Quality Control/ Quality Assurance Plan

Below are examples of QC/QA Plans from Oregon and Oklahoma.

Oregon DOT Bridge Inspection Program QA Review

Bridge Inspection has played and will continue to play an ever-increasing important role in assuring that a safe infrastructure is available for the publics use. As our bridges continue to age and deteriorate, an accurate and thorough condition assessment of each structure is critical in maintaining a safe, functional and reliable highway system.

The six primary responsibilities of the bridge inspection program are:

1.) Maintain Public Safety and Confidence (Structural Concerns)
2.) Protect Public Investment (Maintenance Concerns)
3.) Maintain a desired level of service (Functionality Concerns)
4.) Provide Bridge Inspection Program Support
5.) Provide Accurate Bridge Records
6.) Fulfill Legal Responsibilities (In Compliance with CFR)

Fulfilling Our Legal Responsibilities

Though not specifically required in the Code of Federal Regulations, during a 1989 Bridge Inspection Program Review, FHWA strongly encouraged each State to provide a QA / QC review of the bridge inspections performed by that State. Each local FHWA Division Offices was directed to work closely with each State to develop a program that would follow-up inspection findings and provide a quality control of inspections performed. The objectives of the program were to be as follows:

- Generate a greater consistency of the data,
- Identification of unclear or misleading guidance,
- Better communication between the inspectors and management, and
- Better understanding and prioritization of urgent inspection findings.

FHWA considered the QA/QC Review program to be an integral part of the overall inspection program. The goal of the review program was to perform an independent field review of 5% of the completed inspections that were performed by each inspection team per year.

Thoroughness and Accuracy of the Bridge Inspection Report

As with all business practices, we should be cognizant of and continually scrutinize our business practices to assure that each is as efficient and as effective as possible. The word “Efficiency” as used herein refers to “doing things right the first time” (assuring that sufficient time and resources are allocated to each structure to ensure that the inspection was performed as thoroughly as necessary). The word “Effectiveness” as used herein refers to “doing the right things (assuring that each structure is inspected by the due date). Due to the large number of structures that are assigned to each inspector, it’s imperative that each region inspector, budget their time and resources wisely. A rushed bridge inspection will quite often result in missed bridge inspection elements and inaccurate condition assessment rating information. A completely independent QA field review of the last bridge inspection will clearly point out differences and provide a measure of it’s timeliness, thoroughness and accuracy.

Accuracy of the data in the bridge inspection database

The entire bridge program revolves around the bridge condition assessment information contained in the bridge inspection database. Large multi-million dollar decisions are made annually based solely on that data. Therefore, it is absolutely paramount that the data is as accurate and correct as possible. There is a lot of political embarrassment and loss of program credibility when it is shown that a program decision was made on faulty information. By performing a QA field review on the structures in the bridge program that are scheduled to receive some action, we are validating the information associated with that structure. Bottom-line, in addition to keeping the State of Oregon in compliance with the Code of Federal Regulations, initiation of such a program just makes good business sense.

STIP Projects

To assure that the right projects are getting into the State Transportation Improvement Program, every project needs a champion. By reviewing the structures, in the worst condition, in each region, the QA Review Team is able to discuss, on site, the appropriate strategy and can help develop the appropriate rehabilitation or replacement plan for every structure in question. The QA Review Team is basically functioning as a "sounding board", if you will.

Major Bridge Maintenance Projects

We consider these projects to be "stopgap" measures until a full rehabilitation or replacement project can be programmed by the STIP. These projects are also generally beyond the resources of the district bridge maintenance crews, in terms of time, money, equipment, or expertise involved. By reviewing the structures in the worst condition, the Review Team is able to discuss, on site, the appropriate repair / rehabilitation / replacement strategy and/or preliminary design concepts.

Load Rating / Load Posting Issues

Implementing Load Restrictions on structures are extremely political. However, on the other hand, one of the major responsibilities we are charged with is to assure that a safe facility is available to the public. Therefore, it is absolutely imperative that all deficiencies that directly influence the load rating calculations be located during the ODOT inspection effort and addressed immediately. By reviewing the bridges in the worst conditions, the QA review team provides a second look and/or a second opinion, regarding the severity of the deficiencies and their potential implications. It's like a person being confronted with a serious medical condition; they are encouraged to seek a second opinion from either another doctor or specialist in a given field of medical science.

Bridge Inspection Training

One of our major responsibilities is to provide a complete, thorough and accurate bridge inventory and condition assessment information. The QA Review Team is made up of bridge inspectors from the other regions and any newly hired bridge inspection staff, in order to assure statewide consistency between the geographically dispersed bridge inspectors and to provide on-the-job training for the new inspection staff. All questions are openly discussed, on site, to assure that everyone is in full agreement and that we are achieving statewide consistency. Also, ODOT Bridge Design Staff are encouraged to participate in the QA reviews, so they can obtain a better understanding of the bridge elements, the language contained in the condition state descriptions, and just exactly what the assigned condition assessment ratings are indicating about the bridge elements.

QA Review Process

A. Office Review

1.) Assure that all inspections are performed by the prescribed due date.

2.) Assure that there is an appropriate level of follow-up on identified critical deficiencies.

B. Field Review

1.) Selection of the bridge sampling.

Bridges with urgent or critical maintenance recommendations
Bridges with load rating / load posting issues
Bridges that are in need of bridge rehab / replacement actions
New structures recently opened to traffic – check initial inspection
The sampling size will be at least 5% of the regional routine inspections performed

2.) Selection of the QA Review Team

A QA Review will be performed in each region annually (host inspector)
Bridge Inspection staff from other regions will rotate onto the team as well as any new bridge inspection staff. Bridge Design personnel are encouraged to participate in the QA Review process (guest inspectors)

3.) Independent inspection of the bridge

The QA Review Team will generate a totally independent inspection report.

4.) Comparing bridge inspection findings

The bridge inspection report generated by the QA Review Team will then be compared with the last bridge inspection report of record.

5.) Differences between the two inspections are then openly discussed so that we can determine why any differences might exist.

6.) Initiate interviews with the appropriate district bridge maintenance personnel to determine the effectiveness of the bridge inspection effort.

OKLAHOMA QUALITY CONTROL AND QUALITY ASSURANCE PLAN
FOR STATE AND LOCAL JURISDICTION BRIDGE SAFETY INSPECTIONS

In order to insure that Oklahoma's bridges are being inspected and data is gathered in an accurate and consistent manner, it is necessary to implement quality control and quality assurance plans. For this purpose, quality control can be defined as the steps the inspecting agency and ODOT take to monitor that the inspections are performed correctly and the data collected is accurate. Quality assurance can be defined as the steps taken to insure that the work is being performed by qualified, quality inspectors and reviewers who are properly trained to perform the work.

QUALITY CONTROL

Internal Quality Control (By Inspecting Agency)

At least once every inspection cycle (24 months), the reviewing engineer *(the engineer who routinely reviews inspection reports)* for the inspecting agency (either Off- or On-System consulting firm) will randomly choose five (5) bridges to review in the field **for each team leader** (the reviewing engineer must be someone other than the team leader). The composition of these five bridges will be such that they represent a cross-section of bridge types inspected. It is strongly recommended that they include one of each of the following; a truss bridge, a timber girder bridge, a steel girder bridge, a concrete girder bridge (prestressed or regularly reinforced) and a bridge length concrete culvert. **One of these representative bridges will include a bridge that is rated three (3) tons (if available in the bridges inspected by the team leader).** This field review will consist of the reviewing engineer assessing the correctness and completeness of the inspection, including codings, elements and quantities, photos required by the contract as well as those needed to depict critical conditions, etc. This review should be done with the inspector so that any improper codings or procedures can be immediately corrected. The internal reviewer for the On-System ODOT team leaders shall be the team leader's supervisor (or supervisor's designee...in most cases the county bridge coordinator in each division).

The Bridge Division will develop a *Quality Control* plan for On-System ODOT inspectors. On- and Off-System consultant inspection firms shall develop their own *Quality Control* plan. As a minimum, the plan will include the following:

- Who the reviewing engineer will be. For smaller firms where the engineer is also the team leader, it may be necessary to trade out reviewing responsibilities with another small firm. The reviewing engineer will not be the same person as the team leader being reviewed.
- The reviewing engineer's experience and qualifications. This person should have extensive experience in the bridge safety inspection area and should be very familiar with inspection procedures and requirements.
- How the bridges to be reviewed are chosen.
- When the review will take place, so that an ODOT and/or FHWA official can attend if they choose.
- Specific items the review will include.

Quality Control Report

Once the Quality Control Plan is approved by ODOT, the consultant or field division shall implement the plan. Following the field review, the consultant shall submit a report to the Bridge Division (with a copy to the appropriate field division) which contains the following:

- A copy of the inspection report of each bridge being reviewed, including any photographs, drawings, reports, etc., that are part of the inspection.
- The reviewer shall indicate on the inspection report copy any incorrect codings and corrections found during the field review.
- The reviewer shall summarize findings from the review, and provide a plan which will insure these mistakes will not take place in the future (i.e., in-house training, procedural changes, etc.).
- The Quality Control Report shall be stamped and signed by the reviewing engineer.

On-System ODOT team leaders shall be reviewed by their supervisor (or designee, *someone familiar with inspection procedures and codings*) in this same manner, with a written report and suggestions for correcting findings returned to the Bridge Division.

External Quality Control (By ODOT)

Each inspecting agency shall be reviewed by ODOT in the field at least once during a two-year cycle. This review will be conducted by the persons in the field division county bridge coordinators office who are trained and are very familiar with inspection procedures and codings. It will consist of reviewing inspections of at least five (5) bridges in the field. These bridges will represent the different types of bridges commonly found in the counties inspected by that agency. As a minimum, one of each of the following bridge types should be reviewed; a truss bridge, a timber girder bridge, a steel girder bridge, a concrete girder bridge (prestressed or regularly reinforced) and a culvert. One of these representative bridges will include a bridge that is rated three (3) tons (if available). A Quality Control Report of the findings of this review shall be forwarded to the inspecting agency with a copy to the *Bridge Division. In addition, the Bridge Division will randomly review four (4) inspecting agencies each year in the same manner. A copy of their findings will be forwarded to the inspecting agency and the appropriate field division.*

In addition to the field review, the inspecting agency's office procedures may be reviewed. This *may* include load rating procedures, filing procedures and bridge file content, consultants in-house quality control plan, procedures and results, consultant's procedures for notification and follow-up with bridge owners for load posting and closing of bridges as required by ODOT policies, etc.

QUALITY ASSURANCE

Continuing Training

As part of this quality control/quality assurance process, some form of continuing training will be required for all team leaders and the reviewing engineer. As a minimum, this training will consist of the following:

- One training session will be held each year. Each team leader and each reviewing engineer will be required to attend one of these training sessions at least once every two years. Failure to do so will be grounds for disqualification of the team leader or firm as described below. *If necessary to avoid large numbers of scheduling conflicts, additional sessions may be scheduled.*
- Two test bridges will be identified, one in the western half and one in the eastern half of the state. Each attendee must inspect one of these bridges within one month before the training session, on his/her own.

- At the training session, each bridge will be reviewed and proper ratings discussed. Questions, answers and discussion will follow. Any questions and comments that attendees have should be brought to this session for discussion in an open forum, after the inspections are reviewed. It is recommended that these questions and comments be sent to the Bridge Division prior to the session so that adequate time is available to fully develop answers. This training session should be limited to a half day. More time can be used if necessary. These training sessions will be held in the ODOT central office.

Disqualification

When the inspection review indicates that a team leader and/or an inspecting agency continues to make the same or similar mistakes, omissions, etc., ODOT shall implement disqualification procedures as follows:

- Upon receiving ODOT's Quality Control Report, the inspecting agency shall address the findings of the report and take steps to correct the problems to insure they will not be repeated in the future.
- The team leader and inspecting agency will be placed on probation and reviewed again in six (6) months. This review will be conducted by a team consisting of the original reviewer, a field division representative, and a member of the FHWA, if they desire.
- If the same or similar mistakes are found during this second review, the inspecting agency and/or the team leader shall be given notification that they will be disqualified if these problems are not corrected and avoided in the future, and placed on a secondary probation period of three (3) months.
- The team leader and inspecting agency shall be reviewed again in three (3) months by the reviewing team. If the same or similar problems are found the inspecting agency and/or the team leader will be notified that they are hereby disqualified for a minimum of two years and will no longer be allowed to perform bridge safety inspections in the State until they have been requalified.
- A disqualified team leader and\or inspecting agency may be requalified after the two-year period if they indicate in a written report how they have corrected their deficiencies. Upon approval by ODOT, the team leader or inspecting agency shall be placed back on the qualified list.
- A disqualified team leader may also be requalified when he/she has retaken the training course "Safety Inspection of In-Service Bridges" and achieved a score of 70 percent or better on the examination given at the end of the course. *Attendance in the entire course is mandatory for requalification (i.e., no "testing out").*
- Henceforth, prospective team leaders taking the training course "Safety Inspection of In-Service Bridges" must *attend the entire course and* achieve a score of 70 percent or better on the examination given at the end of the course to be considered qualified.

Reasons For Disqualification

Typical reasons for disqualification can be, but are not limited to, the following:

- Lack of proper follow-up with the bridge owner for critical findings, such as broken load carrying members, critical scour at foundations, vehicular impacts which could adversely effect load carrying members, bridges requiring closure, etc.
- Lack of follow-up with the bridge owner for correcting load posting deficiencies.
- Failure to correct findings from Quality Control or Quality Assurance reviews.
- Recurring miscoded critical inventory items such as NBI Items 36, 41, 43, 51, 53, 54, 92, 93, and 113.

- Recurring miscoded critical elemental items such as structural elements and smart flags. This can include improper or omitted element numbers, quantities and/or condition states.
- Failure to attend required continuing education sessions as outlined in this policy.
- Failure to submit completed inspection data and/or corrections in a timely manner.

The Oklahoma Department of Transportation has the final authority to carry out this disqualification process. The inspecting agency must agree to these procedures as part of any bridge safety inspection agreement before they will be allowed to perform any bridge safety inspections.