	B 084	27/ 7 K	8.060		RSJ/	4.20	4.00	5.70	5.70	7.40	11.00	Narrow	–					–
126	B 084	34/ 1 K	8.060		RSJ/	7.00	7.00	4.50	4.50	7.40	11.00	Narrow, Weak						–
55	B 093	8/ 1 K	840		RSJ/BUC	20.40	22.00	4.55	4.55	6.80	9.20	Narrow						○
56	B 093	3/ 7 K	840		RSJ/BUC	10.10	10.10	4.70	4.70	6.80	9.20	Narrow						○
127	B 093	13/ 2 K	840		RST/T	10.30	11.00	4.25	4.25	6.80	9.20	Narrow	–					○
128	B 097	15/ 4 K	140		RSJ/RCS	15.30	15.30	3.00	3.50	7.40	9.80	Narrow, Weak	–					○
66	B 111	4/ 2 M	6.710	1930	RSJ/COR	36.80	42.00	5.50	6.40	7.40	11.00	Poor Aline						○
31	B 114	3/ 3 K	630		RSJ/	12.20		3.05	3.50			Weak	–					○
57	B 116	2/ 2 M			RSJ/RCS	10.00	10.00	4.50		6.80	9.20	Narrow						○
129	B 127	2/ 7 M	1.240	1900	ARCH/BR	4.50	4.30	4.45	5.25	6.80	9.20	Weak						○
130	B 127	7/ 1 K	1.240	1917	ST.TR/	24.75	26.00	4.20	5.35	7.40	9.80	Narrow, Weak						○
131	B 127	1/ 2 K	1.240	1900	RSJ/RCS	5.80	7.00	4.20	4.40	7.40	9.80	Narrow, Weak						○
132	B 129	18/ 4 M	1.570		RSJ/BUC	7.20	7.00	3.45	3.70	6.80	9.20	Narrow, Damage						–
191	B 156	24/23 K			RCB/RCS	3.60		4.10	3.50			Weak	–					–
199	B 156	24/ 7 K			RSJ/T	6.00		2.70	2.70			Weak	–					–
33	B 157	12/ 3 K	1.040		RSJ/RCS	68.85	71.50	3.30	3.80	6.80	9.20	Narrow, Weak						○
58	B 157	44/ 3 K	1.040	1930	RSJ/RCS	10.30	10.00	3.40	4.20	6.80	9.20	Narrow, Weak						○
59	B 157	43/ 4 K	1.040	1924	RSJ/COR	46.10	46.00	3.30	3.80	6.80	9.20	Narrow						○
67	B 157	23/ 2 K	710	1960	RSJ/RCS	19.40	20.00	3.50	3.50	6.80	9.20	Narrow						○
13	B 158	11/ 1 M	1.410		RSJ/	31.20	30.00	3.40	3.80	6.80	9.20	Narrow						○

SER No.	ROUTE No.	BRIDGE No.	TRAFFIC VOLUME	YEAR OF CONST	TYPE OF BRIDGE	LENGTH EXST	LENGTH PROP	EXISTING WIDTH CARR	EXISTING WIDTH OVRAL	PROP WIDTH CARR	PROP WIDTH OVRAL	EXISTING DEFECTS	INVENTORY & INSPECTION SHEET	UNDER CONSTRUCTION	SECURITY PROBLEM	LESS TRAFFIC VOLUME & LIGHT DEFECT	KUWAIT FUND	EVALUATION
68	B 164	1/ 5	870		RSJ/	97.70	46.00	3.90	6.00	6.00		Narrow, Weak						○
208	B 172	10/ 4 K	350		BAILEY	18.30		4.20	4.80									○
69	B 188	3/ 6	870		ST. TR/COR	13.60	16.00	3.00	3.60	6.80	9.20	Narrow						○
133	B 188	5/ 2	870		RSJ/CON	9.00	9.00	3.50	3.60	6.80	9.20	Narrow						○
78	B 199	5/ 5 K	1,980	1918	RSJ/BUC	127.20		6.65	6.65	7.40	10.00	Narrow						○
19	B 207	6/10 M	1,220	1890	ST. TR/H	32.40	40.00	4.30	4.30	6.80	9.20	Narrow, Weak						○
71	B 227	1/ 5 M	320		ST. TR	16.60	16.00	4.25	5.40	6.80	9.20	Weak						○
134	B 230	4/ 4			ARCH/ST	12.19		4.80	5.50			Damage				○		–
5	B 240	14/ 7 K	7,120		RSJ/	4.80	7.10	4.20	5.20	7.40	10.40	Narrow, Weak		○				–
184	B 274	34/ 1 M			PSC/PRE	59.80	59.80	4.26	4.26				–			○		–
190	B 274	33/ 3			RCC/BAILY	4.70		7.20	7.20			Damage	–	○				–
72	B 248	6/ 6 M	2,700		ST. TR/T	12.50	12.00	4.30	4.82	6.80	9.20	Damage						○
135	B 249	5/ 9 K	400		RSJ/	10.00		4.50	4.75	6.80	9.20	Narrow, Weak	–					○
20	B 264	16/ 6	1,690		RSJ/RCS	14.60	14.00	4.25	4.25	7.40	9.80	Narrow						○
34	B 264	5/ 1	1,690		ST. TR/T	27.60	27.00	4.25	4.25	6.80	9.20	Narrow, Weak						○
38	B 265	8/ 1 K	.		RSJ/T	17.00	19.70	3.30	3.30	6.80	9.20	Narrow, Weak						○
136	B 272	9/ 4 M	1,730		RSJ/RCS	31.30	38.00	4.20	4.35	7.40	9.80	Narrow, Weak	–					○
192	B 272	3/ 2 M	2,190		RSJ/	3.10		6.09	9.45			Weak		○				–
137	B 276	2/ 1			ARCH/ST	12.80		4.60	5.50			Damage				○		–
195	B 288	10/ 2 K	10,800		RSJ/COR	5.30		5.50	5.50			Narrow, Poor Aline						○
197	B 288	10/ 3 K	10,800		ST. TR/	52.80		5.60	6.70			Narrow, Poor Aline						○
201	B 288	10/ 5 K	10,800		ARCH/CC	7.20		7.00	8.00			Poor Aline						○
70	B 295	3/ 6 K	10,700	1960	RSJ/RCS	43.50	45.00	5.50	5.50	7.40	11.00	Narrow						○
60	B 300	10/ 3	830		CAUSEWAY	6.70	32.50	4.60	4.60	6.80	9.20	Narrow	–					○
138	B 304	16/ 5	2,770		RSJ/	12.00	12.00	4.60	4.80	6.80	9.20	Weak						○
173	B 304	17/ 1 K	2,770	1940	RSJ/BUC	7.00		5.75	5.75			Corrd						○
202	B 304	14/ 5 K	2,770	1993	BAILEY	3.90		5.70	5.70			Damage	–					○
139	B 312	25/ 1 K	430	1880	CAUSEWAY	68.40	97.40	3.00	3.50	6.80	9.20	Narrow, Weak	–					○
181	B 312	11/ 5 K		1960	RSJ/RCS	18.90		3.50	4.11			Narrow	–			○		–
196	B 312	13/ 3 M			BAILEY	12.20		4.80	4.80				–			○		–
6	B 322	38/ 3 K	3,770		BAILEY	99.00	98.00	4.95	4.95	7.40	11.00		–	○				–
140	B 322	23/ 3 K	470	1965	RSJ/RCS	14.50		4.00	4.60	6.80	9.20	Narrow, Weak	–			○		–
141	B 344	1/ 1 K			BAILEY	144.50		6.00	9.60						○			–
187	B 346	19/ 3 K			BAILEY	10.38		3.50	3.65				–	○				–

SER No.	ROUTE No.	BRIDGE No.	TRAFFIC VOLUME	YEAR OF CONST	TYPE OF BRIDGE	LENGTH EXST	LENGTH PROP	EXISTING WIDTH CARR	EXISTING WIDTH OVRAL	PROP WIDTH CARR	PROP WIDTH OVRAL	EXISTING DEFECTS	INVENTORY & INSPECTION SHEET	UNDER CONSTRUCTION	SECURITY PROBLEM	LESS TRAFFIC VOLUME & LIGHT DEFECT	KUWAIT FUND	EVALUATION
39	B 349	30/ 2 K	1,410	1927	RSJ/C	23.10	23.00	3.85	4.45	6.80	9.20	Narrow, Weak						○
171	B 350	3/ 1			RSJ	26.00	27.00	6.00		6.80	9.20	Narrow	–			○		–
142	B 363	30/ 2 K			RSJ/T	25.95	30.00	2.90	2.90	6.80	9.20	Submersib	–			○		–
143	B 374	3/ 3 K		1965	ST. TR/	154.50		6.69	7.68			Corrd	–		○			–
186	B 374	16/ 4			CAUSEWAY								–					–
61	B 379	4/ 9			BAILEY	36.00	36.00	4.10	4.10	6.80	9.20	Flood Dam						○
144	B 379	1/ 1 K			RSJ/RCS	6.10		6.50	6.50			Weak						○
193	B 379	51/ 2			PSC/	10.66		5.48	6.32			Flood Dam				○		–
145	B 409	21/ 3	1,410		ST. TR/	13.80	14.00	4.25	4.25	6.80	9.20	Weak	–					–
198	B 409	2/ 4 K											–					–
146	B 412	16/ 7 M	190		RSJ/	5.90	9.83	3.70	3.90	7.40	9.80	Narrow, Weak	–			○		–
147	B 419	31/ 2 M	2,400		RSJ/COR	10.90		4.40	4.80			Narrow, Weak						○
148	B 419	42/ 2 M	2,400		RSJ/	11.00		3.85	4.04			Narrow, Weak						○
21	B 421	8/ 1 K	900	1930	ST. TR/H	36.40	36.90	4.40	4.40	6.80	9.20	Narrow						○
40	B 421	66/ 2 K	1,580	1930	RSJ/COR	21.30	21.00	4.70	4.70	6.80	9.20	Narrow, Weak						○
149	B 421	50/ 2 K	1,580	1970	RCS/	7.10	7.00	3.60	4.50	6.80	9.20	Narrow	–					–
62	B 423	29/ 3 K	450		CAUSEWAY	15.00	49.00	3.20	3.20	6.80	9.20	Narrow						○
63	B 423	27/ 2 K	450		CAUSEWAY	7.00	32.50	3.60	3.60	6.80	9.20	Narrow						○
73	B 423	28/ 2 M	450		RCS	7.00	9.00	3.30	3.90	6.80	9.20	Narrow, Weak						○
172	B 424	13/ 1			RCB	290.00		3.50	4.40	6.80	9.20	Narrow				–		–
7	B 425	20/ 4 K	1,630		PSC	139.00		5.85	5.85	7.40	11.00	Weak						○
8	B 427	12/ 3 M	640		CAUSEWAY	15.90	49.00	5.20	5.20	6.80	9.20		–	○				–
22	B 431	2/ 3 K	590		BAILEYS	162.00		4.20	5.60	7.40	9.80							○
23	B 435	9/ 1 K	10,930	1898	ST. TR/	16.60	20.00	6.30	6.30	7.40	9.80	Narrow	–					–
204	B 435	9/ 2 K	10,930		RSJ/RCS	16.60		6.30	6.30		10.00	Narrow					○	–
205	B 435	9/ 3 K	10,930	1963	RCS/	11.20		7.70	7.70		10.00	Narrow					○	–
206	B 435	11/ 1 K	10,930	1963	RCS/	7.80		8.60	8.60		10.00	Narrow					○	–
207	B 435	11/ 2 K	10,930		RSJ/	5.90		5.70	5.70		10.00	Narrow					○	–
17	B 437	2/ 3 M			RSJ/BUC	10.30	11.00	3.45	3.45	6.80	9.20	Narrow, Weak						○
32	B 437	3/ 1 M			RSJ/BUC	10.20	11.00	3.70	3.70	6.80	9.20	Narrow						○
150	B 444	4/ 5 K	1,230		RSJ/COR	7.90		4.35	4.50	6.80		Corrd						○
182	B 444	1/ 2 K	1,230		RSJ/T	12.20		2.95	3.60			Narrow		○				–
151	B 445	9/ 3 M	4,310		RSJ/BUC	10.30		4.80	6.80	6.80		Corrd						○
152	B 445	19/ 6 M			RSJ/BUC	7.00	7.00	4.50	4.50	7.40	9.80	Narrow	–			○		–

SER No	ROUTE No	BRIDGE No	TRAFFIC VOLUME	YEAR OF CONST	TYPE OF BRIDGE	LENGTH EXST	LENGTH PROP	EXISTING WIDTH CARR	EXISTING WIDTH OVRAL	PROP WIDTH CARR	PROP WIDTH OVRAL	EXISTING DEFECTS	INVENTORY & INSPECTION SHEET	UNDER CONSTRUCTION	SECURITY PROBLEM	LESS TRAFFIC VOLUME & LIGHT DEFECT	KUWAIT FUND	EVALUATION
153	B 445	18/ 3 M			RSJ/BUC	19.50	20.00	3.50	3.50	7.40	9.80	Narrow	—					—
154	B 445	9/ 4	4.310		RSJ/BUC	10.50		4.80	6.80	6.80		Corrd						○
185	B 453	2/ 5 M			BAILELY	24.40		4.00	4.10			Narrow	—	○				—
24	B 454	12/ 4 M	480		RSJ/T	11.00	12.00	2.75	3.70	6.80	9.20	Narrow, Weak						○
25	B 454	4/ 9 M	480		RSJ/RCS	25.01	27.00	3.00	3.30	6.80	9.20	Narrow, Weak						○
35	B 454	2/16 M	480	1945	PSC/PRE	23.60	24.00	3.00	3.25	6.80	9.20	Narrow						○
41	B 454	10/ 3 M	480	1924	RCS/	7.00	12.00	3.70	4.00	6.80	9.20	Narrow, Weak						○
155	B 461	15/10			BAILEY	12.20	12.20	4.30	4.90	7.40	9.80	Weak	—					—
156	B 461	29/ 3 M			RSJ	10.20	7.00	2.70	3.90	6.80	9.20	Narrow	—					—
157	B 461	28/ 2 K			RSJ/BUC	24.80		3.05	3.25			Weak	—					—
26	B 462	10/ 1 K	1.290		ST. TR/-	20.00	20.00	4.40	5.20	7.40	9.80	Narrow	—					○
42	B 464	3/ 3 M	1.590	1964	RSJ/RCS	67.50	60.00	6.70	7.90	7.40	9.80	Narrow	—					○
74	B 466	6/ 5 K	760	1940	RSJ/BUC	10.20	10.00	5.68	5.68	6.80	9.20	Narrow						○
9	B 471	8/ 7 M		1889	ST. TR/COR	30.50	27.00	2.60	2.75	7.40	10.30	Narrow		○				—
188	B 472	3/ 4 M			RSJ/T	10.20		4.20	4.40				—	○				—
158	B 473	3/ 2			ST. TR/	19.70		4.30	5.20			Narrow, Weak	—					—
10	B 473	4/ 2 M	270		RSJ/BUC	57.50	54.00	4.20	4.70	6.80	9.20	Narrow, Weak		○				—
200	B 478	6/ 6 M			ST. TR/H	78.60		3.95	4.25			Narrow	—					—
																		64
209	B 146	21/ 1 K	2.700	1861	ARCH/BR	4.40		6.26	7.26									○
210	B 146	6/ 3 K	2.700	1942	RSJ/RCS	23.70		3.54	4.20									○
211	B 146	8/ 3 K	2.700	1942	RSJ/RCS	23.60		3.55	3.83									○
																		67

CHAPTER 5 PRELIMINARY INSPECTION

5.1 General

Preliminary Bridge Inspection has been carried out for selected 101 bridges mainly by visual inspection. The one of the purposes of this inspection is to investigate Bridge Rehabilitation Plan by understanding current condition of bridges and rehabilitation technique level in Sri Lanka, and then the results of this inspection shall reflect the Maintenance & Rehabilitation Guideline. The other purpose is to demonstrate field inspection techniques, to introduce inspection recording methods into RDA, and to recommend the required maintenance and rehabilitation works.

At the same time, the Preliminary Environmental Examination was carried out for selected 101 bridges in order to comprehend current environmental situation for the bridges and surrounding area and the likely impact.

The inspection procedure and summary of inspection results are presented in this Report. The inspection results for 101 bridges are described in two (2) separate booklets titled, and these report were submitted to RDA in October 1995.

5.2 Preliminary Inspection Procedure

5.2.1 Preparation Works

Prior to the Inspection, Bridge Inventory for 206 bridges made by RDA has been reviewed by the Study Team to refer their location for the "101 bridges" to Route Map (1:500,000) made by RDA. In case of inconsistency occurs for its ID number, the Route Map has been assumed to be right. The inspection had been scheduled considering distance to and from the point, size and type of the bridge, road condition and other circumstances such as safety.

Three teams have been organized to cover all 101 bridges which are dotting all in Sri Lanka. One team consists of one to two members from the Study Team and two released engineers from RDA. The following is actual assignment area for each team.

Colombo Team	:	around Colombo city and the western of Sri Lanka, basing in Colombo
Galle Team	:	Southern part of Sri Lanka, basing in Galle
Kandy Team	:	Central part of Sri Lanka, basing in Kandy

Inspection sheets had been prepared prior to the inspection concerning makes of reliable Bridge Inventory, especially for RDA staff for their future use.

Concerning security of the Study Team, the Colombo Team and the Galle Team had carried out the Inspection with portable telephone and one vehicle, however, it had been impossible for the Kandy Team to use the portable telephone due to their location, so that extra vehicle had been allocated for them.

Each team had been with the following instrument for the Inspection.

1. Survey instrument : Convex (3m, 5m), Holding scale, Steel tape (50m) Inclinometer, Concrete crack gage, Plum bob, Slide caliper, Test hammer
2. Record instrument : Camera, White board, Pen, Ribbon rod, Torch, Chalk, Drawing board
3. Access instrument : Ladder, Rope, Binoculars
4. Safety instrument : Safety colour cones, Leather groves, Cotton groves, Gum boats, First aid boxes

Actual inspection progress is shown in Table 5.1.

5.2.2 Joint Inspection for Three Teams

To standardize the criteria, joint inspection had been carried out for 8 bridges in 6 types as follows, all of which are especially common in Sri Lanka.

- PSC / PRE
- PCB
- STTR / T
- RSJ / COR
- RSJ / BUC
- ARCH / CO

Instant photographs of damages on bridges had been taken to confirm the damage rating among the teams at the site.

5.2.3 Preliminary Bridge Inspection

The Inspection has been carried out by each team mentioned above.

(1) Visual Inspection

- any damages on main & second members
- recording in the Inspection Sheets

(2) Measurement of Basic Dimensions

- bridge length, width, cross section of girder, height of substructure
- sketching those dimensions in the Inspection Sheets

(3) Taking of Photographs

- complete view of bridge and present condition of damage parts

Table 5.1 Schedule of Preliminary Bridge Inspection

May		COLOMBO TEAM (KASUGA, KATAOKA) SER.NO (TYPE)	HOTEL	KANDY TEAM (NAMBA, HARIYA) SER.NO (TYPE)	HOTEL	GALLE TEAM (FURUKAWA) SER.NO (TYPE)	HOTEL	Remarks
8	Mon	7(PSC/PRE,RCB)	COLOMBO	Same as Colombo Team		Same as Colombo Team		
9	Tue	66(STTR/T) 195(RSJ/COR) 197(STTR/T) 201(ARCH/CO)	ditto	Same as Colombo Team		Same as Colombo Team		
10	Wed	79(STTR/T) 17(RSJ/BUC) 32(RSJ/COR)	ditto	Same as Colombo Team		Same as Colombo Team		
11	Thu	39(RSJ/COR)	Anuradapura	68(RSJ/BUC,PSC/PRE)	Anuradapula	75(STTR/T) 76(STTR/T)	Bentota	
12	Fri	193(collapsed) 61(BAILEY) 144(RSJ/RCS) 103(RCS)	ditto	65(RSJ/RCS) 63(CAUSEWAY) 73(RCS) 62(CAUSEWAY)	Kandy	33(STTR/T) 67(RSJ/RCS) 19(STTR/T)	ditto	
13	Sat	122(STTR/T) 71(PSC/PRE)rec. 80(STTR/T)	COLOMBO	139(CAUSEWAY) 119(ARCH/BR) 26(STTR/T)	ditto	173(RSJ/BUC) 138(RSJ/BUC) 21(STTR/T,RSJ/BUC) 202(BAILEY)	ditto	
14	Sun		ditto		ditto	40(RSJ/BUC) 21(STTR/T,RSJ/BUC) 59(RSJ/BUC) 58(RSJ/RCS)	Ahungalla	
15	Mon	2(RSJ/BUC) 123(PSC/PRE)	ditto	106(RSJ(RCS) 128(STTR/T)	Badulla	31(RSJ/RCS) 18(RSJ/RCS) 30(RSJ/COR)	ditto	
16	Tue	136(RSJ/COR) 147(RSJ/BUC) 148(RSJ/BUC)	ditto	43(ARCH/BR) 45(ARCH/CO) 44(RSJ/BUC) 178(STTR/D)	Bandarawela		ditto	
17	Wed	77(STTR/T, RSJ/RCS) 120(RSJ/COR),Red.RCS	ditto	91(RC/BOX) 89(RSJ/COR)	COLOMBO	35(RSJ/RCS) 25(RSJ/RCS) 41(RCS) 24(RSJ/T) 72(STTR/T)	ditto	
18	Thu	129(ARCH/BR) 130(STTR/T) 131(RSJ/COR)	ditto	69(STTR/T) 133(RSJ/BUC)	ditto	52(RSJ/COR) 27(ARCH/ST) 74(RSJ/BUC)	Galle	
19	Fri	53(STTR/T) 151(RSJ/BUC) 154(RSJ/BUC)	ditto	127(RSJ/COR) 55(RSJ/BUC) 56(RSJ/BUC)	ditto		COLOMBO	
20	Sat		ditto		ditto		ditto	
21	Sun		ditto		ditto		ditto	
22	Mon	20(RSJ/COR) 34(STTR/T)	Kandy	47(ARCH/ST) 46(ARCH/ST) 135(RSJ/BUC)	Nuwara Eliya		Ahungalla	
23	Tue	102(RSJ/CCR) 36(RSJ/COR) 60(CAUSEWAY)	ditto	22(BAILEY) 93(STTR/T) 208(BAILEY) 57(RSJ/BUC)	Kandy		Galle	
24	Wed	78(RSJ/BUC) 150(RSJ/COR) 108(RSJ/BUC)	COLOMBO	99(STTR/D) 84(ARCH/S) 85(ARCH/BR)	COLOMBO	1(RCB)	Hambantota	
25	Thu	38(RSJ/T)	ditto	175(RSJ/COR) 70(RSJ/RCS)	ditto	87(PSC/PRE) 42(STTR/T) 86(PSC/PRE)	Colombo	
26	Fri	209(ARCH/BR)Wdn.(RSJ/RCS) 210(RSJ/RCS) 211(RSJ/RCS)	ditto	209(ARCH/BR)Wdn.(RSJ/RCS) 210(RSJ/RCS) 211(RSJ/RCS)	ditto		ditto	
27	Sat						ditto	
28	Sun						ditto	
29	Mon						ditto	
30	Tue					212(PSC/PRE)	ditto	
31	Wed							

(4) Preliminary Environmental Examination

- current environmental situation for the bridge and surrounding area and the likely impact
- recording in the Inspection Sheets

Details of the Preliminary Environmental Examination is stated in Chapter 16 in the Report.

(5) Hearing

- regarding high flood level taken place in the past and any detour route for understanding the construction condition and environmental condition

5.2.4 Damage Rating Criteria

It is important for the visual inspection to observe any damage appeared on bridges along with the time passed by to understand the level of damage quantitatively. RDA, at present, carries out the visual inspection by rating "Good", "Fair", "Poor", and "Very Poor", and the Study Team basically have followed the rating criteria. Actual rating has been carried out on a discussion between released engineers from RDA and the Study Team for the following rating criteria.

Rating	Rating Criteria
1	No damage found in the results of inspection.
2	Damage found and requires routine maintenance inspection work.
3	Damage is critical and requires a detailed survey work to determine a necessity of rehabilitation works.
4	Damage is very critical and requires urgent rehabilitation work, load limitation or restriction.

Rating criteria of each member for bridge inspection is shown in "Bridge Inspection, Maintenance & Rehabilitation Guideline".

5.3 Overall Evaluation Criteria

Overall evaluation for each bridge had been carried out quantitatively for easy judgment of damage. Each part of the bridge had been evaluated with weighted factor depending on its importance and then considered for the overall evaluation. The overall evaluation is the most useful data to determine the priority for bridge rehabilitation in Sri Lanka.

However, main structural member is subjected to the evaluation by the following reasons.

- Care should be taken on pavement consistently, therefore, pavement should not be included in the determination of the priority.

- Because embedded expansion joint is adopted as well as shoe and end part of beam, and visual inspection is impossible, besides, no temperature changes whole year. Therefore expansion joint and shoe don't have to be considered.
- To save the construction cost, abutment was made jutting out into the river to shorten bridge length. Therefore the wing is assumed to be main part.

The weighted factor for each part used in the Inspection is as follows:

Part		Weighted Factor
Superstructure	Deck slab	0.8
	Main beam, Main frame	1.0
	Painting	0.5
Substructure	Abutment (incl. foundation)	1.0
	Pier (incl. foundation)	1.0
	Wing	0.5

Each evaluation point has been determined by multiplying the weighted factor to evaluation for each part, and bigger one has been chosen each for superstructure and substructure, respectively. Any of bigger one, either superstructure or substructure, then has been chosen and determined as overall evaluation for each bridge.

There are few cases where shoe shall be the main part for its structural aspect, in the case, weighted factor for shoe shall be 0.5.

CHAPTER 6 RESULTS OF PRELIMINARY BRIDGE INSPECTION

6.1 General

Preliminary bridge inspection were conducted on 101 bridges by three (3) teams. The purpose of this inspection is to investigate the situation of existing bridge in more details compared with the present inspection forms prepared by RDA.

This chapter presents the general condition of the bridges and results of the analysis of preliminary inspection based on the Bridge Inventory on 101 bridges. And this results formed a basis for Bridge Rehabilitation Plan & Maintenance Management Plan.

As a result of this inspection, many steel girder bridges which became the aim of this inspection could survive their design life span by providing some maintenance works such as redecking of slab on BUC or COR, repainting of main beams, and covering of main beams with reinforced concrete.

6.2 Present Condition of the Bridges Inspected

6.2.1 Bridge Condition Rating

Damages detected in various members were filled in the form of bridge inspection sheets. Damage rating in each member, component part rating, and, finally, overall bridge rating were carried out in accordance with the procedure stated in "Bridge Inspection, Maintenance, and Rehabilitation Guideline".

As a result of the above ratings and the overall bridge ratings are summarized in Table 6.1 and Table 6.2.

Table 6.1 LIST OF BRIDGES FOR PRELIMINARY BRIDGE INSPECTION (1/2)

SER No	ROUTE No	BRIDGE No.	TRAFFIC VOLUME (vpd/Year)	YEAR OF CONST	TYPE OF BRIDGE	YEAR OF REPAIR	TYPE OF REPAIR	LENGTH EXST (m)	NOS. OF SPAN	EXIST WIDTH CARR. (m)	EXIST WIDTH OVRAL (m)	PROP. WIDTH (RDA) CARR. (m)	PROP. WIDTH (RDA) OVRAL (m)	GEOM. DEFECT Narrow (RDA)	GEOM. DEFECT Poor align	STRUCTURAL DEFECTS (RATING) Deck	Main Frame	Abut.	Pier	Wing wall	Super-structure	Sub-structure	Overall Rating	PROPOSED TREATMENT Widen (RDA)	Repair	Re deck	Repl. superst.	Re const.	Bypass	Page
84	AA001	110/2K	16050 /95	1933	ARCH/S			68.30	3	5.50	7.80	7.40	12.00	O	O	3	1	1	1	1	2.4	1.0	2.4	-	O	O	-	-	O	1
85	AA001	91/2K	7060 /95	1894	ARCH/BR			68.90	4	6.30	7.50	7.40	10.00	O	O	-	2	2	2	1	2.0	2.0	2.0	O	O	-	-	-	O	5
1	AA002	99/1K	5880 /94		RCB			30.00	3	7.80	9.30	7.40	10.40	O	-	4	4	2	2	2	4.0	2.0	4.0	O			O			9
27	AA002	87/1K	5560 /94	1898	ARCH/ST			35.20	3	6.80	7.60	7.40	9.80	O	Δ	-	1	2	3	3	1.0	3.0	3.0					O		14
75	AA002	62/2K	8230 /94	1903	ST.TR/T/RCS		(Red)RCS	40.50	1	5.34	5.68			O	-	3	3	2	-	3	3.0	2.0	3.0	-	O			O		17
76	AA002	62/1K	8230 /94	1902	ST.TR/T/RCS		(Red)RCS	90.90	2	5.88	6.25	7.40	12.00	O	O	2	2	2	2	2	2.0	2.0	2.0	-	O			O		21
86	AA002	199/3K	3170/94		PSC/PRE			7.40	1	7.20	9.80			-	-	2	3	4	-	2	3.0	4.0	4.0					O		25
87	AA002	256/1K	1480 /94		PSC/PRE			4.85	1	4.95	5.60			O	-	4	2	3	-	2	3.2	3.0	3.2	O	O	O				29
212	AA002	138/1K	4120 /94	1973	PSC/PRE			62.48	3	10.40	11.90			O	-	2	4	3	2	2	4.0	3.0	4.0	-	O					33
79	AA003	43/1K	12620 /94	1918	ST.TR/T/COR	1995	(Wdn)Footway, under con	69.20	3	4.88	5.18	7.40	10.40	O	-	2	2	2	1	3	2.0	2.0	2.0	O	O	O				37
80	AA003	96/7K	2530 /94	1898	ST.TR/T/COR			106.03	4	3.94	4.24	7.40	9.80	O	-	4	3	2	2	2	3.2	2.0	3.2	O	O	O				42
43	AA004	206/9K	270 /93		ARCH/BR			39.40	3	4.25	4.70	7.40	9.80	O	-	-	2	2	1	2	2.0	2.0	2.0	O	O					46
44	AA004	196/7K	210 /93		RSJ/BUC			31.15	3	4.50	4.50	7.40	9.80	O	-	4	2	2	3	3	3.2	3.0	3.2	O	O	O				50
45	AA004	209/1K	270 /93		ARCH/CO			28.40	2	4.00	4.25	7.40	9.80	O	-	-	2	1	1	2	2.0	1.6	2.0	O	O					54
89	AA004	163/9K	940 /93		RSJ/COR			4.80	1	4.22	4.22			O	-	3	2	3	-	3	2.4	3.0	3.0	O	O	O				58
91	AA004	169/9K	940 /93		RC/BOX			13.80	3	6.70	7.30	7.40	9.80	O	-	-	4	4	3	-	4.0	3.0	4.0					O		62
178	AA004	192/2K	295 /93		ST.TR/D/COR			43.60	4	4.60	4.60	7.40	9.80	O	-	4	2	2	2	2	3.2	2.0	3.2	O	O	O				66
93	AA005	21/4K	4700 /94	1926	ST.TR/T/BUC			98.30	2	4.85	9.01	7.40	12.00	O	-	2	2	2	3	2	2.0	3.0	3.0	O	O					70
46	AA007	73/5K	1380 /94		ARCH/ST			11.70	1	5.20	5.80	6.80	9.20	O	-	-	1	1	-	1	1.0	1.0	1.0	O	O					75
47	AA007	70/8K	1380 /94	1918	ARCH/ST			14.57	1	5.30	6.30	6.80	9.20	O	-	-	2	3	-	1	2.0	3.0	3.0	O	O					79
99	AA009	5/1K	16240 /94	1860	ST.TR/D/COR	1939	(Wdn)Footway	124.80	6	6.70	10.30	7.40	12.90	O	O	3	2	2	2	3	2.4	2.0	2.4		O	O			O	83
2	AA010	75/1K	1110 /94		RSJ/COR			127.60	12	5.19	5.55	7.40	9.80	O	Δ	2	2	1	1	2	2.0	1.0	2.0	O	O	O				87
36	AA010	48/1K	3119 /94		RSJ/COR		(Red)RCS(A1~P1)	31.12	3	5.22	5.52	7.40	10.40	O	Δ	2	2	2	1	2	2.0	2.0	2.0	O	O	O				90
102	AA010	25/2K	3450 /94	1920	RSJ/COR	1979	(Wdn)Substructure	17.20	2	5.54	5.54	7.40	9.80	O	-	3	3	2	2	2	3.0	2.0	3.0	O	O	O				94
65	AA011	24/3K	1500 /93	1967	RSJ/RCS			9.70	1	5.30	5.65	7.40	9.80	O	O	2	3	2	-	2	3.0	2.0	3.0		O			O		98
103	AA012	16/1K	670 /94	1970	RCS			6.64	1	5.50	6.64			O	-			2	-	2	-	2.0	2.0					O		102
52	AA017	2/2K	1250 /93		RSJ/COR			10.50	1	4.30	4.30	6.80	9.20	O	-	3	3	1	-	1	3.0	1.0	3.0	O	O	O				106
77	AA019	3/2K	1992 /94	1869	ST.TR/T/COR RSJ/BUC			39.22 79.66	2 8	5.36 5.36	5.66 5.66	7.40	9.80	-	-	3 3	3 3	- 2	2 2	- 3	3.0 3.0	2.0 2.0	3.0	O		O	or O			110
53	AA021	36/3K	644 /94	1899	ST.TR/T/RCS		(Red)RCS	39.95	1	3.37	3.65	7.40	9.80	O	O	1	2	1	-	1	2.0	1.0	2.0	O	O					115
106	AA026	69/1K	1700 /94		RSJ/RCS			16.30	2	4.70	4.70	7.40	9.40	O	-	2	1	1	1	1	1.6	1.0	1.6	O	O					119
108	AA033	5/3K	3247 /94		RSJ/BUC			5.70	1	3.70	3.70	6.80	9.20	O	-	3	3	2	-	2	3.0	2.0	3.0	O	O	O				123
119	AB026	3/1K	-		ARCH/BR		(Wdn)RSJ/RCS	10.87	1	5.00	7.05	6.80	9.20	O	-	4 -	2 2	2 1	- -	2 -	3.2 2.0	2.0 1.0	3.2	O	O		O			127
175	AB027	1/2M	4750 /94		RSJ/COR			4.40	1	5.70	9.70			O	-	3	4	3	-	3	4.0	3.0	4.0				O			132
120	AB029	12/2K	2059 /94		RSJ/RCS	1994	(Red)COR→RCS (Rep)Con.Cov(MB) (Wdn)	4.25	1	7.03	7.03	7.40			-	3	3	2	-	2	3.0	2.0	3.0	O	O					136
30	B014	8/1K	1390 /91		RSJ/COR			20.70	2	5.50	5.60			O	-	3	3	2	3	3	3.0	3.0	3.0	O	O	O				140
122	B045	19/1K	540 /92	1992	ST.TR/T/RCS	Repair	(Rep)Prot.Con. Foundation	18.50	1	3.40	3.68			O	O	2	4	1	-	1	4.0	1.0	4.0	O			O			144
123	B079	23/2M	1999 /94		RCB		(Resuper)RCB	12.02	2	3.67	4.28	7.40	11.00	O	Δ	3	1	3	1	3	2.4	3.0	3.0	O	O					148
55	B093	8/10K	670 /89		RSJ/BUC			20.90	2	4.50	4.50	6.80	9.20	O	-	4	2	1	1	1	3.2	1.0	3.2	O	O	O				152
56	B093	3/7K	670 /89		RSJ/BUC			10.10	1	4.57	4.57	6.80	9.20	O	-	4	2	1	-	1	3.2	1.0	3.2	O	O	O				156
127	B093	12/2K	670 /89		RSJ/COR			10.20	1	4.25	4.25	6.80	9.20	O	-	4	2	3	-	1	3.2	3.0	3.2	O	O	O				160
128	B097	15/4K	120 /93	1915	ST.TR/T/RCS			14.67	1	3.09	3.09	7.40	9.80	O	O	4	3	4	-	3	3.2	4.0	4.0					O		164
66	B111	7/1K	6125 /94	1930	ST.TR/T/COR			36.80	2	5.50	5.50	7.40	11.00	O	Δ	2	3	2	2	1	3.0	2.0	3.0	O	O	O				168
31	B114	3/2M	480 /91		RSJ/RCS			12.38	2	3.03	3.45			O	-	2	4	2	4	3	4.0	4.0	4.0					O		172
57	B116	2/2K	1126 /93		RSJ/BUC	1991	(Wdn)Footway	9.20	1	4.50	5.65	6.80	9.20	O	-	3	3	2	-	2	3.0	2.0	3.0	O	O	O				176
129	B127	2/7K	1054 /94	1900	ARCH/BR			4.60	1	4.45	5.25	6.80	9.20	O	O(Ver)	-	4	3	-	3	4.0	3.0	4.0					O		180
130	B127	7/1K	1054 /94	1917	ST.TR/T/COR			24.73	1	4.16	4.54	7.40	9.80	O	-	1	2	1	-	2	2.0	1.0	2.0	O	O	O				184
131	B127	1/2K	1054 /94	1900	RSJ/COR		(Rep)Con.Cov(MB) outside beam only, (Rep)Pro.Con.founda., (Rep)Abutment	4.73	1	4.27	4.27	7.40	9.80	O	-	2	3	2	-	2	3.0	2.0	3.0	O	O	O				187
209	B146	21/1K	2620 /94	1861	ARCH/BR		(Wdn)RSJ/COR	4.40	1	6.26	7.26				-	- 3	2 3	- 2	-	2	3.0	2.0	3.0					O		191
210	B146	6/3K	2620 /94		RSJ/RCS			23.70	3	3.54	4.20			O	Δ	1	2	1	1	2	2.0	1.0	2.0	O	O					196
211	B146	8/3K	2620 /94	1942	RSJ/RCS			23.60	3	3.55	3.93			O	-	2	2	2	1	1	2.0	2.0	2.0	O	O					199

Table 6.2 LIST OF BRIDGES FOR PRELIMINARY BRIDGE INSPECTION (2/2)

SER No	ROUTE No.	BRIDGE No	TRAFFIC VOLUME (vpd)/year	YEAR OF CONST	TYPE OF BRIDGE	YEAR OF REPAIR	TYPE OF REPAIR	LENGTH EXST. (m)	NOS. OF SPAN	EXIST. WIDTH CARR. (m)	EXIST. WIDTH OVRAL (m)	PROP. WIDTH (RDA) CARR. (m)	PROP. WIDTH (RDA) OVRAL (m)	GEOM DEFECT Narrow (RDA)	GEOM DEFECT Poor align	STRUCTURAL DEFECTS(RATING) Deck	Main Frame	Abut.	Pier	Wing wall	Super-structure	Sub-structure	Overall Rating	PROPOSED TREATMENT Widen (RDA)	Repair	Re deck	Repl. superst.	Re const.	Bypass	Page
33	B157	12/3K	750/91	1945	ST.TR/T/RCS RSJ/RCS			51.00 17.85	1 2	3.30	3.64	6.80	9.20	O	-	3	4	2	2	1	4.0	2.0	4.0	O	O					203
58	B157	44/3K	750/91	1950	RSJ/RCS		(Rep)Con.Cov(MB) Abn.Steel Piers(P1-4)	10.35	1	3.68	3.96	6.80	9.20	O	-	2	2	2	(4)	-	2.0	2.0	2.0					O		207
59	B157	43/4K	750/91	1924	RSJ/BUC			51.00	5	3.20	3.56	6.80	9.20	O	-	2	2	2	2	2	2.0	2.0	2.0	O	O					211
67	B157	2/V2K	554/94	1960	RSJ/BUC		Abandoned Steel Piers	19.10	4	3.34	3.34	6.80	9.20	O	-	2	2	3	2	2	2.0	3.0	3.0	O	O	O				215
18	B158	16/7K	940/90	1935	RSJ/RCS		(Red)BUC⇒RCS	31.20	3	3.40	3.70	6.80	9.20	O	-	2	4	2	2	2	4.0	2.0	4.0	O			O			219
68	B164	1/5K	670/92		RSJ/BUC			46.9	4	4.55	4.55			O		3	3	4	3	3	3.0	4.0		O	O	O				
					(ext)		(Ext)PSC/PRE	50.6	5	4.90	6.14	6.00		O		1	1	1	1	3	1.0	1.5	4.0	O						223
208	B172	10/4K	300/93		BAILEY			18.30	1	4.12	4.12			-		(3)	(1)	-	-	-	(2.4)	-	(2.4)					O		228
69	B188	5/4K	873/95		ST.TR/T/RCS		(Red)COR⇒RCS	12.60	1	3.06	3.06	6.80	9.20	O	-	1	3	2	-	-	3.0	2.0	3.0	O						232
133	B188	5/2M	873/95		RSJ/BUC			9.00	1	3.60	3.60	6.80	9.20	O	O	4	1	1	-	1	3.2	1.0	3.2	O	O	O				236
79	B199	5/5K	1829/94	1918	RSJ/BUC	1995	(Wdn)Footway	124.40	12	4.52	4.52	7.40	10.00	O	-	4	3	2	1	2	3.2	2.0	3.2	O	O	O				240
19	B207	10/3K	1088/94	1890	ST.TR/T/COR	1997	(Rep)COR, Cross Beam	32.38	1	4.28	4.28	6.80	9.20	-		2	3	3	-	3	3.0	3.0	3.0	O	O	O				244
71	B227	1/5M	320/95	1994	PSC/PRE		(Repaint)	16.20	1	4.50	5.98	6.80	9.80	O	Δ	1	1	1	-	1	1.0	1.0	1.0	O						248
72	B248	9/4K	2210/92		ST.TR/T/COR			12.10	1	4.30	4.30	6.80	9.20	O	-	2	4	2	-	2	4.0	2.0	4.0	O			O			251
135	B249	5/9K	320/92		RSJ/BUC			9.30	1	4.60	4.60	6.80	9.20	O	O	3	3	3	-	3	3.0	3.0	3.0	O	O	O				255
20	B264	2V7K	1601/94		RSJ/COR			14.35	2	3.97	4.29	7.40	9.80	O	O	3	4	2	1	2	4.0	2.0	4.0	O	O		O			259
34	B264	7/1K	1601/94		ST.TR/T/COR			27.23	2	4.33	4.33	6.80	9.20	O	Δ	4	2	2	2	2	3.2	2.0	3.2	O	O	O				263
38	B265	8/1K	-		RSJ/T			17.02	3	3.19	3.49	6.80	9.20	O	-	4	4	4	4	4	4.0	4.0	4.0					O		267
136	B272	15/2K	1270/89		RSJ/DEC			30.50	5	4.28	4.28	7.40	9.80	O	-	1	2	3	2	3	2.0	3.0	3.0	O	O					271
195	B288	10/2K	8480/94		RSJ/COR			5.50	1	6.06	6.06			O	-	-	2	1	-	1	2.0	1.0	2.0	O	O	O				275
197	B288	10/3K	8480/94	1918	ST.TR/T/DEC			52.80	2	5.48	5.48			O	-	2	3	2	2	2	3.0	2.0	3.0	O	O	O				279
201	B288	10/5K	8480/94		ARCH/CO			7.20	2	6.00	8.06			O	-	-	1	2	-	2	1.0	2.0	2.0	O	O					283
70	B295	3/6K	8818/94	1960	RSJ/RCS			43.23	5	5.46	5.93	7.40	11.00	O	-	2	2	3	2	2	2.0	3.0	3.0	O	O					286
60	B300	15/6K	610/89	1933	CAUSEWAY			7.87	3	4.60	4.60	6.80	9.20	O	-	-	2	1	1	2	2.0	1.0	2.0					O		290
138	B304	25/3K	2000/91		RSJ/BUC			10.30	1	5.47	5.47	6.80	9.20	O	-	3	2	2	-	2	2.4	2.0	2.4	O	O	O				294
173	B304	17/1K	2000/91	1940	RSJ/BUC			6.80	1	5.55	5.70			O	-	2	3	3	-	2	3.0	3.0	3.0	O	O	O				298
202	B304	14/5K	2600/91	1993	BAILEY			9.15	1	4.42	4.80			-	-	-	-	(4)	-	(4)	-	(4.0)	(4.0)					O		302
139	B312	2V1K	310/91	1880	CAUSEWAY	Sch.1995		67.50	20	3.30	4.01	6.80	9.20	O	-	-	4	4	4	-	4.0	4.0	4.0					O		306
39	B349	30/2K	1410/95	1927	RSJ/COR			23.10	3	3.87	3.87	6.80	9.20	O	O	2	3	2	2	2	3.0	2.0	3.0	O	O	O				310
61	B379	7/6K	-		BAILEY			33.50	1	4.11	4.75	6.80	9.20	-	-	(4)	(1)	-	-	-	(3.2)	-	(3.2)					O		314
144	B379	1/1K	-		RSJ/RCS			3.10	1	5.50	6.38			O	-	4	4	2	-	2	4.0	2.0	4.0					O		318
147	B419	6/2K	2260/94		RSJ/BUC			9.94	1	4.35	4.68			O	-	2	3	3	-	2	3.0	3.0	3.0	O	O	O				322
148	B419	24/2K	2260/94		RSJ/BUC			8.40	1	3.60	3.60			O	-	3	3	3	-	2	3.0	3.0	3.0	O	O	O				326
21	B421	8/1K	875/94	1930	ST.TR/T/COR RSJ/BUC			26.22 10.50	1 1	4.22	4.22	6.80	9.20	O	-	4	2	2	2	2	3.2	2.0	3.2	O	O	O				330
40	B421	66/2K	1452/94	1930	RSJ/BUC			21.00	2	4.60	4.70	6.80	9.20			4	3	2	2	2	3.2	2.0	3.2	O	O	O				334
62	B423	29/3K	351/94		CAUSEWAY			15.02	4	3.00	3.66	6.80	9.20	O	-	-	4	3	2	-	4.0	3.0	4.0					O		338
63	B423	27/2K	351/94		CAUSEWAY			7.00	3	3.30	3.30	6.80	9.20	O	-	-	4	4	3	2	4.0	3.0	4.0					O		342
73	B423	44/3K	351/94		RCS			7.60	2	4.00	4.00	6.80	9.20	O	-	1	-	1	1	3	1.0	3.5	1.5	O	O					346
7	B425	20/4K	1380/93		PSC/PRE.RCB			139.18	18	5.85	6.85	7.40	11.00	O	-	1	4	3	1	4	4.0	3.0	4.0	O	O		O			350
22	B431	2/3K	460/92	1978	BAILEY			162.30	5	4.17	4.17	7.40	9.80	-	-	(2)	(1)	(1)	(1)	-	(1.6)	(1.0)	(1.6)					O		354
17	B437	3/1K	-		RSJ/BUC			10.35	1	3.42	3.42	6.80	9.20	O	-	3	2	3	-	2	2.4	3.0	3.0	O	O	O				357
32	B437	2/1K	-		RSJ/COR			10.20	1	3.70	3.70	6.80	9.20	O	-	3	2	4	-	2	2.4	4.0	4.0					O		361
150	B444	4/5K	1231/95		RSJ/COR			7.90	1	4.00	4.31	6.80		O	-	4	4	3	-	3	4.0	3.0	4.0	O	O	O				365
151	B445	14/2K	3912/94		RSJ/BUC			10.10	1	4.66	4.66	6.80		O	-	3	3	3	-	2	3.0	3.0	3.0	O	O	O				369
154	B445	14/3K	3912/94		RSJ/BUC			10.35	1	4.60	4.60	6.80		O	-	3	3	3	-	2	3.0	3.0	3.0	O	O	O				373
24	B454	19/2K	370/91	1937	RSJ/T			13.60	2	2.75	3.06	6.80	9.20	O	-	4	2	2	3	2	3.2	3.0	3.2	O	O	O				377
25	B454	6/6K	370/91		RSJ/RCS		(Rep)Con Cov(MB)	24.20	4	3.28	3.28	6.80	9.20	O	-	2	2	2	3	2	2.0	3.0	3.0	O	O					381
35	B454	3/1K	370/91	1945	RSJ/RCS		(Rep)Con Cov(MB)	22.30	5	3.30	3.30	6.80	9.20	O	-	2	2	4	4	4	2.0	4.0	4.0					O		385
41	B454	15/0K	370/91	1924	RCS			10.30	2	3.63	3.63	6.80	9.20	O	-	-	2	3	2	3	2.0	3.0	3.0	O	O					389
26	B462	10/1K	520/93		ST.TR/T/COR			19.00	1	4.00	4.26	7.40	9.80	O	-	3	2	2	-	1	3.0	2.0	3.0	O	O	O				393
42	B464	3/1K	1140/90	1904	ST.TR/T/COR			59.20	3	4.29	4.29	7.40	9.80	O	-	4	2	2	2	2	3.2	2.0	3.2	O	O	O				397
74	B466	6/5K	380/91	1940	RSJ/BUC			10.30	1	5.60	5.60	6.80	9.20	O	-	4	2	2	-	3	3.2	2.0	3.2	O	O	O				401

LIST OF ABBREVIATION & SYMBOL FOR TABLE 6.1 & 6.2

Type of Superstructure

ARCH/BR	Brick Arch Bridge
ARCH/CO	Concrete Arch Bridge
ARCH/S	Steel Arch Bridge
ARCH/ST	Stone Arch Bridge
BAILEY	Bailey Bridge
CAUSEWAY	Causeway Bridge
PSC/PRE	Prestressed Pretensioned Concrete Beam
PSC/POS	Prestressed Posttensioned Concrete Beam
RCB	Reinforced Concrete Beam Bridge
RCS	Reinforced Concrete Slab Bridge
RC/BOX	Reinforced Concrete Box Culvert
RSJ/BUC	Buckle Plate over Rolled Steel Joist
RSJ/COR	Corrugated Plate over Rolled Steel Joist
RSJ/DEC	Deck Plate over Rolled Steel Joist
RSJ/RCS	Reinforced Concrete Slab over Rolled Steel Joist
RSJ/T	Timber over Rolled Steel Joist
ST.TR/D	Steel Deck Truss
ST.TR/T	Steel Through Truss

Type of Repair

EXT	Extension of Bridge
RED	Re-decking
REP	Repair
RESUPER	Replacement of Superstructure
WDN	Widening of Bridge
MB	Main Beam

Geometric Defects

O	Defect existed
Δ	Better to be considered
(ver)	Vertical Alignment

Structural Defects (Rating)

1	No damage detected on the basis of the inspection results.
2	Damage has been detected and a follow-up survey is required.
3	There is significant damage and a detailed survey needs to be carried out to establish whether repair work is to be carried out or not.
4	There is substantial damage and urgent repair is required or the bridge has to be closed to traffic or restriction on vehicle weight to be imposed.

Proposed Treatment

O	Conceivable Treatment for the defects

6.2.2 Classification of Bridges Inspected

It is important to classify bridges under several types because every type has different way of rehabilitation.

(1) Superstructure

As there are 7 bridges which have multi-type of superstructures among 101 bridges, the total number of bridge is 108. The type of superstructure could be classified as follows:-

Table 6.3 Classification of Superstructure Type

Type of Bridge	No. of Bridge (%)	Type of Superstructure	No. of Bridge (%)
Wrought Iron/ Mild Steel Bridge	77 (71.3)	ST.TR / D	2 (1.9)
		ST.TR / T	20 (18.5)
		RSJ	54 (50.0)
		ARCH / S	1 (0.9)
Concrete Bridge	14 (13.0)	RCS	3 (2.8)
		RCB	3 (2.8)
		PSC / PRE	6 (5.6)
		ARCH / CO	2 (1.9)
Stone Masonry Bridge	3 (2.8)	ARCH / ST	3 (2.8)
Brick Masonry Bridge	5 (4.6)	ARCH / BR	5 (4.6)
Causeway	4 (3.7)	CAUSEWAY	4 (3.7)
RC Box Culvert	1 (0.9)	RC / BOX	1 (0.9)
Bailey Bridge	4 (3.7)	BAILEY	4 (3.7)
Total	108 (100.0)	Total	108 (100.0)

Wrought iron/mild steel bridges could be classified under the type of deck slab as follows:

Table 6.4 Classification of Deck Slab

Type of Bridge	No.	Type of Deck Slab	No.
ST.TR / D	2	COR	2
ST.TR / T	20	BUC	1
		COR	11
		DEC	1
		RCS	7
RSJ	54	BUC	22
		COR	15
		DEC	1
		RCS	14
		Timber	2
ARCH	1	COR	1
Total	77		77

Type of Deck Slab	No. of Bridge (%)
COR	29 (37.7)
BUC	23 (29.9)
RCS	21 (27.3)
DEC	2 (2.6)
Timber	2 (2.6)
Total	77 (100.0)

Span length for each type of superstructure is shown in Table 6.5.

Table 6.5 Classification of Span Length

Type of Superstructure	Span Length (M)	Span (M)	No.	Remarks
RSJ	3.1 ~ 10.8	3.1 < L ≤ 5.0	6	
		5.0 < L ≤ 8.0	13	
		8.0 < L ≤ 10.0	12	
		10.0 < L ≤ 10.8	22	
ST.TR / D	10.9 ~ 20.8	L = 10.9	1	
		L = 20.8	1	
ST.TR / T	12.1 ~ 51.0	12.1 < L ≤ 20.0	9	
		20.0 < L ≤ 30.0	5	
		30.0 < L ≤ 40.0	2	
		40.0 < L ≤ 50.0	3	
		50.0 < L ≤ 51.0	1	
ARCH / S		L = 23.0	1	
RCS	3.8 ~ 6.6	3.8 < L ≤ 6.6	3	
RCB	6.7 ~ 10.0	6.7 < L ≤ 10.0	3	
PSC / PRE	4.8 ~ 16.6	4.8 < L ≤ 7.0	1	
		7.0 < L ≤ 10.7	2	One T-beam brdg.
		10.7 < L ≤ 13.4	1	T-beam brdg.
		13.4 < L ≤ 16.2	1	
		16.2 < L ≤ 16.6	1	
ARCH / ST	6.0 ~ 9.9	6.0 < L ≤ 9.9	3	
ARCH / BR	4.4 ~ 15.4	4.4 < L ≤ 5.9	3	
		10.9 < L ≤ 15.4	2	
CAUSEWAY	2.3 ~ 3.8	2.3 < L ≤ 3.0	2	
		3.0 < L ≤ 3.8	2	
RC / BOX		L = 4.6	1	

There are 49 bridges of which the year constructed is known (the oldest bridge is No. 99, Katugastota Bridge constructed in 1860), and there are 37 bridges (80%) which were constructed within the era of British Dominion out of former. However, there are only 9 bridges (20%) which were constructed after the independence.

It is assumed that most of other bridges had been constructed in early 20th century by their materials used (wrought iron, mild steel, stone, brick, etc.). Bridges constructed in these years are recycled one in their materials except concrete bridges.

(2) Classification of Type of Superstructure

98 out of 101 bridges are classified under their type of abutment as follows (there are 3 bailey bridges which are serial No. 61, 202, and 208) (bridges of which serial are No. 57 and 58 have 2 different types of abutment.):

Table 6.6 Classification of Type of Abutment

Type of Abutment	No. of Bridge (%)
Stone Masonry	70 (70.0)
Brick Masonry	4 (4.0)
Concrete	18 (18.0)
RSJ	3 (3.0)
Caisson	4 (4.0)
Pile Bent	1 (1.0)
Total	100 (100.0)

55 bridges out of 101 bridges which are multi-span bridge are classified under their type of pier as follows (except 3 bailey bridges mentioned above.) (bridge of which serial is No. 68 has 2 different types of pier.):

Table 6.7 Classification of Type of Pier

Type of Pier	No. of Bridge (%)
Stone Masonry	27 (48.2)
Concrete	7 (12.5)
RSJ	9 (16.1)
Caisson	8 (14.3)
Pile Bent	3 (5.4)
RC Rigid Frame	1 (1.8)
Truss	1 (1.8)
Total	56 (100.0)

6.2.3 General Condition of Each Main Structure Member

Average part rating of each main structure is shown in Figure 6.1, which reveals the following findings regarding the general condition of each main structure.

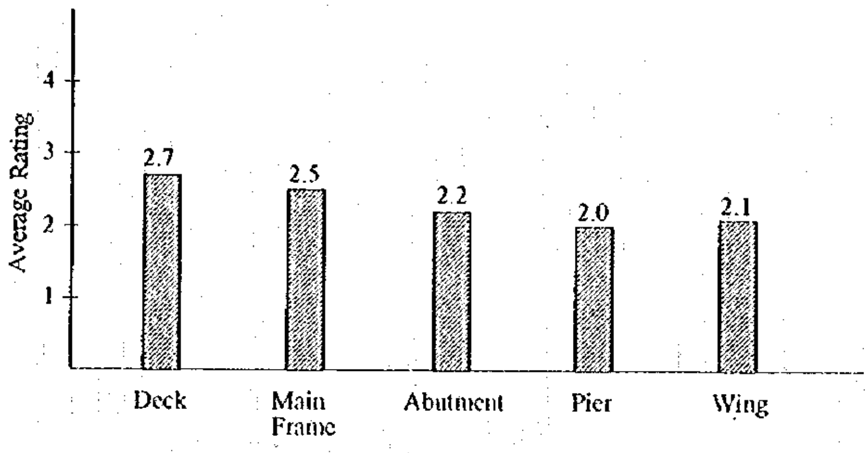

Figure 6.1 Average Rating of Each Main Structure

- Deck slab which is part of steel bridge has been deteriorated in advance as compared to other bridge members.

- In general, damage of superstructure is greater than damage of substructure.

6.2.4 General Bridge Condition of Each Bridge Type

The general bridge condition of each bridge type is indicated in Figure 6.2 which shows the average bridge rating of each bridge type. In this clause, average rating means average value of deck and main frame rating.

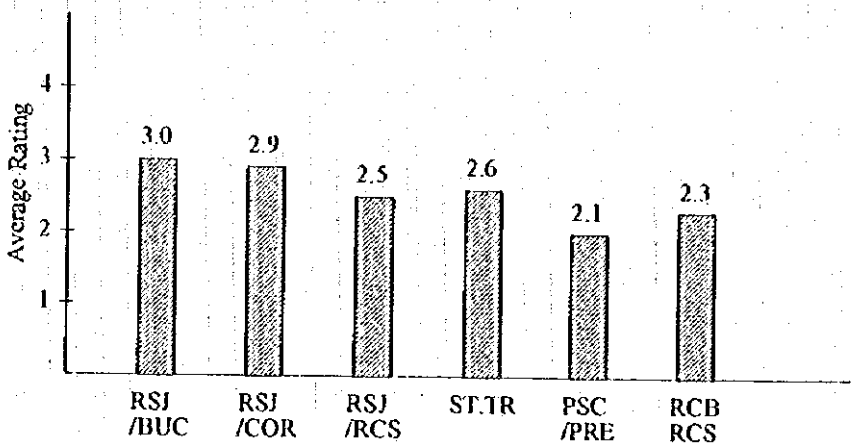

Figure 6.2 Average Rating of Each Bridge Type

- RSJ/BUC and RSJ/COR bridges are the most deteriorated type of bridges among other types of bridges.

- PSC/PRE bridges are generally in good condition.

6.3 Analyses of Preliminary Bridge Inspection Results

The purpose of this analyses is to study the general tendency of the damages observed in each bridge based on the results of damage condition rating and to assist in the planning of possible rehabilitation works which could deal with the various damages correspondingly in terms of type, degree and extent.

6.3.1 Present Condition of Superstructure

(1) Truss Bridge (22 bridges)

There are only 2 steel deck truss bridges, which are Katugastota Bridge of No. 99 and Nikapotha Bridge of No. 178, and others are steel through truss bridges. However, Gampola Bridge of No. 93 is the only steel through truss bridge which has upper lateral bracing, and rest of them are pony truss bridges. Bentota Bridges of No. 75 & 76 and Ritigaha Oya Bridge of No. 53 have portal braced (strut) main truss to prevent buckling.

Most of truss bridges are double warren truss bridges with no vertical member.

There are 18 bridges (82%) of which types are COR, DEC, or RCS, and with cross beam at truss panel point, cross beam for support range and longitudinal direction for deck span. And there are 4 bridges (18%) with stringer of which longitudinal direction shall be for deck span.

Cross section of main truss for most of pony truss bridges is " TT " of upper chord and " ⊥⊥ " of lower chord for long spanned bridge, and is " T " of upper chord and " ⊥ " of lower chord for short spanned bridge. Adding, wrought iron/mild steel is assumed to be used for these bridges with rivet connection because of their construction era of 1860 to 1945.

Serious damaged deck slab and corrosion at lower flange of cross section of lower chord are assumed to be main damage for truss bridges by observing free lime at bottom of the deck and damaged pavement such as pothole and crack.

Since no widening seems to be taken place, width (1 to 2 lanes, present) doesn't cope with the present traffic condition such as increasing traffic volume and heavy vehicles.

Especially for bridge which carries a bunch of pedestrian, footpath widening has been carried out by setting brackets at the panel points. However, carriageway widening hasn't done yet because of their structural difficulties. Most of bridges have carriageway width of under 6.0m except width of No. 99 Bridge with 6.7m width so that heavy vehicles can not be passed by each other on the Bridge.

Since truss bridge has its characteristics which is difficult to be widened for its structural aspect, therefore, it is needed to construct a new bridge next to that. Where the new bridge is constructed, it is assumed to be reasonable to detour traffic on the new one, and rehabilitation such as reconstruction of deck slab, reinforcing main girder and widening of footway should be taken place for the old bridge during the period. Bridges with narrow width of under 4m (No. 33, 53, 122, 128) have to be reconstructed in the future.

(2) Wrought Iron/Mild Steel Beam Bridge (54 bridges)

There are 54 bridges (50%) which hold wrought iron/mild steel beam out of 101 bridges (however, the number of types of bridges is 108). Main beam of most of these bridges is I-beam, but beam with angle steel braced web are used for the bridges of No. 147, 148, 210 & 211.

Deck slab can be classified into 5 types, however, main types of these are 1) with corrugated steel deck over main girder, 2) buckle plate type (with buckle plate over angle plate connected to web), 3) normal RC deck slab type.

Many bridges have their asphalt random pavement over stone pitching pavement (at construction). There are some bridges with exposed upper flange and without either concrete or stone pitching pavement.

Damage on deck slab is obvious because of observing its honey comb crack of asphalt pavement, rain permeation due to pavement characteristics, and free lime of bottom of deck slab. There is also serious corrosion of outside girder due to no cantilevering of deck slab.

There are many types of bridges with no parapet wall for abutment and embedded end of girder into concrete. There are much corrosion observed by rain permeation in this type.

Where corrosion is observed on outside girders, it is recommended to take some countermeasure such as covering girder with concrete after putting stirrup reinforcing bars and longitudinal reinforcing bars in main girder.

Bridges of buckle type and corrugated type need to be replaced to RC deck slab due to obvious damage of the deck. To minimize damage on outside girders, RC deck slabs definitely have to be cantilevered and held creasing. There are some bridges with enough cross section for their span length, therefore, it is assumed to be possible to cantilever some deck slab. Furthermore, covering girder with concrete increases rigidity of main beam so that it is useful.

PSC / PRE beams are used for the new girders for widening because the available span length of PSC / PRE is bigger than RSJ's span length. When PSC / PRE beams are combined with RSJ girders, RSJ girders should be covered with concrete.

Considering a road alignment and surrounding condition, widening work is divided into the following orders:

One side widening

- Repairing and widening of substructure
- Erection of PSC / PRE beams (construction for additional 1 lane)
- Traffic diversion (1 lane is available)
- Covering RSJ girders with concrete and redecking (2 lanes are available)

Both side widening

- Repairing and widening of substructure
- Erection of PSC / PRE beams at one side (construction for half lane)
- Traffic diversion (1 lane is available for temporary)
- Covering RSJ girders with concrete and redecking at the other side
- Traffic diversion (Final 1 lane available)
- Covering RSJ girders with concrete and redecking at the other side

The bridges which have big corroded main girders such like SER No. 75 are necessary to be reconstructed for superstructure.

(3) RCS (3 bridges), RCB (2 bridges)

Reinforced concrete bridges which locate at sea shore have damages due to sea salt effect, and it was seen that bottom side concrete of beams had been dropped and the reinforcement had been broken.

As a repairing measurement, it is recommended to clean the corroded surface of reinforcement and pat a resin concrete into defective area and bond a steel plate with epoxy resin injections. It is considered that the sea salt effect is not so considerable, concrete lining with resin mortar or paint is reasonable for repairing.

Reinforced concrete bridge in which main reinforcement is corroded evidently should be reconstructed.

(4) PSC / PRE (5 bridges)

SER No. 7 and 212 bridges which are located at sea shore have damage due to sea salt effect, and these are the same level with the damages of reinforced concrete bridges. The repairing for beam surface is similar to the case of RCS or RCB.

SER No. 86 (PSC / PRE l = 7.2m) is presumed to be constructed in recent years comparatively, and it was found that there was sure flaking of beam bottom due to differential settlement of abutment. Rehabilitation of the abutment and repairing of beams with steel plate bonding, and epoxy resin mortar injection are required.

SER No. 87 (PSC / PRE l = 4.8m) has no deck and load distribution is not expected, therefore, decking is necessary.

(5) Arch Bridge

(i) Wrought Iron Bridge (1 bridge) SER No. 84, Peradenia Bridge

Though there is not so big damage in main arch, the bottom plate of deck is corrugate and there is stain and free lime due to leak of water from surface of pavement. The steel members that support cantilever slab have corrosion caused by the above matter. It is recommended to redeck in early time.

Some white colour parts on arch member is considered to be effected by free lime from deck slab.

(ii) Concrete Arch Bridge (2 bridges)

No special abnormality was recognized in general. SER No. 45 bridge has side wall which consists of brick and it is seen that trees and grasses grow. It is required to demolish trees and grasses and carry out surface protection for wall and water protection for bottom side of pavement.

(iii) Stone Arch Bridge (3 bridges)

SER No. 27 bridge is located at sea shore and its surface shows deterioration due to sea waves and wind in about 100 years after construction. And piers have some strippings.

SER No. 47 bridge is located at the curved point of river, so some part of abutment foundation is affected by scouring. It is necessary to carry out river-bed protection in early time.

SER NO. 46 bridge is located at the curved point of road, so some part of handrails are broken by traffic accidents. There is no damage in main structure of this bridge.

(iv) Brick Arch Bridge (5 bridges)

Main damages of brick arch bridges are weathering and washout by infiltration water from pavement. SER No. 129 bridge shows deterioration throughout structure. There are trees and grasses growing at the surface of brick wall and they cause cracks on brick wall. Reconstruction is necessary for SER No. 129 bridge.

As for the other 4 bridges, it is required to clean the trees and grasses on the brick surface and carry out surface protection for wall and water protection for bottom side of pavement.

(6) CAUSEWAY (4 bridges)

Deck slab is reinforced concrete slab whose span length is 2.3 to 3.8m. Almost of all substructures have spread foundation on rock and the bottom side of the foundation shown abrasion through long term's erosion. Considering this situation, it is considered that there have been dip, settlement and displacement of substructure. There are big shear cracks due to the above conditions in every bridge. Especially SER No. 60 bridge has longitudinal crack through the main slabs of total spans. Other 3 bridges have some cracks on the main slab surrounded the substructure which is considered to cause settlement and etc.

Repair method can be divided into the following items:

- Short term measurement	:	additional reinforced concrete on the surface of deck
- Long term measurement	:	reconstruction with improvement of vertical alignment

(7) RC / BOX (1 bridge) SER No. 91

There are many serious cracks for the bridge as follows:

- Cracks which are shown in the bottom side of deck (bump is 11cm)
- Cracks in transverse direction of deck in the center of span
- Horizontal cracks at the center of depth in deck slab
- Horizontal cracks at the top of vertical wall

However, the existing bridge length is 13.8m, it is enough to reconstruct a new bridge using 3 x 5m length of span PSC beams crossing the river.

(8) BAILEY BRIDGE (4 bridges)

SER No. 22 bridge has 46m of maximum span length, and it was constructed for the transportation to electricity power station 18 years ago. No special abnormality was recognized in general.

The other three bridges are used for temporary bridge. since the wooden deck of SER No. 61 & 208 bridges have severe damage, urgent rehabilitation is required and reconstruction of bridges would be necessary in the feature.

6.3.2 Present Condition of Substructure

(1) Abutment

i) Stone Masonry Abutment

70 % of abutments which were investigated in this Study are stone masonry abutments, and typical damages are washout, crack and loose stone. There are 4 bridges whose abutments are required to be repaired immediately and these abutments have big crack due to washout of footing. There are 12 bridges which require detailed survey and rehabilitation for loose stone in near future.

Other 52 bridges have low level damages, and their rating points are less than 2. As the rehabilitation for these bridges, it is considered that footing protection with concrete and repair of loose stones should be carried out.

ii) Brick Masonry Abutment

The percentage of brick masonry abutment is 4 and some abutments have large cracks and broken bricks because weathering of brick hastens under continuous wet condition and brick have lost its durability. The crack which occurs on the surface of SER No. 32 bridge is 10cm of width, and the other 3 bridges also have been judged as rating point 3.

However, bricks are used for widening of abutment or construction of retaining wall, such using should be avoided considering character of brick.

iii) Concrete Abutment

18 bridges have concrete abutments, and this type will be used widely in the future.

There are 4 bridges which are judged as rating point 4, and these damage situation are as follows:

- SER No. 86 bridge : Settlement occurs because the foundation type is not suitable for ground condition.
- SER No. 91 bridge : Cracks occurs because the foundation is supported on rock and silt.
- SER No. 139 & 63 bridge : Settlement occurs because foundation of causeway is often eroded.

Since it is possible to presume cause of damages, powerful and positive countermeasure is necessary when reconstruction of bridge will be carried out.

Three bridges were judged as rating point 3 and their situations are as follows:

- SER No. 62 bridge	:	Erosion of causeway foundation
- SER No. 175 bridge	:	Deterioration of concrete due to sea salt effect
- SER No. 212 bridge	:	Horizontal cracks due to poor construction

Even though SER No. 86 & 212 bridge were constructed in recent years, big damages were seen in both bridges. So careful consideration is necessary in future construction stage.

iv) Other Abutments

There are 3 types of abutment other than the above types. RSJ type abutment was adopted in the case of deep bed rock, and caisson type abutment consists of 2 caissons and tie wall between both caisson. Pile-bent type abutment consists reinforced concrete piles and tie wall.

Main damage of these abutments is cracks, and it is advisable to adopt concrete cover as the rehabilitation method.

The damages of the other 5 bridges are not very serious, and rating points are less than 2.

(2) Pier

i) Stone Masonry Pier

This type is used in wide range and percentage of this type pier is 48. There is no bridge as rating point 4, and 3 bridges were judged as rating point 3. In the above 3 bridge, SER No. 27 bridge is scheduled to be reconstructed by the Kuwaiti Fund. Although the foundations of SER No. 44 & 93 bridges are washout, it is enough to protect the foundation with concrete cover.

The rating point of the other 23 bridges are less than 2. Since loose stones are seen in every bridge, rehabilitation for joint parts is necessary as the same as abutment.

ii) Concrete Pier

There are 7 bridges which have this type of pier, and 4 bridges are causeway. The ground which surround foundation is eroded and causes settlement and inclination of foundation.

The pier of SER No. 92 bridge has many cracks, and reconstruction is necessary. The damage of SER No. 123 & 212 bridges are little, and they keep good condition.

iii) RSJ Pier

This type is adopted in nine bridges, and the piers of 3 bridges (SER No. 59, 70, 136) keep this type from the first. The steel member of these piers are covered with concrete below the O.W.L. in order to avoid corrosion by water.

In the other 6 bridges, it is presumed that RSJ piers were added to the original piers for the purpose of rehabilitation after the construction of bridges. And damages of these bridges are as follows:

- SER No. 24, 30, 31, 38 bridges	:	Steel members are corroded because they are soaked in the river water and exposed to rain and sun.
- SER No. 25 bridge	:	Scouring of the ground which surrounds the foundation.
- SER No. 35	:	Pier was driven out by flood in the past years. The above damages are judged as rating point 3 or 4.

iv) Caisson Pier

This type is adopted in 8 bridges, and those situations are good.

v) Pile-bent Pier

This type is adopted only 3 bridges. Visual investigation on piles was impossible in SER No. 7 bridge because the water level was high at the time when the site survey was carried out, but there is possibility that the piles were damaged with sea salt.

The conditions of the other 2 bridges are good.

vi) Rigid Frame Pier

This type is adopted in the additional part of SER No. 68 bridge, and its condition is good.

vii) Trussed Pier

Trussed pier which consists steel support and bracing is adopted in SER No. 22 bridge (Bailey bridge), and its condition is good.

(3) Retaining Wall, Back-filling and Slope Protection of River Bank

As a general rule, many abutments jut out into the river in order to shorten a bridge length in Sri Lanka. And wing wall is impossible to be connected with abutment because the structure type of abutment is stone masonry or brick masonry. Therefore, retaining wall is used to cover back-filling instead of wing wall. The foundation of retaining wall is not so strong compared with abutment, and it is seen that there are many large cracks caused by scouring or settlement of the ground surrounding foundation.

Whereas there are no protections at the side embankment of abutment, and some parts of embankment have been washed away because of raining.

Slope protection of river bank should be given to the front of abutment and surrounding area because water flow changes greatly. Embankment will scoured unless this protection is carried out.

Retaining wall, back-filling, embankment and slope protection of river bank are also some part of bridge. Therefore lengthy and careful consideration should be given to these countermeasures in the future designs and reconstruction of bridges.