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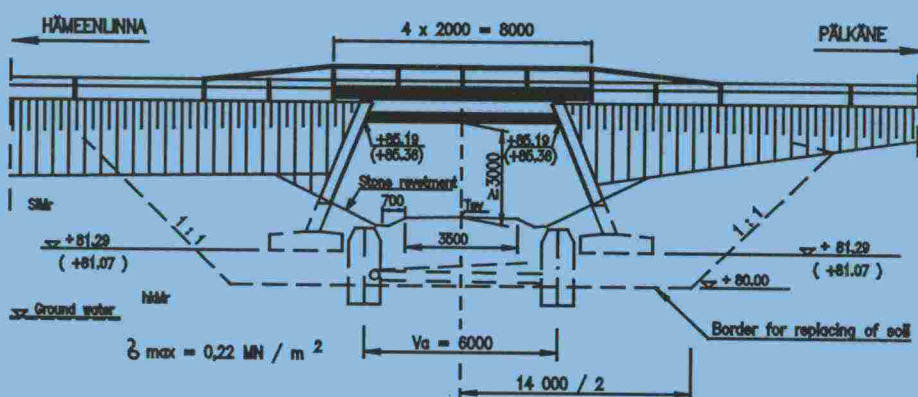


Finnish National Road  
Administration

# GENERAL QUALITY REQUIREMENTS FOR BRIDGE CONSTRUCTION

General Instructions - SYL 1

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Specifications and  
quality requirements

Helsinki 1996

Bridge Engineering Unit

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# **GENERAL QUALITY REQUIREMENTS FOR BRIDGE CONSTRUCTION**

General Instructions - SYL 1

**Finnish National Road Administration**  
Bridge Engineering Unit

Helsinki 1996

ISBN 951-726-216-7  
TIEL 2210003-96  
Oy Edita Ab  
Helsinki 1996

Publication and sale:  
Finnish National Road Administration, Service Unit  
Printed Publications  
Fax: Int. + 358 (0)204 44 2652

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## PREFACE

The General Quality Requirements for Bridge Construction consist of the following sections:

General instructions	SYL 1
Earthworks, soil improvement and foundations	SYL 2
Concrete structures	SYL 3
Steel structures	SYL 4
Timber structures	SYL 5
Deck surface structures	SYL 6
Equipment and accessories	SYL 7

The necessary sections of the General Quality Requirements will be used as construction documents for each work. The section 'General instructions - SYL 1' is always relevant as it includes the general requirements for the entire bridge and overall quality assurance.

Kalevi Falck M.Sc. (Eng.) of Laatukonsultit Oy has prepared the draft of SYL 1 on the basis of SYL 1 published in 1992. The work has been monitored and supervised by Antti Rämetsä, highway engineer, Jouko Lämsä M.Sc. (Eng.), Mauno Peltokorpi M.Sc. (Eng.) and Ossi Räsänen, highway engineer, of the Bridge Engineering Unit at the Finnish National Road Administration.

The alterations, checks and final revisions made on the basis of the comments have been carried out at the Bridge Engineering Unit.

Helsinki, August 1996

Bridge Engineering Unit

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## **1 GENERAL INSTRUCTIONS**

### **1.0 A PRODUCT MANUFACTURED IN ANOTHER EUROPEAN COUNTRY**

A product which has been manufactured in another Member State of the European Union or in another country in the European Economic Area shall be deemed upon application to be in conformity with the quality requirements presented in this publication on the following preconditions:

1. The tests and inspections have been performed in the country of manufacture in accordance with the methods and requirements employed in Finland or ones yielding a corresponding standard of quality and safety, and the results show that the product meets the requirements laid down for it.
2. The body which performed the test and inspections is approved for these tasks by the country of manufacture.

The Finnish National Road Administration is keeping abreast of European standardization in the sector and will amend the guidelines to conform with European standards once they are ready.

### **1.1 GENERAL INFORMATION**

#### **1.1.1 Area of application**

This document shall be complied with when constructing bridges by the 'LVR' method or by the traditional construction method.

The 'LVR' method refers to a method of construction based on responsibility for quality whereby the client specifies the quality requirements for the structures and materials but, generally speaking, does not specify the standards for the manufacture of the materials and the working methods. The quality is confirmed by the contractor's quality system and by ascertaining the suitability of the structures and materials.

The traditional construction method refers to a method of construction whereby the client specifies the quality requirements for the structures and materials, and also specifies the standards for the manufacture of the materials and the working methods. The quality is checked by ascertaining the acceptability of the structures and materials and by observing the requirements laid down for the working methods.

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### 1.1.2 Abbreviations

SYL	General Quality Requirements for Bridge Construction
LVR	Construction with responsibility for quality
LVR method	Contracting method based on the contractor's responsibility for quality

The abbreviation SYL 1 is used to refer to this section, 'General instructions', of the general quality requirements.



### 1.1.3 Terms

Acceptability report refers to the information acquired by the contractor to prove the acceptability of the structure.

Acceptability testing refers to the measuring, inspection or testing, the results of which shall be used by the contractor or the manufacturer to demonstrate the acceptability of the structure.

Approved construction material, structure, method etc. refers to the construction material, structure etc. approved by the client. The construction material, structure etc. shall be approved by the person who has the necessary authority to do so, on behalf of the client.

Bridge quality plan refers to the quality plans, separate technical work plans and a record of these.

Clear span refers to the minimum open horizontal distance between two consecutive supports, parallel with the centre line of the bridge.

Confirmation of acceptability refers to the client's assessment based on the inspections and the results of research and measurements carried out by the contractor of the extent to which the product or service meets the quality requirements laid down.

Continuous measurement generally refers to measurement covering the entire construction, e.g. between station numbers along the chainage line.

Defect means that the requirements for planned serviceability have not been met.

Design refers to the drawings according to the drawing catalogue and the quality requirements for a particular bridge.

Design documents refers to the design and the general quality requirements.

Height of passage refers to the minimum vertical distance between the upper structures of the deck restricting the height of passing vehicles and the deck of the bridge (upper surface of the superstructure).

Horizontal clearance of bridge deck refers to the distance between the rail posts, minus 200 mm, measured horizontally and perpendicular to the road line.

Inspected manufacture refers to the manufacture of the construction material or other products when the manufacturing plant's own quality control is subject to inspection approved by the client.

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Limit value = standard value  $\pm$  permissible deviation.

Manufacturer refers to a company or a production unit which manufactures bridge components or construction materials, equipment or accessories for the bridge in an industrial plant.

Permissible deviation or tolerance refers to the maximum permissible positive or negative deviation connected with the quality requirement.

Perpendicular clear span refers to the minimum open horizontal distance between two consecutive supports, perpendicular to the overpass.

Proof of acceptability refers to submitting to the client the results of the acceptability tests and inspections carried out by the manufacturer or the contractor.

Quality refers to the ability of the product or service to meet the owner's, user's and environmental requirements and expectations.

Quality assurance refers to all the planned and systematic procedures to ascertain that the product or service will meet the quality requirements laid down.

Quality control refers to the measuring and inspection procedures to ascertain that the product or service meets the quality requirements laid down.

Quality deviation means that the quality requirements have not been met.

Quality guidance refers to the operative techniques and functions which are used to meet the quality requirements.

Quality management refers to the part of the general management which defines and implements the quality policy.

Quality plan refers to a document which defines the quality procedures, resources and implementation stages connected with particular jobs, a work stage or service.

Quality policy refers to the principles governing quality and the quality procedures.

Quality rating is the parameter indicating the quality of the construction work calculated on the basis of the quality deviations in the quality assurance programme for bridge production (SILAVA).

Quality requirement refers to either the standard value or the range between



the limit values or the verbal definition of quality.

Quality system refers to the organization, procedure and course of action as well as the resources required for implementing the quality policy.

Traceability refers to the ability to retrieve information relating to the method of construction, the end product, maintenance and use, by means of stored data.

Sampling refers to taking samples of the structure or the construction material either at random or at fixed intervals in accordance with the sampling plan.

SILAVA programme refers to the quality assurance procedure for bridges based on automatic data processing.

Single measurement refers to measurement carried out only once, e.g. bridge loading test.

Site quality plan refers to a quality plan covering all the works at the site.

Span length refers to the distance between two consecutive support lines measured in the direction of the road alignment.

Standard value refers to the target value laid down for the quality of the structure or material.

Supervisor refers to a person who has been authorized on behalf of the client, during construction or purchase, to make sure that the construction or manufacture is carried out in accordance with the design documents.

Technical work plan refers to a work plan which has been drawn up for the technical implementation of a work stage, a work section or the entire work.

Verified application report refers to a report which has been verified by the client or a body approved by the client (e.g. Finnish Concrete Association).

Vertical clearance refers to the minimum vertical distance measured either from the highest point of the road surface under the viaduct or the high water level to the lowest point of the superstructure.

Work stage quality plan refers to a quality plan connected with a certain work stage.

#### **1.1.4 Documents and their legal validity**

In SYL the requirements and instructions binding on the contractor are shown as text in wide columns. The instructions and the descriptions of working



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methods clarifying these are shown as text in narrow columns. When construction is carried out using the traditional contracting method, the working method descriptions are generally binding on the contractor.

SYL also includes some material manufacturing instructions and work method descriptions to be observed in contracting using the LVR method. These are written as text in wide columns.

When traditional contracting methods are used, deviation from the working methods shown as text in narrow columns is permitted with the client's consent.

The documents to be complied with during construction and their order of precedence are defined in the contract documents. Texts referred to are considered to take equal precedence with the document in which they are referred to. In special cases in international contracts, another norm or standard or part thereof, approved by the client, may be complied with, instead of the norm or standard referred to.

#### **1.1.5 Plans and alterations to plans**

All the plans required by the documents shall be drawn up clearly and in detail. The plans for permanent structures and alterations to the plans shall be sent for the client's approval.

Only those persons authorized by the client may inspect and approve the plans for permanent structures and alterations to the plans during the course of construction.

The requirements concerning quality plans and technical work plans are given in Section 1.3.

#### **1.1.6 Works management and labour force**

In all work stages the management and the labour force shall be skilled and experienced for the stage in question.

The expert knowledge and experience of the management and the labour force shall be demonstrated in a reliable manner where required.

The other sections of SYL will lay down requirements in more detail regarding the qualifications of the managers and the work force in various areas.

## 1.2 GENERAL QUALITY REQUIREMENTS FOR BRIDGE CONSTRUCTION

### *General information*

The dimensions and other characteristics of the completed structure shall be in accordance with the design documents. Each quality requirement shall be met separately.

Unless other specified requirements are shown in the design or elsewhere in SYL, for the completed bridge, the allowable construction tolerances and the corresponding requirements concerning the procedure of acceptability measurements are as follows:

### *The span length and the clear span*

The permissible deviations for the span length and the clear span are +60 mm and -30 mm. However, the dimension of the open space given in the design for flyovers shall not be reduced.

The span lengths and the length of the cantilevers are determined from the outermost bearings. The span lengths can be determined either by measuring directly or by calculating indirectly on the basis of the results from the location measurements of the bearings. The span lengths are determined on a level with the lower surface of the bearings. If some of the supports of the bridge do not have bearings, the span length is determined from the support line marked in the design drawings or from the centre of the support surface. The span length is not determined if the design drawings instead show only a clear span.

The clear span and the perpendicular clear span of all bridges are measured where these are marked in the design drawings. The measurements are taken at a height of 1.0 m up from the surface of the road passing under, from the high water level or from the points marked in the design drawings.

The measured span lengths and the minimum measurement of each measured clear span and the perpendicular clear span are given in the bridge acceptability report.

### *Vertical clearance and height of passage for the bridge*

The permissible deviation of the vertical clearance and the height of passage of the bridge is  $\pm 50$  mm. However, the dimension of the open space given in the plan for flyovers shall not be smaller than the given dimension.

The vertical clearance and the height of passage are determined either by



measuring directly or by calculating indirectly on the basis of the results of the height measurements. The vertical clearance of a bridge spanning e.g. a river or a sound is determined on the basis of the high water level marked on the design drawing.

The vertical clearance is determined at the points entered in the design drawing, gap by gap, or at its minimum point. The height of passage is determined at its minimum point.

The vertical clearance and height of passage measurements shall be written in the bridge acceptability report. If the bridge has several gaps restricting the height of passage, the minimum height of passage of each gap is given in the acceptability report.

*Horizontal clearance of bridge deck, width of the carriage way and widths of raised pavements and cycle paths*

The permissible deviations of the horizontal clearance of bridge deck, the width of the carriage way as well as the widths of the raised pavements and cycle paths are  $\pm 30$  mm. The width is measured from the support lines and from the centre of the gaps, and these measurements are given in the acceptability report.

*The profile of the superstructure and the side girder*

The upward deviation of the superstructure profile and the edge beam may be a maximum of  $L/1000$ , where  $L$  = span length or twice the length of the cantilever. The downward deviation of the superstructure profile and the edge beam may be a maximum of  $L/1000$ , but no more than 100 mm. However, no greater accuracy than 20 mm is required for deviation in profile.

The profile of the superstructure refers to the profile of the lower surface of the superstructure between two adjacent support lines in accordance with the plan. The profile is determined from both sides of the superstructure.

The profile of the edge beam refers to the shape of the upper surface of the edge beam between two adjacent support lines in accordance with the design. The profile is determined from the outer edge on top of the edge beam.

The profile of the superstructure and the edge beam is measured at the ends of the superstructure, at the centre of the supports as well as at the centre of the gaps and the quarter points. The results are given in the acceptability report.

*Horizontal shape of the bridge*

The horizontal deviation of the bridge shape may be a maximum of  $L/1000$ ,

but no more than 100 mm. However, no greater accuracy than 20 mm is required.  $L$  = length of the bridge.

The horizontal shape of the bridge refers to the shape of the edge beam or, if there is no edge beam, the outer edge of the bridge in accordance with the design. The shape is determined from the outer edge on top of the edge beam. If the bridge has wing walls in the direction of the superstructure, the survey of the shape is extended to the end of the wing walls. Measurements are taken at least from the ends of the wing walls, support lines as well as from the centre of the gaps and quarter points. The results are given in the acceptability report.

#### *Location of the bridge*

The permissible vertical deviation of the bridge location is  $\pm 20$  mm and horizontally  $\pm 40$  mm. Both the vertical and horizontal location of the bridge are generally inspected in relation to the reference points of the surveying grid at the intersections of the inner edge of the edge beam and support lines on the upper surface of the superstructure. The results are given in the acceptability report.

#### *Tilt of the structural element*

The permissible deviation in the tilt of the vertical or diagonal surface of a column, wall-like support or end pier or abutment is  $\pm 0.5$  % of the value according to the plan, however, to a maximum of  $\pm 40$  mm measured as a horizontal deviation between the upper and lower edge. The measurements are taken from all the surfaces of the wall-like support and end pier or abutment but one measurement is sufficient for the column. The results are given in the acceptability report.

### **1.3 QUALITY ASSURANCE**

#### **1.3.1 General information**

For the quality assurance of the project, the contractor shall draw up a quality plan for the site in accordance with Section 1.3.2 and a bridge quality plan in accordance with Section 1.3.3 as well as quality plans and separate technical work plans for the work stages connected with it. The work shall be carried out in accordance with the work and quality plans. Permission shall be obtained from the supervisor for alterations regarding the plans.

For contracting with responsibility for quality, the bridge contractors and the most important sub-contractors shall have an efficient quality system approved by the Finnish National Road Administration. The requirements on quality systems and the procedure of classification of contractors are given in



the instructions for classifications of contractors in bridge contracting for Finnish National Road Administration with responsibility for quality.

### **1.3.2 Site quality plan**

Before commencing the construction work, a site quality plan covering all work at the site is drawn up and delivered to the supervisor for inspection at the initial work meeting at the latest.

The site quality plan shall include the following:

- Timetable
- the site management and quality control organization (persons, responsibility, authority, tasks and the qualifications required)
- special equipment used for construction and quality control
- quality assurance of the work (e.g. going through the plans with the workers, clarifying the internal quality control and guidance)
- quality assurance of the sub-contractors' and sub-suppliers' deliveries
- being prepared for risks and exceptional situations connected with the implementation of the work
- handling of quality deviations
- tools for quality assurance (e.g. SILAVA)
- co-operation with the client and the designer.

A task specific quality plan relating to a particular work (e.g. work on steel structures, SYL 4, Section 4.3.1.1) may be drawn up as in case of the site quality plan.

### **1.3.3 Bridge quality plan**

#### **1.3.3.1 General information**

The quality plans for the work stages and the separate technical work plans shall be included in the bridge quality plan. The quality plans and the separate technical work plans to be drawn up during construction, are listed at the beginning of the bridge quality plan. This record shall be delivered to the supervisor at the same time as the site quality plan.

#### **1.3.3.2 Work stage quality plan**

A work stage quality plan shall be drawn up for all significant work stages and delivered to the supervisor not later than a week before the commencement of the work included in the work stage in question. The same

quality plan may cover quality assurance for one or more structural elements or work stages.

The work stage quality plan includes:

- a general description of the work stage and the working methods connected with it (unless a separate technical work plan has been drawn up)
- quality assurance during construction (inspections, measurements and other quality control and quality guidance procedures to be carried out prior to or during construction)
- proof of acceptability based on the requirements concerning the quality of the end product and proof of acceptability referred to in different sections of SYL, where the dates, equipment, persons in charge and documentation of the results of the inspections and measurements are given.

#### **1.3.3.3 Technical work plan**

The design and subsequent sections of these general quality requirements will list the work where a separate technical work plan shall be drawn up. The plan shall be delivered to the supervisor a week before the commencement of the work in question at the latest. If the work plan deviates from the bridge design or the requirements of SYL, the plan shall be delivered to the client for approval two weeks before the commencement of the work in question.

The technical work plan shows in detail how the work is done, the resources required, the work capacities, the order of work, and the timetable for the work. Also the requirements imposed by Health and Safety at Work and environmental protection are taken into account. The technical work plan includes, for instance, the operating instructions, product information sheets and operational safety information, in Finnish, for substances which are hazardous to health.

If it is necessary to deviate from the technical work plan, an amended plan is drawn up and delivered to the supervisor.

#### **1.3.4 Proof of acceptability and quality reports**

##### *General information*

The contractor is obliged to prove the acceptability of all building materials, equipment and accessories used in the structure as well as the structural elements and the finished structure. The acceptability criteria have been given



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in the plan and in different sections of SYL.

For inspected manufacture of building materials, equipment or accessories, the acceptability can generally be proved by labels on packaging, delivery notes and products.

When the structural elements are manufactured at a manufacturing plant which has an efficient quality system approved by the client, the supervisor monitors the acceptability measurements by random sampling.

The instructions given later shall be observed when proving and reporting on acceptability of the structural elements and the finished structure.

The client's supervisor may also carry out his/her own inspections and measurements by random sampling.

#### *Planning and carrying out inspections and measurements*

Different sections of these general quality requirements show the minimum number of the acceptability inspections, tests and measurements of most common building materials, structural elements, structures as well as equipment and accessories. If their results or other findings give reasonable cause to suspect that the quality requirements have not been met, additional measurements and tests will be carried out to determine the areas of the structure to be corrected or to be regarded as deduction of the value of the structure.

When planning inspections and surveys on site, the supervisor shall have an opportunity to repeat the planned survey or inspection.

The measuring equipment shall be of approved type and calibrated.

The supervisor shall be informed of the time and date of the inspections, tests and measurements for acceptability.

#### *Inspection and measurement log, summary reports and implementation drawings*

The inspection and measurement log will contain entries indicating whether the structure or the building material, equipment or accessory used in its manufacture meets the requirements laid down. In addition, entries shall be made for non-compliance with the quality requirements, their position and the results of the inspections and measurements. When there is a deviation affecting the exterior of the bridge, entries shall be made indicating whether the effect is significant, minor or nonexistent. The inspection and

measurement log will also refer to the associated quality deviation reports.

The inspection and measurement log shall include the following as a minimum requirement:

- client
- object
- contractor or assembler
- supplier of building material, equipment or accessory
- nominal dimensions and tolerances or limit values
- results of inspection or measurement
- person carrying out the inspection or measurement and checking the measuring work
- date and signatures

The inspections may be visual, auditory or carried out with different devices.

The implementation drawings as well as summary reports relating to a particular job and bridge are drawn up with the help of the minutes of inspection and measuring.

#### *Quality deviations*

Immediately when a quality deviation is found, it shall be reported to the supervisor and a report on the deviation drawn up. The report will describe the shortcomings in quality, the reasons for it and suggested corrective and preventive action. The report on the quality deviation is delivered to the supervisor as soon as it is completed and not later than a week before the commencement of any corrective action. If this work will change the original structure and the report is accompanied by a separate correction plan, the plan shall be delivered to the client for approval two weeks before the commencement of the corrective work.

#### *Bridge acceptability report*

On the basis of information on acceptability the contractor will draw up a bridge acceptability report. It will systematically show, element by element, the exact information on the materials, equipment and accessories used, the summary of inspection and measurement, information indicating whether the bridge will meet the requirements laid down, possible shortcomings in quality and corresponding reductions in value and the bonuses paid.

The acceptability report in accordance with the SILAVA programme will also calculate the quality rating of the entire structure.



The bridge acceptability data is gathered together as an appendix to the acceptability report containing information on acceptability (the results of acceptability inspections, measurements and tests), summary reports relating to particular work, reports on quality deviations, implementation drawings and memoranda including possible amendments to the plans.

#### *Proof and confirmation of acceptability*

To prove acceptability the contractor will hand over the bridge acceptability report and its appendices to the supervisor.

The client will ascertain the acceptability of the structure on the basis of the information in the bridge acceptability report. If necessary, the client will carry out spot check inspections and measurements.

## **1.4 MEASUREMENTS**

### **1.4.1 General information**

A measurement plan shall be drawn up of the measurements in situ of the structures and structural units and of transformation and dislocation measurements and it is delivered to the supervisor. The measurement plan will show:

- the person in charge of the survey
- the equipment used
- fixed and measuring points used
- the principles for controlling the accuracy of measurements
- objects to be measured
- coding and documentation of acceptability measurements

The surveying foreman shall be a construction technician, a surveying technician or have equivalent qualifications. To mark the main points (i.e. points from which an auxiliary straight line can be formed for measuring with a tape measure), a theodolite or tacheometer fitted with an electronic telemeter unit shall be used and their accuracy shall be checked as appropriate. A tape measure can be used for other measurements. A surveyor's level is recommended for use in measuring heights although a tacheometer may also be used.

While designing the bridge, measuring data shall be drawn up for construction and quality surveying. It will show the co-ordinates for different structural elements and coding for the points in question.

If supplementary calculations for measuring data are carried out or a separate system of co-ordinates is used, the results shall be delivered to the supervisor at least a week before use.

#### **1.4.2 Set of points**

At least three polygon points shall be constructed or measured for the bridge construction with internal accuracy of  $\pm 10$  mm. The set of points shall include at least one point where the height is known, and its accuracy is  $\pm 5$  mm. If the bridge is large, there shall be points on both shores.

When planning the points to be measured, care shall be taken that the starting points for the surveying grid and altimetry are reliable, that the points remain in place for the duration of the entire building work and that they are sufficiently visible for measuring every structural element.

The set of starting points shall be constructed and measured by the client. If any points are added during the work, they shall be shown to be reliable with appropriate measurements and calculations.

#### **1.4.3 Measurements in the course of work**

##### **1.4.3.1 Measuring in situ**

Measurements serving the construction work shall be taken at points shown in the measuring plan. When surveying, sufficient accuracy shall be observed. Orientation shall be carried out, if possible, to the known point and a fixed prism (on feet) shall be used on connection points.

##### **1.4.3.2 Verification measurements**

During bridge construction, verification measurements shall be taken which control the position and the accuracy of the dimensions. The number of measurements taken shall be in accordance with the work stage quality plan and at the planned points. If there are deviations, verification measurement shall be carried out after correction.

##### **1.4.3.3 Acceptability measurements**

Acceptability measurements shall be taken on completed structures at points and in number shown in SYL or in quality plans. A model for coding and documentation of the measurements is shown in the measuring plan. The



reports shall be delivered to the supervisor immediately the measurements have been completed.

#### **1.4.4 Deformation and dislocation measurements**

##### **1.4.4.1 General requirements**

Deformation and dislocation measurements are carried out where required by the plan and also for other justifiable reasons.

The measurements shall be given for expert planning and to be carried out by a group of surveyors capable of precision surveying.

The methods used shall be explained accurately and the detailed calculation procedure shall be clearly reproduced to make sure that the differences in measurements are in fact movements of the bridge and not measuring errors.

Dispersion of measurement shall be stated reliably. Conclusions regarding the movements of the bridge are drawn taking into account the dispersion obtained.

Measurement shall be based on vertical control point which is reliably fixed. Unless this kind of point is within reasonable distance, only respective differences of levelling points in the bridge are measured.

##### **1.4.4.2 Monitoring bridge deflections and bending**

Unless otherwise stated in the design, stainless steel pins of diameter  $d = 10$  mm, with a round head, shall be installed to monitor bending in the superstructure and deflections in the substructure, as follows:

- at abutments to the outermost corner points of the wing walls in the upper surface of the edge beam
- by each pier and in the middle of each bridge span in the upper surface of the edge beam in both edges of the bridge deck
- in the upper part of the piers, in both edges of the bridge.

The tops of the monitoring pins are marked with a cross, by means of which its horizontal position can be measured. The monitoring pins shall not touch the reinforcing bars.

The points are measured immediately after the bridge is completed. The results are passed on to the supervisor.

For bridges with a span at least 30 metres, the measurement is carried out again in connection with the guarantee inspection.

### **1.5 TRAFFIC ORGANIZATION AND GENERAL ORGANIZATION OF THE WORK**

The publication 'Traffic at Roadwork Sites' /1/ shall be complied with, where applicable, in the organization of traffic during construction.

The general organization of the work is shown in the site plan, which shall be delivered to the supervisor before commencement of the work.

Rules and regulations regarding Health and Safety at Work as well as waterways and environmental protection given in laws, acts, instructions from authorities and construction documents shall be complied with. The necessary procedures shall be planned before commencement of the work and the plans delivered to the supervisor.

A plan to coordinate the road work and the ground and foundation work for the bridge shall be drawn up and delivered to the supervisor.

In addition, it shall be ascertained that the visibility at the site of an auxiliary bridge is not less than the minimum stopping distance in accordance with the normal regulations of the Finnish National Road Administration.

### **1.6 COMPLETION WORK**

The bridge structure and all the areas used during the work shall be made tidy. The temporary structures (piles, scaffolds, framework etc.) built in connection with the bridge work as well as construction waste shall be removed or broken to the ground surface or to the bottom of the river bed, unless there are instructions in the plan for them to be left in place, e.g. as erosion protection.

The roads used for the site and the bases of the storage areas shall be repaired. Fallen or withered trees due to construction shall be cleared away.

When constructing and finishing the structures on a bridge site, the SILKO Directives /2/ as well as the General Quality Requirements and Specifications for Road Construction Work shall be complied with, as applicable.

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## 1.7 REMEDYING DEFECTS

All discrepancies and defects shall be reported to the supervisor at the earliest possible opportunity. A plan of the remedying work shall be drawn up and delivered to the supervisor a week before work commences. If the remedying works will change the structure or its function, the remedying work plan shall be delivered to the client for approval two weeks before work commences.

There are instructions regarding remedying work in other sections of SYL.

There are also instructions regarding remedying work in SILKO Directives /2/.

Damage may not be corrected or masked without the supervisor's permission.

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