



# Transportation Synthesis Report

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## Contractor Prequalification Quality-Based Rating

*Prepared for*  
**Bureau of Highway Construction**  
**Division of Transportation Infrastructure Development**

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*Transportation Synthesis Reports (TSRs) are brief summaries of currently available information on topics of interest to WisDOT technical staff in highway development, construction and operations. Online and print sources include NCHRP and other TRB programs, AASHTO, the research and practices of other state DOTs, and related academic and industry research.*

### **REQUEST FOR REPORT**

The Bureau of Highway Construction requires interested bidders to establish proof of their competency and responsibility prior to submitting bids. Firms must complete a Prequalification Statement that includes information on finances, plant and equipment, organization, prior experience and other pertinent information. The quality of a contractor's past performance on WisDOT jobs is currently not a formal part of the prequalification process, although project managers complete an "Overall Rating" of contractors at the end of a project that includes "Quality of Work." The Bureau is interested in exploring ways to make past performance a greater factor in the process. The RD&T Program was asked to look at approaches that other state DOTs have taken to this issue.

### **SUMMARY**

A March 2001 report of the National Cooperative Highway Research Program (Project D10-54), *Quality-Based Performance Rating of Contractors for Prequalification and Bidding Purposes*, provides comprehensive information on this issue.

Key findings of the report are summarized below. The full report is available as Web Document 38 at [http://www4.trb.org/trb/onlinepubs.nsf/web/nchrp\\_web\\_documents](http://www4.trb.org/trb/onlinepubs.nsf/web/nchrp_web_documents) on the Web site of the Transportation Research Board.

- Survey responses on existing prequalification systems are documented from 35 states and Ontario; innovative approaches are described in detail.
  - Wisconsin and five other states surveyed reported using an indexing system to rate contractor performance.
  - Minnesota uses incentives and disincentives to encourage higher levels of quality tied to measures of such things as ride quality, water-cement ratio, aggregate quality and asphalt mat density.
  - Missouri, which developed a performance ranking system similar to the model proposed in this report, uses a questionnaire aimed at identifying levels of performance related to quality, contract compliance, prosecution/progress and safety.

- Maryland waives the five percent retainage for contractors who score high. (A 2001 legislative initiative—HB 480—was designed to assist smaller companies by amending the state’s pre-qualification process to include past performance, minority information, management plans, and safety and quality control measures. The bill died in March 2002.)
- A model for quality-based qualification of highway contractors is proposed, and results are presented from field-testing the model with four state DOTs (Florida, Pennsylvania, Utah and Kentucky). The model includes a project performance factor from a questionnaire (PPFq) and a project performance factor from data (PPFd). Input from a DOT/contractor team was used to weight the factors for greatest objectivity. The investigators recommend that AASHTO or NCHRP integrate the Quality-Based Performance Rating (QBPR) model into the AASHTO SiteManager software.
- Third-party quality certification systems, such as the International Standards Organization ISO 9000 series of standards, are evaluated for potential application to highway construction.

### **CURRENT STATE DOT PRACTICES**

A table on pages 11-12 of the report summarizes the pre-qualification elements used by each of the 35 states responding to the survey. Many of the performance rating systems currently in place use a questionnaire to measure the key elements of **contractor cooperation, schedule and product**. Six states, including Wisconsin, are already using an indexing system to rate or rank contractors. The following DOTs were identified as having unique practices for evaluating contractor performance. The summaries below are edited verbatim excerpts from the report.

#### **Wisconsin**

The Project Manager rates the prime contractor and each subcontractor at the time of contract completion or, if necessary, when a subcontractor’s work is completed. The Overall Rating is a function of six factors:

1. **Quality** of work.
2. Prosecution and progress.
3. Supervision.
4. Cooperation/contract compliance.
5. Adequacy of work force.
6. Adequacy of equipment.

Each of the six factors has a list of between three and eight sub-items to consider, and each factor is rated and multiplied by an ‘Importance Factor’ to derive a ‘rating.’ The rating for each factor is summed to generate an ‘Overall Rating’ from zero to ten. The primary purpose of the rating is to provide input when establishing a contractor’s bidding limit. The bidding limit is determined by multiplying a ‘Financial Factor’ (taken from prequalification documents) by a ‘Work Factor’ (an evaluation by the DOT as to the quality of the work being performed by the contractor). The generation of the work factor includes referencing the six-factored rating mentioned earlier, but the two are not tied together procedurally. A secondary purpose is to monitor extremes in contractor performance. Contractor bidding limits have both increased and decreased based upon this rating. This state is adamant that prequalification based on any criteria is a waste of time and that post-qualification is an equal waste of time.

#### **Minnesota**

In an alternate approach to achieving the goal of quality construction, Minnesota bases its entire transportation-building program on a system of **incentives and disincentives**. Minnesota awards contracts based upon a low bid with a full performance bond and a full payment bond. Incentive clauses are included to reward a contractor for achieving better than specified **quality levels** or penalize the firm for achieving less than the specified quality levels. Some view incentive payouts as a waste of money since the contractor has, by signing bid forms, agreed to construct according to specifications. Others view incentives as a tool to drive quality higher than is specified. The discussion below describes the evolution of the Minnesota incentive program.

Approximately ten years ago, MinnDOT offered incentives for **ride quality**, hoping to improve the quality in that area of its construction program. At first, the incentives were only offered for smoother rides on concrete pavement. Later, bituminous paving was added to the incentive/disincentive program. The plan was to test each project with a California Profilograph and reward or penalize contractors according to set criteria. MinnDOT officials were encouraged as they watched contractors purchase new and better equipment to assist them in garnering the incentive money. Ride quality rose dramatically.

Approximately five years ago, the program was extended to include other areas of construction. Concrete was the first area to be added to the program, with **compressive strength** as the measuring stick. Unfortunately, there was too much disagreement among the parties involved as to how and when to measure the strength. The state decided to change the measure from compressive strength to **water/cement (W/C) ratio**. This has worked very well, as the statewide average W/C ratio has fallen 17 percent since the program was implemented.

At approximately the same time, **aggregate-quality** bonuses went into affect. This incentive was offered in order to lower alkali content in the coarse aggregate and achieve more uniformity in the aggregate size, as gap-grading had been a problem. MinnDOT is very happy with the improvement shown in this area also.

Recently, with the advent of Superpave, attention has again turned to bituminous paving, specifically to achieving **higher density** in the asphalt mat. To this end, density specifications were used to formulate an incentive program for asphalt density. The results have been extremely encouraging. Knowing MinnDOT's commitment to its incentive program, contractors immediately bought better compaction equipment.

Contractors have become innovative in their pursuit of incentive money. Large rubber-tired traffic rollers were being used as breakdown rollers. This technique has been long debated by bituminous engineers, and long resisted by contractor advocacy groups due to the initial cost involved. Contractors in Minnesota have discovered ways to remedy each of the problems associated with the technique, and have improved statewide asphalt mat density over one percent on average since the implementation of the incentives. One percent is considered a very significant increase.

Minnesota officials warn that, when implementing a program such as theirs, a state must realize that for the first two years or so costs will remain higher because the state is basically buying new equipment for the contractor. After that period, however, bids will start to come down as the contractors, knowing that the incentives are achievable, start adjusting bids accordingly. Thus, contractors who can consistently achieve the higher performance standards could theoretically improve their bidding success.

Data from MinnDOT indicates that, at this point in their experience, three percent is the key figure for their overall program. The DOT pays out approximately three percent over the bid amount on an average contract. The contractors, on the other hand, are submitting bids approximately three percent lower than when the program was first implemented. This seems to indicate that Minnesota is getting better quality for approximately the same price.

### **Missouri**

The Missouri Highways and Transportation Commission (MHTC) has been engaged in development of a **performance ranking system** for highway construction projects. Starting January 1998, a new questionnaire rating system replaced a subjective performance evaluation system that had been in place since 1991. The contractors were participants in the development of the questionnaire system. The MHTC specifications were the guiding format for the evaluation system.

The questionnaire is divided into sections corresponding to specifications. Point values are assigned to each question. Each question is assigned to one of four categories. Not all questions in the questionnaire would be applicable to all projects. Category performance is determined from total points scored on applicable questions. Achievement in each category is weighted according to the predetermined weighting scheme or importance factors as follows: **Quality, 30 percent**; Prosecution and Progress, 30 percent; Contract Compliance, 20 percent; and Safety, 20 percent. The contractor's overall performance is a weighted average on the basis of each contract's value.

Section	Title	No. Questions by Internal Division			
		Contract Compliance	Prosecution/ Progress	Quality	Safety
100	General Provisions	18	8		
200	Earthworks	5		6	1
300	Bases and Aggregate Surfaces	1		10	
400	Flexible Pavements	3		9	
500	Rigid Pavements	2		9	
600	Incidental Construction	2		9	7
700	Structures	3		17	1
800	Roadside Development	4		4	
900	Traffic Control Facilities	2		3	

Contractor performance is then placed into one of five categories: Outstanding, Above Average, Average, Below Average, and Unacceptable. These categories are determined from the annual data reported for all contractors using a Normal Distribution. The plus- and minus-one- standard-deviation range is considered the average range. Between plus one and plus two standard deviations, the contractor would be rated as Above Average. Any score greater than two standard deviations above the mean would rate the contractor's performance as outstanding. Similarly, the below average and unacceptable ratings are determined by the mean-minus-one and minus-two-standard-deviations respectively.

The contractors are rated annually in each of the questionnaire categories and overall. A contractor who has been given an unacceptable rating is placed in a probation category. If the following year's rating is also unacceptable, the contractor is suspended for a period of one year. After suspension the contractor is permitted to bid projects in a probationary status. A contractor in this probationary category who, at the end of the year, is again rated unacceptable is suspended for a period of three years.

The department also recognizes contractors who achieve superior performance ratings. The contractors are divided into four groups. The first three groups are based on contract dollar volume and the last category is specialty contractors or those who perform 85% or more of their work in a single specification area. In 1999 the MHTC evaluated 111 contractors on 334 projects. Two contractors who should have been placed on suspension were given an additional year of probationary status due to changes in the evaluation process. Eleven contractors were placed on probationary status and three were returned to good standing. Top achievers in 1999 for overall and each questionnaire category were recognized with plaques at the Annual Resident Engineer's Luncheon. Having a brass plate displayed in the lobby of the MHTC's support center also recognizes the top overall achiever in each group.

### **Maryland**

Although the Construction Section of each district in the state annually rates all contractors who worked in their district in the past year, Maryland **does not tie the grade to a bid ceiling or bid limit in any way**. The Project Engineer who oversaw the project performs the ratings. All ratings for a particular contractor are tallied and averaged, giving the contractor one grade for the entire state.

The numerical grade is between zero and one, and is a function of nine factors:

1. Competence of Personnel.
2. Public Relations.
3. Quality of Work.
4. Overall Administration.
5. Cooperation.
6. Adherence to Safe Practices.
7. Sub-contractors.
8. Equipment.
9. Contract Time.

Each of the factors has between one and seven sub-items to consider and is rated between one and ten and then multiplied by its weight to derive the numerical grade of between zero and one. A letter grade from A to F is then assigned each contractor based upon the numerical grade.

Each year, every contractor who did work in Maryland gets a **Report Card** that provides the contractor's numerical grade for that year, the numerical grade for a four-year period, and the state-wide average for each of those time periods. One of the incentives for contractors under this system is a **waiver of the normal 5 percent retainage** if they maintain an A grade.

If the apparent low bidder on a contract has a current grade of D, then that contractor is summoned to the DOT office, where the contractor's credentials and capacity to perform are challenged. The state has a contractual right at that point to reject submitted bids if they are not satisfied that the contractor can do the job. If the contractor is awarded the contract, then the retainage can be raised as high as 10 percent for the project.

Maryland has not failed to award a contract to a prime contractor based on a grade of D, but retainage has been raised to 10 percent on occasion. Several subcontractors with D grades have also been rejected. Only one contractor has ever received a grade of F, and that contractor was never the apparent low bidder during that period of time. No challenges to the grading system are known.

*(Note: The newspaper account summarized here is not from the NCHRP report.)* A January 11, 2002, story in the *Daily Record* (Baltimore) describes a controversy over a "best-value contracting" bill (HB 480) put to the Maryland legislature late in 2001. The bill was designed to assist smaller companies by amending the state's pre-qualification process to include past performance, minority information, management plans, and safety and quality control measures.

Industry lobbyists contended the bill would create a "beauty contest" with too much subjective criteria and that Maryland's existing pre-qualification system was effective in accounting for past performance. The bill died in March with a failure of the House to recommend it to the Senate. HB 480 attempted to quantify the specific proportion of the bid evaluation process that each factor should play. For instance, bid price would account for 70 percent of the weight of evaluation, past performance 13 percent, and so on, with other factors including minority involvement, staff recruiting and training techniques, and so on. The bill, its legislative history, and its backers can be reviewed at <http://mlis.state.md.us/2002rs/billfile/hb0480.htm>.)

## Utah

The Utah Department of Transportation is currently developing a new contractor rating system, which will consist primarily of a list of questions to be answered by the UDOT project engineers. Each of the questions, which relate to contractor project performance, can be answered "Yes," "No," or "NA." The concept is to evaluate contractor performance based upon these ratings of basic project activity. Examples of typical questions:

1. Did the contractor have the right equipment to perform the work?
2. Did the contractor start the work on time?
3. Did the contractor respond quickly to the Public's needs?

There are currently 76 questions covering a wide range of **performance categories** including project management, timely scheduling, reporting and documentation, EEO and DBE compliance, training program compliance, **installed work quality**, subcontractor supervision, and contract claims. UDOT assigns a weight of one point to each question. The contractor's score would be the total points received for positive answers. The department is also considering applying a Project Difficulty Factor, which would adjust the Contractor's score based upon the relative difficulty of the project. UDOT plans to have the Project Engineer review the evaluation questionnaire with the Contractor several times during the performance of the project, not just at the conclusion. This should improve DOT-Contractor communications and facilitate addressing deficient performance promptly.

The Utah approach removes a measure of subjectivity from the evaluation process. Yes/No answers to basic questions on project activity are used to define the contractor's performance. As with any questionnaire, the questions must first be tested with different personnel to insure consistent interpretation. With refinement, however, the questionnaire approach should contribute to the goal of a fair and consistent contractor evaluation.

Breaking down the performance evaluation into specific items should improve consistency of measurement from project to project. Also, from an organizational management perspective, both the owner and the contractor should benefit from the additional level of detail in the evaluation. Problem areas can be identified for further attention.

### **Virginia**

The Virginia Department of Transportation (VDOT) uses a two-factor qualification system that employs the use of a **performance questionnaire score** in the determination of the contractor's bidding capacity. The C-36 form referenced below is the DOT's questionnaire evaluation of the contractor's end of project performance. The VDOT capacity formula is as follows:

$[(CA - CL) + (NA - NL) (0.60)] A = \text{Maximum Capacity}$

CA = Current Assets

CL = Current Liabilities

NA = Non-current Assets

NL = Non-current Liabilities

A\* = Summation of last 24 months C-36s (\*based on a minimum of five (5) form C-36s) (number of C-36s) x 100/12

The interim project report and final project report are divided into four categories as follows:

- Prosecution of Work
- Project Communication
- Safety
- Environmental

There is room for the reviewer to comment on each category on the back of the scoring sheet. The final report includes a report on previous interim reports filed for the project. The interim reports are given a 70 percent weight factor in the final project evaluation. The District-level evaluation focus is on the same four areas but on more global issues in the contract. The District evaluation is given a 30 percent weight in the final evaluation. The questionnaire is fairly open in terms of specific question weights. Total points are constant, but the reviewer has discretion on point distribution to each question. Bonus points are also possible for contractors who exceed expectations.

The use of two related questionnaires, one for the project level issues and the other for the final evaluation, incorporating District input, is unique. The use of interim reports to track the contractors' project progress provides contractors an opportunity to improve some elements of their performance during execution of the work.

### **Connecticut**

The Connecticut Department of Transportation conducts annual performance ratings of all contractors, including subcontractors, for a calendar year. Interim ratings are used to evaluate a contractor's performance on a project to date and are conducted only when requested by the Offices of Construction or Contracts. The Connecticut questionnaire has five elements as follows:

- Quality of Work
- Performance of Work
- Adherence to Project Schedule
- Implementation of Federal, State, and Local Policies, Procedures, and Regulations
- Procedural and Administrative

The first category, quality, is a single question with a maximum value of 4 for excellent. Other categories contain 4 or more questions, not all are required responses, and the average is taken for the section. An interpretation key is provided to give the evaluator a guide on each question's response possibilities. The primary use of the information is in determination of responsibility questions. The data collected by the Department is not unlike that of many other performance rating systems. It is not used in direct calculation; rather it is available for decision support. Their process is mentioned here because of the trend data retained from the surveys.

The distribution of ratings from 1993 to the present reveal that in a four-year period many contractors only performed work on a single project. Of the 430 contractors in the database, more than half only had a score for one project. There was no obvious pattern that these one-time contractors performed any better or any worse than

'regular' contractors. Without performing any sophisticated evaluation, the data clearly supports the contention that good contractors perform consistently well. Poor contractors perform at a relatively consistent poor or below average level.

**QUALITY-BASED PERFORMANCE RATING (QBPR) MODEL**

**Chapter Three.** The investigators reviewed a wide variety of factors that the literature, the researchers and the focus groups indicated should be in any model used to evaluate a contractor’s performance and quality. Approximately 600 surveys were sent to state DOTs, and over 400 surveys were distributed to contractors in the four states participating in the focus groups. Two hundred forty useable surveys were returned.

Respondents were asked to rate eight factors, selected based on suggestions from the Focus Groups in order of importance to overall construction project quality. The results were tabulated for DOT personnel, contractors, and all respondents (see Table 3.2.). Since the overall distribution of the surveys heavily favored the DOTs, a comparison of the rankings was deemed appropriate. The team found it quite interesting that the contractors and DOT personnel generally had similar rankings. The greatest area of disparity was in the area of “Financial Considerations”—the contractors felt that this was the third most important consideration, whereas DOT personnel ranked this lowest. The combined ranking reflects the overwhelming weight of responses by DOT personnel in the survey.

Table 3.2. Quality Factor Rankings

Factor	DOT Ranking	Contractor Ranking	Combined Ranking
Personnel	2	2	2
Project Management/Control Skills	1	1	1
Financial Considerations	8	3	8
Schedule Adherence	7	7	7
Contractor Organization	6	6	6
Experience with this type of work	4	4	4
Plant and Equipment	5	8	5
Final Product	3	5	3

In addition to ranking the alternatives in the survey, additional questions were asked. The first question was: *Is it possible to justly rate a contractor’s quality of work and tie it to qualification?* When all of the respondents are considered, 80% said yes, 12 % said no, and 8% gave some other answer. Of the DOT respondents, 83% said yes, 9% said no, and 8% gave some other answer. Of the contractors, 66% said yes, 28% said no, and 6% gave some other answer.

The second question was: *Is it possible to justly rate a contractor’s quality of work and factor it into a bid to determine the awardee of a contract?* When all respondents are considered, 47% said yes, 37% said no, and 16% gave some other answer. Of the DOT respondents, 50% said yes, 33% said no, and 17% gave some other answer. Of the contractors, 34% said yes, 57% said no, and 9% gave some other answer.

**Chapter Four.** The investigators discuss in detail possible models for including quality in the traditional Design-Bid-Build environment. They propose a combination of periodic evaluations by the field supervisor using an objective questionnaire (project performance factor from a questionnaire - PPFq) and collection of final product test information (project performance factor from data (PPFd). The final model would include both kinds of data in a compatible form, with weighting to account for the relative importance of subfactors.

On pages 75-76 the authors discuss possible application of their QBPR system for both prequalification purposes and as a factor in awarding bids.

**Chapter Five.** The investigators discuss the actual data used from the four focus group states to develop and validate their model. They claim the model is accurate and easy to use.

**Chapter Six.** Extensive discussion of implementation issues.

**Appendices** include results of the literature search, activities of the focus groups, questions for an interim and end of project questionnaire, and charts and graphs of results of using the model in the four test states.

## **EXTERNAL RATINGS AND CERTIFICATIONS**

### **ISO 9000 (International Standards Organization)**

The ISO 9001 Quality Management Standard was reported as being used contractually on infrastructure projects in Europe (roads and metros), Africa (water supply and waste treatment), and the Far East (roads, railways and airports) as a model for project quality systems driven by owners. Documented quality systems are used, audited, and improved by project teams to reduce the cost of meeting the needs of those who finance, will use, and will be affected by the project. Owners intending to prequalify must give the construction industry time to assess and upgrade, as necessary, its quality systems to meet the American National Standard (ANSI/ASQC Q9001 or Q9002). (Broomfield, 1995) Although reported as such, no further evidence could be found that the implementation of ISO was a project qualification requirement or the quality assurance process bid for that particular project.

The ISO system requires that external audits of quality systems are performed prior to certification, and that periodic reassessment is conducted to assure the certification is valid. This would effectively add a third layer of assessment on projects. The contractor, in checking his or her quality and inspection procedures, conducts the first level of quality assessment. The second level of assessment conducted is generally the assurance or inspections conducted by external parties (consultant inspections or DOT inspections) who perform a detailed examination of the product or service provided. The ISO requirement involves the third level assessment by an external examiner on the entire contractor organization for quality.

### **Advantages in ISO Certification**

- Ensures that at one point in time (during the certification audit) the contractor would be maintaining this type of quality management process (the system requires continuous process improvement and measurement).
- Would require all contractors in the industry to evaluate and document their processes and procedures related to every element of their operations. Increased standardization in procedures would likely result.
- Demonstrates the level of control the contractor maintains.
- Likely to reduce rework and some costly installation mistakes.

### **Disadvantages in ISO Certification**

- Relatively high maintenance to manage and operate system.
- Requires significant investment of personnel and time.
- Level of training required.

### **Unknowns Regarding ISO Certification**

- Would an ISO requirement provide value added to the DOT as well as the contractor?
- Does an ISO certificate provide sufficient evidence of quality performance to be considered mandatory for all contractors?
- What would be the overall effect of some DOTs adopting and others not adopting?
- Would requiring ISO result in reduced competition? Is it appropriate for all contracts?
- Challenges presented by DOT's prescribing how a contractor conducts business internally.
- Would it be reasonable for DOTs to also become ISO compatible with their systems?
- What time frame would be permitted for implementation?

The unknowns posed by the ISO systems are more problematic than any of the disadvantages. These are hard issues to evaluate given the scarcity of information on contractors who have adopted ISO for public construction. The Utah DOT was contacted in regard to their use of ISO 9000 on the Interstate-15 project. They sent the following reply: "Our contractor continues to maintain its certification. They had to do some work to get the original certification,

but there have been minor findings on the recertification reviews. To answer your question of effectiveness, I think the measure is somewhat intangible, I'm sure there have been some aids to the project, but there are so many new things happening on the project, it is hard to measure.”

### **CONQUAS - Construction Quality Assessment System**

The Construction Industry Development Board (CIDB) of Singapore developed this system of contractor assessment. It was developed as an objective quality measurement system for building construction. It has also been applied to civil construction. Its purpose is to provide an incentive scheme for encouraging contractors to improve the quality of their construction. The incentive process awards contractors by allowing them up to a 5 percent premium on bidding or \$5 million, whichever is lower. Thus, a contractor with a high CONQUAS rating can bid higher than a non-rated contractor and still be awarded the contract.

The CONQUAS system has defined the criteria or tolerances for inspection and determines to what extent a project satisfies those requirements. Rather than performing a complete building inspection, the system is based on obtaining a representative sampling of the building areas. The sample size is determined by the physical size of the structure. As described in the CONQUAS manual, the weight system is “a compromise between the cost proportions of the three components in the various buildings and their aesthetic value.” (p. 5) The three basic component areas are structural, architectural, and mechanical—electrical (M&E) work.

### **Application of CONQUAS**

The score is currently used in the bidding process as a premium for the contractor. The following rules apply:

- Average quality assessment score on past three projects must be above 65.
- A premium of 0.2 percent of the contract size is given for every point above 65.
- The maximum premium is 5 percent of the project bid total or \$5 million, depending on which is lower.

This system of objective measurements allows the award of a contract to someone other than the lowest bidder when the bid is adjusted for the quality premium based on the CONQUAS score. An independent third party conducts the scoring process. One analysis suggests that tendering premiums may be most effective on large projects. An analysis of bids in the referenced material suggested that the difference between the two top bidders was generally smaller on larger projects. Contract size bias, from this perspective, is an important element to consider if the QBPS is used in a similar fashion. (Prasertsintanah, 1996)

The CONQUAS model provides several clear advantages:

1. A well-defined measurement scheme that permits measurements among various projects to be compared on an equal basis.
2. The independent third party is not involved in the project and views quality and test results without knowledge of interacting factors.
3. By modifying the bid amount rather than the prequalification, the contractor is being rewarded for consistently providing above the targeted level of quality. The target level of 65 would represent a project that meets the minimum acceptable level of quality.

Disadvantages of the CONQUAS approach are:

1. Does not consider the effectiveness of the contractor’s safety or management systems.
2. The cost of supporting a third party process must be considered in weighing the total costs. The third party costs are in addition to the increased cost of performance for those situations where contracts would be awarded to someone other than the low bidder based on the premium calculation.

### **Constructibility Review**

Many owners are requesting that contractors document their quality process along with their results. Quality assurance or quality control process documentation would be valuable in evaluating a contractor for the purpose of bidding eligibility. However, relying on a binder of materials or an external certification to validate quality contractors does not assure that the products delivered will be high quality. Owners should realize that just because a contractor has a quality assurance program and process does not mean that the contractor will deliver more than the specified minimum quality. While for some contractors this alone may be an improvement, this may result in a “dumbed-down” concept for quality. If the specifications represent the minimum acceptable quality, the contractors would be wise to devise systems and processes to deliver that level of quality with great assurance. Thus, before

embarking on a mission to improve quality by prequalifying contractors for quality, a DOT must be sure its processes provide specifications and drawings commensurate with the quality of output desired. The DOT must assure that processes and personnel are compatible with the targeted quality level.

To that end, the Florida Department of Transportation has instituted a plan whereby each district has a Bidability/Constructibility Engineer. This engineer is generally one with a construction background (though not always). The engineer has a staff made up of experienced, full-time design and construction personnel who review every set of plans that will be let for bid by that district.

Previously designated DOT personnel had reviewed plans at several project development stages (30 percent design, 60 percent design, and 90 percent design). Additional department personnel occasionally checked projects at the 100 percent stage. This process is still in place. However, now, after this has been accomplished, at the time when the plans would have formerly gone to bid, this new Bidability/Constructibility staff reviews the plans. The number of mistakes caught by this staff after the former process is complete varies from job to job, but is sometimes so high that one of these Bidability/Constructibility Engineers could only classify the number as “scary.” It would seem reasonable that after the traditional 30-60-90 percent reviews were completed, there would be only a rare error for this team to find, but this apparently has not been the case. Thus, design review or design performance is an important consideration in the institution of contractor quality performance measurement.