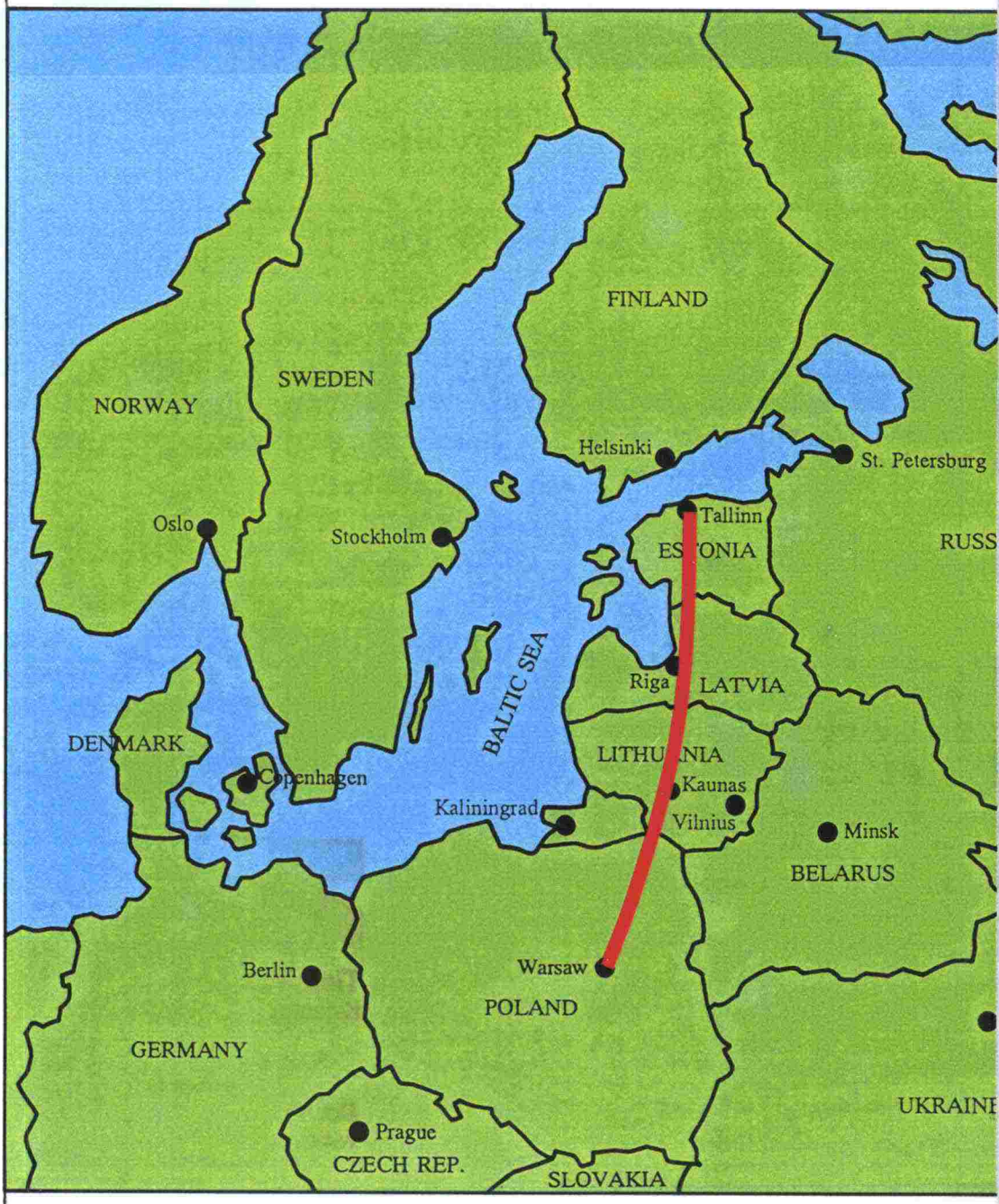
Ministry of Transport and Communications of Finland

VIA BALTICA BRIDGES

Summary of General Inspections



Helsinki
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FinnRA
Finnish National Road Administration

SUMMARY

After the Baltic-Polish-Finnish seminar on bridge management which took place in Finland in December 1992, it was decided that a Finnish-type general inspection of all bridges along the Via Baltica route would be carried out. The purpose of the bridge inspections was to obtain a better understanding of the true condition of the bridges and to reach proper and uniform conclusion concerning the Via Baltica bridges. The inspection consisted an ocular evaluation of the damages and a necessary surface testing by a concrete pressure gauge and/or an elastic hammer.

This study was financed by the Ministry of Transport and Communication of Finland and carried out by the Finnish National Road Administration and Jorma Huura Consulting Company, Finland, with the cooperation of the bridge experts of each country.

General inspections of the bridges of the Via Baltica were made over a two week period in May - June 1993. In Estonia 19 bridges, in Latvia 27, in Lithuania 32 and in Poland 23 bridges, a total of 101 different bridges were generally inspected.

When comparing the numbers of bridges, it must be remembered, that in Poland bridges are considered as structures with at least a 10 m free span. In Estonia the limit is 5 m and in Latvia and Lithuania 2 m.

In accordance with the inspection system principles and the time limit, only the repair actions and costs relating to the most significant damages (even so accounting for 80-90 % of total costs) were registered in the reports of each individual bridge. In this summary the total costs have been arrived at by increasing the costs of each bridge by 25 % in order to take into account smaller repair works and common costs. It also has to be noted that unit costs have been estimated according to the cost levels prevailing in Finland.

The total required repair expenditure is estimated to be approximately FIM 28,8 Million (equal to USD 5 Million). Repair costs of bridges which should be renovated within 3 years is estimated at FIM 14,5 Million, of which half are in Latvia.

Detailed conclusions and recommendations of the necessary repairs are drawn up in the technical report which is presented in the appendices.

As a general impression of all the bridges on the Via Baltica it can be stated that:

* *The general condition of the bridges is roughly at the same level as in Finnish bridges of similar age. Exceptions, of course, exist in either direction.*

* *One positive factor is the slight carbonization of the concrete in the bridges cast in-situ and the non-cracking of the concrete structures. The slight carbonization can be due to the good quality of the concrete and the low incidence of cracking may be caused by small traffic loads and volumes as compared with the planning values.*

* *There are in most cases good stairs and landings in ramps, so it is easy to move in the bridge areas. Stairs are very useful for bridge inspectors and maintenance personnel.*

* *Negative factors include the edge structures of the bridges and the lack of a drying system, which cause a great deal of unnecessary corrosion damage.*

* *There exist a large number of narrow bridges. The sidewalks of many bridges also seem to be unnecessary especially in the countryside. The drying system relative to the width of bridges requires a total solution which should also take into account the demands of the traffic-technical cross-section in different road areas.*

* *The frost resistance of the of concrete should be improved by introducing porosifiers and plasticisers.*

* *The expansion joint arrangements should be made watertight.*

Attitudes and enthusiasm towards bridge care are excellent in all the countries along the Via Baltica, but knowledge of repair methods and materials need to be improved. For example, protective agents of concrete and hot-galvanized or stainless steel are hardly used at all.

It is recommended that the Via Baltica should be designated as a development center regarding the upkeep of bridges in Estonia, Latvia, Lithuania and Poland. The training of bridge experts and development of bridge management system will help those countries to maintain and improve the present level of the bridges. The development of new advanced inspection system, repair methods and instructions is also important. Inspection of bridges and research activities are already at a good level Poland and Lithuania. Accordingly, cooperation can also be of advantage to Finland.

As a result of this study, it is recommended that the cooperation between Finland, Estonia, Latvia, Lithuania and Poland should be continued in the bridge sector, whereby one bridge repair project could be realized as a pilot project. This kind of special inspection and the repair scheme could be made in the spring of 1994 and the actual repair work could be carried out during of the summer 1994.

Bridge specialists from different countries would strictly monitor the different phases of the project and they could, if they wish, participate in the work. The project would be a suitable continuance of the Baltic-Polish-Finnish bridge seminar and the general inspections of the Via Baltica bridges. At the same time the frames and guidelines of the systematic education should be characterized.

VIA BALTICA BRIDGES

NEEDED REPAIR EXPENDITURE

Country	Number of bridges	Repair costs FIM	Costs per bridge
Estonia	19	5.307.000	279.300
Latvia	27	11.356.000	420.600
Lithuania	32	6.631.000	207.200
Poland	23	5.515.000	239.800
Altogether	101	28.809.000	285.200

VIA BALTICA BRIDGES

ESTONIA

Report of General Inspections 5-7 May 1993

by

Bridge Register of the Finnish Road Administration

Inspectors Jorma Huura
Antti Rämet

Reports Marja-Kaarina Söderqvist

VIA BALTICA BRIDGES IN ESTONIA

There are in total 19 bridges on the Via Baltica, Estonia. The total length is 618m, 8 bridges < 20m, 6 bridges 20-50m and 5 bridges > 50m. The average length is 32,5 m. The width of bridges is as follows: 4 bridges <7,5m, 5 bridges 7,5-9,5m and 10 bridges >9,5m. 17 bridges cross water and 2 are overbridges.

The condition of the bridges is rather good and at same level as bridges of the same age in Finland. There are many bridges made of elements and the carbonization of concrete in these bridges is quite high. The situation of the cast-in-situ bridges is normal and in many case cracking is quite slight.

There is only a low level of cracking of the concrete structures resulting from small traffic loads and high planning values.

It seems to be relatively easy to arrange adequate control and maintenance of bridges in Estonia. Some advanced new inspection and repair methods, as well better scheduling of actions, might need to be developed.

It was estimated that required repair expenditures of 19 bridges on the Via Baltica in Estonia total about FIM 5,3 Million. The extent of repair actions and costs are based upon a preliminary and mainly ocular estimate. Final costs may increase considerably as a result of special inspections and more detailed planning. Detailed damage types, needed repair measures, the extent and unit prices as well as urgency classification per each bridge are presented in the technical report which is annexed to this study.

There is no particular bridge in Estonia which needs emergency repair, but it was estimated that 7 bridges should be repaired within 3 years. The repair costs of these bridges will be FIM 2,4 Million.

The general conditions of the bridges in Estonia are similar to those in other Baltic countries and in Poland. The following observations can be made based on a preliminary ocular inspection.

On the edges of bridges, concrete has deteriorated due to the structural solution and deficiencies in the drainage system. For repairing the edges, a standardized solution with a drainage system should be designed. Waterproofing should be made using rubberized bitumen sheets.

Precast concrete structures suffer from reinforcement corrosion due to a too thin concrete cover and the carbonization of the concrete. The deterioration is critical to the durability of the structures. The basic solution for repair action is concreting by spraying. This is the case in bridges made of elements. The condition of cast-in-situ bridges is quite good.

Parapets do not always fulfil the requirements of traffic safety. Parapets should be reconstructed to be stronger and lengthened with rails on the road. The rehandling of parapet painting has, in most cases been done carelessly, allowing corrosing to begin within a few years. In surface treating, hot-dip galvanizing should be used and painting methods should also be checked.

The narrow bridges should be widened. This could be carried out quite easily while repairing the edges of the bridge. The required standardized horizontal clearance of bridges should be determined and attention paid to the needs for widening when planning repair works. In some bridges in the countryside the narrow sidewalks seem to be unnecessary.

The most important elements are in order with regard to taking care of bridges, but the knowledge of the latest inspection and repair methods and materials could still be developed. By scheduling maintenance and repair actions correctly and more precisely, deterioration will be prevented and the service level, which fulfills the requirements of traffic safety, and the optimal service life of bridges are guaranteed.

VIA BALTICA BRIDGES, ESTONIA

SUMMARY OF NEEDED REPAIR INVESTMENTS

No	Name	L	FIM	Urg.cl.
ES-1	Topi I & II	27 m	154.000,-	3.
ES-2	Jögisoo I & II	73 m	258.000,-	2.
ES-3	Maidla I & II	27 m	147.000,-	2.
ES-4	Ääsmäe I	67 m	158.000,-	3.
ES-5	Ääsmäe II	67 m	175.000,-	3.
ES-6	Kernu	5 m	8.000,-	2.
ES-7	Kongu	6 m	12.000,-	2.
ES-8	Ruunavere	16 m	250.000,-	2.
ES-9	Vardi	16 m	250.000,-	2.
ES-10	Konnaveski	11 m	168.000,-	3.
ES-11	Konuvere	110 m	-	-
	(New bridge under construction)			
ES-12	Päärdu	41 m	1.500.000,-	2.
ES-13	Jädivere	25 m	71.000,-	3.
ES-14	Langermaa	7 m	28.000,-	3.
ES-15	Postioja	11 m	177.000,-	3.
ES-16	Angoja	3 m	7.000,-	3.
ES-17	Käära	24 m	80.000,-	3.
ES-18	Nurme	52 m	1.815.000,-	3.
ES-19	Rannametsa	29 m	49.000,-	3.

2.425.000 FIM = Σ 2.
2.882.000 FIM = Σ 3.

5.307.000 FIM = ΣΣ

Urgency classification:
1. To be repaired within one year
2. To be repaired within three years
3. To be repaired later

In accordance with the inspection system principles only the repair actions and costs of most significant damages, causing 80-90 % of total costs, are registered in the reports of each individual bridge. In this summary the total costs have been arrived at by increasing the costs of each bridge by 25 % in order to take into account smaller repair works and common costs.

NOTE. The extent of repair actions and costs are based upon a preliminary ocular estimate. Final costs may increase considerably as a result of special inspections and more detailed repair planning.

BRIDGES OF ESTONIA

Code	REPAIR MEASURES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
	FOLLOW UP																			3
	Inspection of corrosion state of the vault												2							
100	**CONCRETE STRUCTURES**																			
101	Replacement of the edge beam													3	3					
102	Repair of the structure by casting	3	2		3	3	2		(2)	(2)			2	3	3			3		
105	Patching without shuttering				3												3			
106	Patching using shuttering					2														
107	Ejection													3	3					
108	Applying gunite to concrete surfaces	3	2						(2)	(2)										
109	Applying gunite to concrete structures								(2)	(2)			2							
110	Injection of a crack using epoxy													3						
115	Concrete surface treatment			2	3	3		3						3				3		3
200	**STEEL STRUCTURES**																			
201	Replacement of railing							1	(2)	(2)	3		2	3	3			3		
205	Repair of rail post connection to deck																			2
207	Patch painting																			2
208	Repainting	2	3	2	3	3	2													
209	Maintenance of bearings																	3		
400	**STONE STRUCTURES**																			
404	Embedding a stone structure into concrete										3									
500	**DRAINAGE EQUIPMENT**																			
505	Constr. of drainage for exp. joint / bridge seat				3	3														
600	**JOINTS**																			
603	Replacement of an exp. joint elastic strip		2	2														3		
608	Sealing the joint superstr./prefabr.		2																	
609	Repair of area betw. bridge and emb.																			3
700	**WATERPROOFING AND SURFACINGS**																			
701	Replacement of surfacings								(2)	(2)			2							
703	Replacement of the wearing course		3		3	3														
704	Repair of the waterproofing	3	2	2																
709	Replacement of the thin layer pavement																			3
800	**BRIDGE FURNISHINGS**																			
804	Construction of a concr. slab revetment		3																	
806	Construction of a peat revetment							2									3			
809	Constr. of a revetm. of stones 150...250 mm																	3		
812	Construction of a retaining wall										3									
900	**MAJOR REPAIR AND RECONSTRUCTION**																			
901	Widening of a bridge										3									
904	Replacement of the superstructure															(3)			(3)	
	Rebuilding of the bridge																		3	
	Rebuilding as an arch bridge								2	2						3				
	Comprarison with rebuilding costs												?							
	The bridge will be removed from service											2								

1 = To be repaired within one year
2 = To be repaired within three years
3 = To be repaired later
? = Alternative

VIA BALTICA BRIDGES

LATVIA

Report of General Inspections 3-5 May 1993

by

Bridge Register of the Finnish Road Administration

Inspectors Jorma Huura
Anti Rämet

Reports Marja-Kaarina Söderqvist

VIA BALTICA BRIDGES IN LATVIA

This paper is based upon the general inspections of Via Baltica bridges in May and June 1993. All bridges on the Via Baltica in Baltic countries and in Poland were inspected. There were 101 bridges in all, of which 27 were in Latvia. The cooperating inspector with the undersigned was consulting engineer Jorma Huura, who has specialized in inspections and repair procedures of bridges. Accompanying persons from the Latvian Road Administration were Ojars Gulbis and Vilnis Urbanovics.

There are in total 27 bridges on the Via Baltica, Latvia. The total length is 1745 m, 6 bridges < 20 m, 10 bridges 20-50 m and 11 bridges > 50 m. The average length is 64,6 m. The width of bridges is as follows: 8 bridges < 7,5 m, 9 bridges 7,5-9,5 m and 10 bridges > 9,5 m.

The condition of Via Baltica bridges in Latvia is a little worse than in other countries, yet the problems are much the same. Defects due to exceeding the bearing capacity fortunately occur rather seldom therefore the bridges can be rehabilitated by the usual repair actions. It is important to start the repair works without delay, because through deferring activities the damages are rapidly worsening while the urgency for repair actions together with the expense is increasing.

On the edges of bridges concrete has deteriorated due to the structural solution and the deficiencies of the drainage system. For repairing the edges, a standardized solution together with a drainage system should be designed.

Precast concrete structures suffer from reinforcement corrosion due to a too thin concrete cover and the carbonization of the concrete. This deterioration is critical to the durability of the structures. The basic solution for repair action is concreting by spraying.

Parapets do not always fulfil the requirements of traffic safety. Parapets should be reconstructed so as to be stronger and lengthened with rails on the road.

The prehandling of parapet painting has been done carelessly allowing corrosion to begin within a few years. In surface treating, hot-dip galvanizing should be used and the painting method should also be checked.

Steel bearings have not been taken care at all and they are totally corroded. Maintenance of bearings could also be carried out as an independent project by a group which would specialize in this work.

Surface components of bridge decks are damaged, and their renovation needs a solution of principle. Waterproofing should be made by using rubberized bitumen sheets.

There are a considerable number of narrow bridges in Latvia. In many cases widening can be carried out quite easily while repairing the edges of the bridge. That is why the required standardized horizontal clearance of bridges should be determined and attention paid to the needs of widening when planning repair works. On several bridges in the countryside the narrow sidewalks seemed to be unnecessary.

The persons who are responsible for bridges want and are able to take care of the bridges if the financial preconditions are made clear to them. The main matters are in order, but knowledge of the latest inspection and repair methods and materials can be improved.

Bridges are a great national asset in all countries - so too in Latvia. By maintaining and repairing, purposeless deterioration is prevented and so the service level, which fulfills the requirements of traffic safety, and the optimal service life for bridges are guaranteed.

VIA BALTICA BRIDGES, LATVIA

SUMMARY OF NEEDED REPAIR INVESTMENTS

No	Name	L	Constr.	FIM	Urg.cl.
LA-1	Krisupe	9 m	1959	93.000,-	2.
LA-2	Salaca	181 m	1959	2.164.000,-	2.
LA-3	Svetupe	38 m	1979	131.000,-	3.
LA-4	Vitrupe	45 m	1957	177.000,-	3.
LA-5	Liepupe	20 m	1956	252.000,-	3.
LA-6	Age	25 m	1963	141.000,-	3.
LA-7	Kisupe	23 m	1952	237.000,-	2.
LA-8	Peterupe	20 m	1958	75.000,-	3.
LA-9	Incupe	13 m	1954	56.000,-	3.
LA-10	Bazenurga	6 m	1960	32.000,-	2.
LA-11	Railway overpass Riga-Saulkrasti	136 m	1962	312.000,-	3.
LA-12	Lilaste	28 m	1957	133.000,-	3.
LA-13	Gauja	222 m	1954	1.618.000,-	2.
LA-14	Baltezera kanals	38 m	1956	295.000,-	2.
LA-15	Railway overpass Riga-Sigulda	50 m	1968	138.000,-	3.
LA-16	Highway overpass Riga-Pskov	66 m	1968	271.000,-	3.
LA-17	Liela Jugla	70 m	1968	260.000,-	2.
LA-18	Maza Jugla	70 m	1968	291.000,-	3.
LA-19	Railway overpass Riga-Krustpils	57 m	1968	482.000,-	2.
LA-20	Highway overpass Riga-Daugavpils V-T	57 m	1968	226.000,-	3.
LA-21	Highway overpass Riga-Daugavpils T-V	59 m	1972	281.000,-	3.
LA-22	Daugava	265 m	1970	1.617.000,-	3.
LA-23	Kekava	14 m	1972	118.000,-	2.
LA-24	Misa	46 m	1957	454.000,-	2.
LA-25	Iecava	30 m	1959	241.000,-	3.
LA-26	Memele	139 m	1960	1.076.000,-	2.
LA-27	Ceraukste	18 m	1963	185.000,-	2.

7.014.000 FIM = Σ 2.
4.342.000 FIM = Σ 3.
11.356.000 FIM = ΣΣ

Urgency classification:
1. To be repaired within one year
2. To be repaired within three years
3. To be repaired later

In accordance with the inspection system principles only the repair actions and costs of most significant damages, causing 80-90 % of total costs, are registered in the reports of each individual bridge. In this summary the total costs have been arrived at by increasing the costs of each bridge by 25 % in order to take into account smaller repair works and common costs.

NOTE. The extent of repair actions and costs are based upon a preliminary ocular estimate. Final costs may increase considerably as a result of special inspections and more detailed repair planning.

VIA BALTICA
BRIDGES OF LATVIA

Code	REPAIR MEASURES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
	FOLLOW UP																			2	2							
100	**CONCRETE STRUCTURES**																											
101	Replacement of the edge beam			3	3																							
102	Repair of the structure by casting	2	2			3	3	2	3	3	2		3	2-3	2	3	3	2	3	2	3		3	2	2	3	2	2
105	Patching without shuttering		2		3				2	3													3					
108	Applying gunite to concrete surfaces	2	2	3		3	3	2-3				3			3	2	2			2				3	2	3	2	2
110	Injection of a crack using epoxy												3															
111	Injection using cement grouting																							3				
115	Concrete surface treatment																	3	3		3	2-3				3	3	
200	**STEEL STRUCTURES**																											
201	Replacement of railing	2	2				3	2	3	3	2	3	2		2		3	3	3	2	3	3		2	2	3	2	2
202	Replacement of steel member						3													2								
207	Patch painting			2																								
208	Repainting					3						3		2		3												
209	Maintenance of bearings		2						3			3		2				3	3					3		3		
213	Adjusting the position of a bearing		2																					3		3	2	3
500	**DRAINAGE EQUIPMENT**																											
507	Construction of a downspout (upper part)																						3					
600	**JOINTS**																											
602	Replacement of expansion joint devices		2											2									1					
603	Replacement of an exp. joint elastic strip																		2	2								
605	Sealing the joint of edge beam w. joint filler																				3	2						
609	Repair of area betw. bridge and emb.							2				2				2	2	1				2						3
700	**WATERPROOFING AND SURFACINGS**																											
701	Replacement of surfacings	2	2		3	3		2	3	3	2		3	2	2	3	3	2	3	2	3		3	2	2	3	2	3
702	Replacement of pavements					1																						
703	Replacement of the wearing course						2																					
705	Sealing of pavement cracks										2		3								2							
706	Repair of pavements (also rut repair)			1						1						2		1										
800	**BRIDGE FURNISHINGS**																											
802	Construction of a rip-rap revetment	2																										
803	Construction of a stone revetment																											
804	Construction of a concr. slab revetment					1	3		3							3						3					
809	Constr. of a revetm. of stones 150...250 mm											3			3													3
810	Construction of gabions		2																									
814	Repair of an erosion damage									2														2	2			
900	**MAJOR REPAIR AND RECONSTRUCTION**																											
901	Widening of a bridge													?														
904	Replacement of the superstructure		?																									
	Renovation of bridge (incl. plan and inspect.)		1					2					3	2	3					2					2	3	2	2

1 = To be repaired within one year
2 = To be repaired within three years
3 = To be repaired later
? = Alternative

VIA BALTICA BRIDGES

LITHUANIA

Raport of General Inspections 9-11 June 1993

by

Bridge Register of the Finnish Road Administration

Inspectors Jorma Huura
Antti Rämet

Reports Marja-Kaarina Söderqvist

VIA BALTICA BRIDGES IN LITHUANIA

There are in total 32 bridges on the Via Baltica in Lithuania. The total length is 1034m, 12 bridges < 20m, 12 bridges 20-50m and 8 bridges > 50m. The average length is 32 m. The width of bridges is as follows: none <7,5m, 9 bridges 7,5-9,5m and 23 bridges >9,5m. 26 bridges are across water and 6 are overbridges.

The general condition of the bridges is slightly worse than that of bridges of similar age in Finland. There are also many bridges made of elements in Lithuania. The carbonization of the concrete within these bridges is quite high. The situation of the cast-in-situ bridges is better.

The condition of bridges is regularly monitored and there is detailed information on the condition of each bridge. Unfortunately, the financial resources seem to be inadequate for regular maintenance and needed repair actions.

It seems that there is the need for developing new methods for inspecting and analyzing the actual reasons for damages.

It was estimated that needed repair expenditures on 32 bridges on the Via Baltica in Lithuania total about FIM 6,6 Million. The extent of repair actions and costs are based upon a preliminary and mainly ocular estimate. Final costs may increase considerably as a result of special inspections and more detailed planning. Detailed damage types, required repair measures the extent and unit prices, as well as urgency classification per each bridge, are presented in the technical report which is annexed to this study.

There is only one bridge in Lithuania which needs emergency repair and 11 bridges which should be repaired within 3 years. The repair costs of these bridges will be FIM 2,0 Million. It is recommended that the repair works of these bridges should be started without delay because the damages will worsen and the urgency for repair actions together with the expense will grow yearly. It is also recommended that the highway bridges are given special attention.

Detailed lists of damages and required repair measures are listed in the technical report. But here are some general observations made according the general ocular inspection.

On the edges of bridges, concrete has deteriorated due to the structural solution and the deficiencies of the drainage system. In most cases the sidewalks are lacking any drainage arrangements. For repairing the edges a standardized solution with a drainage system should be designed. Waterproofing should be made using rubberized bitumen sheets.

Precast concrete structures suffer from reinforcement corrosion due to too thin concrete cover and the carbonization of concrete. The situation concerning element bridges is worst, while the condition of cast-in-situ bridges is better. The deterioration is critical to the durability of the structures. The basic solution for repair action is concreting by spraying.

Parapets do not always fulfil the requirements of traffic safety. Parapets should be reconstructed to be stronger and lengthened with rails on the road. The prehandling of parapet painting has been carried out carelessly, allowing corrosion to begin within a few years. In surface treating, hot-dip galvanizing should be used and the painting method should also be checked.

Maintenance of steel bearings should be carried out as an independent project. The bearings should be protected against corrosion and a special group could be trained to be specialized this work.

The main elements are in order with regarding to taking care of the bridges, but the knowledge of the latest inspection and repair methods and materials need to be developed. By scheduling maintenance and repair actions correctly and precisely, deterioration will be prevented and the service level, which fulfills the requirements of traffic safety, and the optimal service life of bridges are guaranteed. The financial preconditions must be fulfilled.

VIA BALTICA BRIDGES, LITHUANIA

SUMMARY OF NEEDED REPAIR INVESTMENTS

No	Name	L	Constr.	FIM	Urg.cl.
LI-1	Tatula	48 m	1993	(new)	-
LI-2	Viesmuo	25 m	1963	190.000,-	2.
LI-3	Pyvesa	42 m	1962	188.000,-	2.
LI-4	Svalia	29 m	1978	141.000,-	3.
LI-5	Istras	24 m	1961	165.000,-	2.
LI-6	kanalas	13 m	1938	68.000,-	2.
LI-7	Istras	11 m	1938	69.000,-	2.
LI-8	Levuo	59 m	1935	402.000,-	3.
LI-9	Upyte	8 m	1939	78.000,-	2.
LI-10	Nevezis	71 m	1956	304.000,-	3.
LI-11	Dotnuvele	24 m	1956	411.000,-	3.
LI-12	Smilga	24 m	1957	442.000,-	2.
LI-13	Susve	51 m	1953	493.000,-	2.
LI-14	Cinkiskio	57 m	1975	285.000,-	3.
LI-15	tunelinis prav.	6 m	1972	46.000,-	3.
LI-16	Paneveziuko	50 m	1975	331.000,-	3.
LI-17	Nevezis	101 m	1975	685.000,-	3.
LI-18	Gyne	50 m	1975	441.000,-	3.
LI-19	tunelinis prav.	6 m	1974	78.000,-	3.
LI-20	Gailiusiu	39 m	1974	412.000,-	3.
LI-21	Apzeld.tr	39 m	1974	269.000,-	3.
LI-22	kanalas	6 m	1932	5.000,-	1.
LI-23	kanalas	7 m	1930	C 150.000,-	3.
LI-24	Vabalksne	20 m	1930	69.000,-	3.
LI-25	kanalas	10 m	1930	C 150.000,-	2.
LI-26	Sasna	22 m	1930	105.000,-	2.
LI-27	Raisupka	11 m	1937	C 150.000,-	3.
LI-28	kanalas	6 m	1930	C 150.000,-	3.
LI-29	Marijampole c.	100 m		194.000,-	3.
LI-30	kanalas	14 m	1930	58.000,-	3.
LI-31	kanalas	8 m	1930	28.000,-	2.
LI-32	Sesupe	49 m	1992	74.000,-	3.

(C = will be rebuilt as a culvert)

5.000 FIM	= Σ 1.
1.976.000 FIM	= Σ 2.
4.650.000 FIM	= Σ 3.
6.631.000 FIM	= ΣΣ

Urgency classification:

1. To be repaired within one year
2. To be repaired within three years
3. To be repaired later

In accordance with the inspection system principles only the repair actions and costs of most significant damages, causing 80-90 % of total costs, are registered in the reports of each individual bridge. In this summary the total costs have been arrived at by increasing the costs of each bridge by 25 % in order to take into account smaller repair works and common costs.

NOTE. The extent of repair actions and costs are based upon a preliminary ocular estimate. Final costs may increase considerably as a result of special inspections and more detailed repair planning.

VIA BALTICA
BRIDGES OF LITHUANIA

Code	REPAIR MEASURES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
	FOLLOW UP														3							3	3										
100	**CONCRETE STRUCTURES**																																
101	Replacement of the edge beam		3				2	3	3	2	3	3	2		3		3	3	3	3	3				3		3	3			3		
102	Repair of the structure by casting			3	2-3	2	2	2			3			2				1									2	3			2	2	
105	Patching without shuttering																					2									3		
107	Ejection																3																
108	Applying gunite to concrete surfaces		2	2-3		2	2	2	3	2	3	3	2-3	3											3	2-3		3		3	3	2	
111	Injection using cement grouting												2																				
115	Concrete surface treatment				3											3		3	3	3	3	3								3			2
200	**STEEL STRUCTURES**																																
201	Replacement of railing									2				2				3		3			1		3						3	2	
208	Repainting		3	3	3	3	3	3	2		3	3	3		3		3		3		3	3				3	2	3		3			3
209	Maintenance of bearings											2																					
	Calculation of load bearing capacity																										2						
400	**STONE STRUCTURES**																																
404	Embedding a stone structure into concrete																									2							
500	**DRAINAGE EQUIPMENT**																																
508	Extension of a downspout																				2												
600	**JOINTS**																																
608	Sealing the joint superstr./prefabr.																	2															
609	Repair of area betw. bridge and emb.			2		2			2		2				2	3	2	2	2		2	2								2			
700	**WATERPROOFING AND SURFACINGS**																																
701	Replacement of surfacings									2		2	2																				
702	Replacement of pavements													2	2																		
703	Replacement of the wearing course																2																
705	Sealing of pavement cracks						2	3	2											3													
706	Repair of pavements (also rut repair)										1																						
800	**BRIDGE FURNISHINGS**																																
803	Construction of a stone revetment								2																								
804	Construction of a concr. slab revetment		2	2	2									2																		2	
813	Repair of an approach embankment			2																													
814	Repair of an erosion damage											2										2											
900	**MAJOR REPAIR AND RECONSTRUCTION**																																
901	Widening of a bridge									?																							
904	Replacement of the superstructure																										?						
	Rebuilding of the bridge					?																											
	Rebuilding as a culvert																							3		?		?	3				
	Comprarison with rebuilding costs									2																							

1 = To be repaired within one year
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VIA BALTICA BRIDGES
POLAND

Report of General Inspections 7-9 June 1993

by

Bridge Register of the Finnish Road Administration

Inspectors	Jorma Huura Antti Rämet
Reports	Marja-Kaarina Söderqvist

VIA BALTICA BRIDGES IN POLAND

There are in all 23 bridges on the Via Baltica outside town areas in Poland. The total length is 1012m, 10 bridges < 20m, 8 bridges 20-50m and 5 bridges > 50m. The average length is 44 m. The width of bridges is as follows: 11 bridges <7,5m, 7 bridges 7,5-9,5m and 5 bridges >9,5m. 19 bridges cross water and 4 are overbridges.

The condition of bridges made of elements is not very good, mainly because of carbonization of the concrete. The situation of the bridges cast on site is better but conditions within the structure one bridge can vary a great deal.

Bridge maintenance in Poland seems to be of quite a high level. The condition of bridges is regularly monitored and the bridge management system is under way. The financial resources also seem to be quite good.

There seems to be a need for developing methods for inspection and analyzing the reasons for damages. Also the scheduling of actions might need to be developed.

It was estimated that required repair expenditure 23 bridges on the Via Baltica in Poland will be totally about FIM 5,5 Million. The extent of repair actions and costs are based upon a preliminary and mainly ocular estimate. Final costs may increase considerably as a result of special inspections and more detailed planning. Detailed damage types, required repair measures, the extent and unit prices as well as urgency classification per each bridge are presented in the technical report which is annexed to this study.

There are no bridges in Poland which need emergency repairs, but it was estimated that 12 bridges should be repaired within 3 years. The repair costs of these bridges will be FM 3,2 Million.

On the edges of bridges concrete has deteriorated due to the structural solution and deficiencies in the drainage system. There is no drainage system for sidewalks, and on some bridges sidewalks seem not to be needed.For repairing the edges and also sidewalks a standardized solution with drainage system should be designed. Waterproofing should be made using rubberized bitumen sheets.

Precast concrete structures suffer from reinforcement corrosion due to too shallow concrete cover and the carbonization of concrete. This is the case especially in element bridges, the situation concerning cast-in-situ bridges is better. The deterioration is critical to the durability of the structures. The Basic solution for repair action is concreting by spraying; but in many cases corrosion is already so advanced that the best solution is a cathodic protection.

Parapets are missing in some cases and some parapets do not fulfil the requirements of traffic safety. Parapets should be reconstructed to be stronger and lengthened with rails on the road. The rehandling of parapet painting has in some cases been carried out carelessly allowing corrosion begin within a few years. In surface treating, hot-dip galvanizing should be used and the painting method should also be checked.

There are also many narrow bridges in Poland , the width of 11 bridges being narrower than 7,5 meters. In many cases widening can be carried out quite easily while repairing the edges of the bridge. The required standardized horizontal clearance of bridges should be determined and the needs of widening should be given attention when planning repair works. On several bridges in the countryside, the narrow sidewalks seemed to be unnecessary.

The main matters are in order. The condition of the bridges is monitored regularly and maintenance and repairing methods are quite advanced. Some knowledge of the latest inspection and repair methods and materials could still be developed. By scheduling maintenance and repair actions correctly and more precisely, deterioration will be prevented and the service level, which fulfills the requirements of traffic safety, and the optimal service life of the bridges are guaranteed.

VIA BALTICA BRIDGES, POLAND

SUMMARY OF NEEDED REPAIR INVESTMENTS

No	Name	L	Constr.	FIM	Urg.cl.
PL-1	Szczeberke	11 m	1956	54.000,-	3.
PL-2	Blizne	22 m	1956	89.000,-	2.
PL-3	Laczacym kanal	14 m	1955	106.000,-	3.
PL-4	Bystry kanal	21 m	1962	105.000,-	3.
PL-5	Augustowski kanal	28 m	1960	200.000,-	2.
PL-6	Nette	14 m	1960	77.000,-	2.
PL-7	Biebrze	54 m	1961	106.000,-	2.
PL-8	Olszanke	29 m	1953	145.000,-	2.
PL-9	Kumialke	29 m	1963	147.000,-	2.
PL-10	Brzozowke	11 m	1963	43.000,-	3.
PL-11	Suprasl	54 m	1963	483.000,-	3.
PL-12	Railway overpass	39 m	1961	284.000,-	3.
PL-13	Railway overpass	11 m	1962	94.000,-	3.
PL-14	Biala	17 m	1952	29.000,-	2.
PL-15	Narew	168 m	1965	965.000,-	3.
PL-16	Sline	18 m	1980	82.000,-	2.
PL-17	Dab	11 m	1952	37.000,-	3.
PL-18	Jablonke	17 m	1952	79.000,-	2.
PL-19	Ostrow Maz (Railway overpass)	≈30 m		208.000,-	2.
PL-20	Wyskow (under repair 1992-93)	≈300 m		1.482.000,-	2.
PL-21	Radzymin	≈50 m		133.000,-	3.
PL-22	Radzymin (Railway overpass)	≈40 m		521.000,-	2.
PL-23	Marki	≈26 m		46.000,-	3.
				3.165.000 FIM = Σ 2.	
				2.350.000 FIM = Σ 3.	
				5.515.000 FIM = ΣΣ	

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BRIDGES OF POLAND

Code	REPAIR MEASURES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
	FOLLOW UP							3		2				3										
	Require a special inspection				2																			
100	**CONCRETE STRUCTURES**																							
101	Replacement of the edge beam	3	2	3	3	3			3		3	3	3			3	3	3			3		2	
102	Repair of the structure by casting			3											2	3						3		
105	Patching without shuttering						2-3		3															3
106	Patching using shuttering						2																	
107	Ejection																					2-3		
108	Applying gunite to concrete surfaces	3				3	3	2		2		3		3				3	2	2-3	2		2	3
110	Injection of a crack using epoxy								2						2							3		3
115	Concrete surface treatment				3						3					3								
116	Impregnation of concrete surfaces														2									
200	**STEEL STRUCTURES**																							
201	Replacement of railing	3	2	3								3				3			2				2	
202	Replacement of steel member																						2	
207	Patch painting																3							
208	Repainting				3								3	3						3		3		
209	Maintenance of bearings		2													2					2	3		2
600	**JOINTS**																							
601	Repair of expansion joint devices															2			2					
609	Repair of area betw. bridge and emb.				2																			
700	**WATERPROOFING AND SURFACINGS**																							
701	Replacement of surfacings			2		2	2		2	2		3	3	2						2			2	
703	Replacement of the wearing course																					2		
704	Repair of the waterproofing		2														2							
705	Sealing of pavement cracks												3			2	2							
706	Repair of pavements (also rut repair)				2																			
800	**BRIDGE FURNISHINGS**																							
804	Construction of a concr. slab revetment					2		2																
813	Repair of an approach embankment															2								
814	Repair of an erosion damage			3																				

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VIA BALTICA BRIDGES

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