

COMMONWEALTH OF VIRGINIA
DEPARTMENT OF TRANSPORTATION

CONSTRUCTION DIVISION MEMORANDUM

JOINT MEMORANDUM

GENERAL SUBJECT: QUALITY INDEX

NUMBER: CD-97- 17 / LD-219

SPECIFIC SUBJECT: DESIGN & CONSTRUCTION INDEX FORMS

DATE: SEPTEMBER 22, 1997

Original w/Signature on file in Construction Division

C. F. Gee
Construction Engineer

J. T. Mills
Location & Design Engineer

A. V. Bailey, II
Maintenance Engineer

DIRECTED TO - DISTRICT ADMINISTRATORS

Attached is the Design Quality Index form (LD-433) and the Construction Quality Index form ([C-54](#)).

During 1996, the Department released its Strategic Plan for the 21st Century. During the process, executive management developed four Strategic Outcome Areas (SOA) that support the Strategic Plan. The four SOA are System Maintenance and Operations, Customer Satisfaction, Employee Satisfaction and Construction Program Delivery. Each Assistant Commissioner is the "champion" of one of these areas. The Chief Engineer is the champion for the Construction Program Delivery SOA. The goal of this SOA is that "Construction projects will satisfy our customers by producing the highest quality highways and structures, that are completed on time and within budget."

One of the performance measures to support this goal is the *Quality Index* for Design and Construction. To gauge our progression toward improvement, it is necessary to establish baseline data and then regularly compare current to past ratings. This process will determine the *Quality Index*. The Index is comprised of two indices, design and construction. The Design Quality Index focuses on the quality of the Department's plans and specifications. The Construction Quality Index focuses on the maintainability of the completed project. The expectation of the Quality Index is the improvement of overall design and construction, the remedy of systemic problems and concerns, and the measurement of our performance in achieving our goals against a baseline.

Prompt and accurate completion of the forms is very important in order to produce effective quarterly reports of the Quality Index. For the Quality Index to be the most effective, a great deal of thought needs to be put into each rating.

Design Quality

The **Design Quality Index** form (LD-433) evaluates the completeness, accuracy, clarity, and construct ability of the design. The evaluation form will be used on all new and ongoing projects completed and accepted by VDOT on or after October 1, 1997 except SAAP, annual contracts (such as guardrail repair, signal projects, pavement markings etc.) and maintenance schedules (such as paving, sidewalk, curb and gutter, etc.). The evaluation form is to be submitted as a routine part of the final record submission process. The form is being printed, so you may use copies of the attached form.

The Design Quality Index Evaluation Form is to be completed by the Project Inspector, in conjunction with the Project Engineer. Where applicable, data to be used in the evaluation should be collected by all persons involved in the project (including those outside of VDOT), throughout the life of the project. The project will be evaluated on seven factors:

Construct ability	Maintenance of Traffic
Drainage	Document Clarity
Subsurface Investigation	Survey
Utilities.	

The rating value for each factor is to be given in whole numbers. The Inspector will also provide a brief explanation as to why the rating was given with specific examples, if available, that support the rating given. To arrive at the Project Index, all of the ratings are added together, and then divided by the number of factors used. The number is rounded to the nearest tenth. For other design related concerns which occurred on the project, but cannot be included in one of the seven factors, comments shall be made in the "Additional Comments" section on back of the form. If more space is needed in any of the comments sections, additional paper may be used and attached to the form.

Each of the seven factors will be rated using the following scale:

RATING

- 4 - No design problems** - Minor deviations or field adjustments, no plan revisions or work orders processed.

Example: "Two additional entrances were installed to match existing farm entrances".

"The power source for the signals was shown 1250' from the controller when in reality, power was available only 225' away. This saved almost \$2500."

- 3 - Some design problems** - Minor plan revision, minor work order or time extension processed.

Example: "An abandoned lighting standard foundation that was shown on the old as-built plans was discovered during pipe excavation. The abandoned lighting system was not shown on the new plans even though it was in conflict. The obstruction was removed by work order during the pipe work."

“The new ditch line was deep enough that when field reviewed, necessitated guardrail to be installed.”

- 2 - Numerous design problems** - Plan revision(s) processed, work order or time extension required to construct.

Example: “Many of the culvert tie-ins were shown to be concrete pipe. All were found to be CMP. Because of the deteriorated state of the CMP all had to relined before the new pipe could be attached. The project was delayed while the Dept. decided on a repair method and secured prices to do the work.”

“Even though the gas line is evident by the above ground markers, it was not indicated on the plans as being in conflict.”

- 1 - Major design problems** - Major design change required or major time impact to construction.

Example: “The proposed west bound storm drain system was found to be in conflict with a 12” high pressure gas main. Since the cost to relocate the gas main was prohibitively expensive, the entire WB storm system was redesigned. This added considerable cost due to disposal of DI’s and lost time and production.”

“Sequence of construction indicated a center lane closure, which is not permitted by Traffic Engineering.”

Each factor is to be evaluated; however, if a factor does not apply to a particular project, do not enter a score for that factor. Write "N/A" for all non-applicable factors.

After the Inspector and Project Engineer have completed the form, the Resident Engineer will hold a Post Construction Meeting for the purpose of discussing the ratings provided on the form. The attendees at the Post Construction Meeting will be at least the Resident Engineer, Project Inspector, Project Engineer, Location and Design designer/coordinator and consultants and other designers/coordinators involved in the project (Structure & Bridge, Right-of-way, Traffic Engineering, Materials, Construction). If for some reason the Post Construction Meeting cannot be attended by all parties, the latest technology can be used to accomplish the objectives of the meeting.

At the post Construction meeting, at least the following items will be discussed:

- o How the evaluator arrived at each rating
- o Review of each comment (ensuring that each section has a comment)
- o General discussion regarding the overall design
- o How effectively changes were made
- o Other design concerns noticed by the Inspector that did not fall under one of the seven criteria listed on the form
- o Feedback for improvement regarding the design (or the evaluation process)

If any differences of opinion occurs as to whether design issues are errors, omissions, unforeseen or changed conditions, and cannot be resolved at this meeting, the designer may attach a written statement as to why the rating is not appropriate with specific comments. The designer should also indicate what rating is more appropriate with specific reasons. The form will be signed by the

Project Inspector, Project Engineer, and the Resident Engineer and distributed within 30 days of the Post Construction Meeting.

The original signed form and all attachments will be sent to the State Location and Design Engineer. If a difference of opinion exists regarding a rating between the inspector and the designer, the State Location & Design Engineer (L & D) will ask the appropriate District Construction Engineer and District Location & Design Engineer (or other appropriate designer) to review the information and decide what the appropriate rating should be. This will then be recorded as the final rating.

Construction Quality

The **Construction Quality Index** form ([C- 54](#)) evaluation measures how well the project was built considering the elements of appearance, ride, function and maintainability. This evaluation will be done one year after the completion of construction. The project will be evaluated on seven factors:

Pavement Distress	Drainage
Rideability	Erosion
Incidental Concrete	Traffic Devices
Slope Stability	

The State Construction Engineer will send the form ([C-54](#)) to the Resident Engineer a year after the completion of the construction as indicated on form ([C-5](#)). This will start with projects completed during October 1996. The project will be evaluated by the Maintenance Superintendent in conjunction with the Maintenance Operations Manager. The Superintendent will assign each factor a rating based on the condition(s) encountered on the project. Deficiencies related to normal wear and tear, or previous maintenance should not be rated in the evaluation. Examples of items not to be included in the evaluation include ruts caused by vehicles running off the pavement and damage to curb caused by snowplows.

The rating value for each factor is to be given in whole numbers. The Superintendent will also provide a brief explanation as to why the rating was given with specific examples, if available, that support the rating given. To arrive at the Project Index, all of the ratings are added together, and then divided by the number of factors used. The number is rounded to the nearest tenth. For other construction related concerns which occurred on the project, but cannot be included in one of the seven factors, comments shall be made in the "Additional Comments" section on back of the form. If more space is needed in any of the comments sections, additional paper may be used and attached to the form.

Each of the seven factors will be rated using the following scale:

RATING

4 - No maintenance problems.

Example: "Some bare spots where the seed did not take."

"All culverts are functioning correctly and are completely dry two day after rains."

3 - Minor maintenance problems-nothing requiring immediate attention.

Example: "Several fissures noticed in the slope. Keep a eye on it."

“Some minor separation in the joints of two end sections. This is probably due to settlement. Does not appear to be serious but check in Spring.”

- 2 - Moderate maintenance problems**-requires remedial work to be scheduled.
Example: “Numerous gullies forming in slope. Install a small section of curb to divert the water.”

“Joint separation and settlement has caused ponding in several lines. Noticed a slight dip in the pavement above these lines.”

- 1 - Major maintenance problems**-must be fixed immediately.
Example: “Major soil slide caused by drainage not being channeled correctly. May jeopardize the shoulder and guardrail if not fixed.”

“Cracks and some spalding noticed on the inside of a 60” concrete culvert exposing the re-steel. Complete failure is imminent if not repaired immediately.”

Each factor is to be evaluated; however, if a factor does not apply to a particular project, do not enter a score for that factor. Write "N/A" for all non-applicable factors.

The Resident Engineer and the evaluator shall meet with the Inspector and Project Engineer for the purpose of discussing the construction quality. The Resident Engineer may invite the Contractor if he desires.

At a minimum the following issues should be discussed:

- o How the evaluator arrived at each rating
- o Review of each comment (ensuring that each section has a comment)
- o General discussion regarding the overall construction
- o Maintenance concerns resulting from the way the job was constructed
- o Design issues that effect the maintainability
- o Other construction related concerns that did not fall under one of the seven criteria listed on the form
- o Feedback for improvement regarding the construction (or evaluation process)

The Resident Engineer (RE) will settle any differences of opinion and make the final determination on the rating of that item. The RE shall return the signed original form to the State Construction Engineer within *30 days* of receipt. The State Construction Engineer will be the archivist of the *Construction Quality Index* and will compile the information received and issue reports to the Chief Engineer. The Construction Engineer will send the forms to the Resident Engineers at the appropriate time for the evaluation.

Note: In the case of projects that VDOT does not maintain such as urban projects, the Resident Engineer may ask that the municipality’s representative do the evaluation if desired, possibly assisted by the RE or a member of his staff (such as the Maintenance Superintendent from the adjoining area). This may coincide with your annual urban street review.

In summary, the Design Quality Index evaluation will be done by the Inspector at the completion of the work. The Designers will meet with the Resident Engineer and the construction staff involved

in the project to discuss the design. When the RE is satisfied that the project has been fairly evaluated, he/she shall send it to the L & D Engineer. The State L & D Engineer will compile the rating statewide and issue the Design Quality Index.

One year after the completion of the work the project shall be evaluated for Construction Quality. The Construction Division will send an evaluation form to the Resident Engineer. The RE will ensure that the evaluation is done and will meet with the Inspector (and Contractor if desired) to discuss the construction quality. Once the RE is satisfied that the evaluation is accurate, he/she shall send it to the Construction Engineer. The Construction Engineer will compile the ratings statewide and issue the Construction Index.

The Quality Index will become a major indicator of the services we render and an integral part of our strategic plan, as we strive to become the most effective customer oriented public agency in Virginia by the year 2000.

DES:rg