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Performance Based Contracting and Improving the Current Contracting Process

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PERFORMANCE BASED CONTRACTING
AND
IMPROVING THE CURRENT
CONTRACTING PROCESS

A Thesis
Presented to
the Graduate School of
Clemson University

In Partial Fulfillment
of the Requirements for the Degree
Master of Science
Civil Engineering

By
Troy Robert Berkland
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Accepted by:
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ABSTRACT

The primary objective of the research described in this report was to suggest improvements to the maintenance contracting process currently utilized by the South Carolina Department of Transportation (SCDOT). A secondary research objective was to examine to what extent SCDOT could migrate more toward performance based, as opposed to method based, highway maintenance specifications.

A comprehensive literature review indicated some states had successfully implemented performance based specifications for a wide range of maintenance activities whereas others had not. Some states have adopted performance based specifications as part of a comprehensive asset management program whereby the contractor typically performs all routine maintenance activities within a specified geographic region. The literature also indicated that performance based contracting is often driven by legislative mandates to outsource maintenance activities. The literature review further indicated the Maintenance Rating Program (MRP) that has been implemented by the Florida Department of Transportation (FDOT) has the potential to serve as a template for examination and discussion within SCDOT.

In an attempt to solicit input from the SCDOT maintenance contractor community, a survey was executed to document contractor perceptions with respect to cost, training, and ease of implementation issues associated with performance based specifications. In general the contractors indicated that performance based specifications
would increase the need for additional manpower training, but the additional cost of implementation would be minimal.

In order to obtain input from SCDOT field maintenance personnel, brainstorming workshop sessions were conducted in all six SCDOT district offices. Both the utilization of performance based specifications and the overall improvement of the SCDOT maintenance contracting process were discussed in the workshop sessions. A document comparing the FDOT MRP to current SCDOT contracting practice was distributed to the district offices prior to the workshop sessions. In general, the concept of performance based specifications was not well received by SCDOT maintenance personnel. Budget concerns, district control of mowing cycles, and contractor performance were common issues raised by the workshop participants. However, workshop participants endorsed a suggested contractor prequalification concept as a means of improving the maintenance contracting process. Increased inspector training, the use of regional specifications, and the implementation of reasonable liquidated damages were among the additional suggestions put forth during the workshop sessions.
ACKNOWLEDGEMENTS

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I would also like to thank the South Carolina Department of Transportation Research Steering Committee for their direction and input throughout this research. The input of the steering committee was vital to the success of this research.

Finally, I would like to thank my wife, Joely Tommie Berkland, for her support and reviews of this manuscript.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>TITLE PAGE</td>
<td>i</td>
</tr>
<tr>
<td></td>
<td>ABSTRACT</td>
<td>ii</td>
</tr>
<tr>
<td></td>
<td>ACKNOWLEDGEMENTS</td>
<td>iv</td>
</tr>
<tr>
<td></td>
<td>LIST OF TABLES</td>
<td>vii</td>
</tr>
<tr>
<td></td>
<td>CHAPTERS</td>
<td></td>
</tr>
<tr>
<td>I.</td>
<td>INTRODUCTION</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Research Steering Committee</td>
<td>1</td>
</tr>
<tr>
<td>II.</td>
<td>METHODOLOGY</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Research Steering Committee</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Literature Review</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>District Workshops</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Contractor Survey</td>
<td>5</td>
</tr>
<tr>
<td>III.</td>
<td>LITERATURE REVIEW</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Introduction</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Concepts Utilized in Other States</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Current Research Initiatives</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>ASSHTO-TRB Maintenance Management Conference</td>
<td>12</td>
</tr>
<tr>
<td>IV.</td>
<td>RECENT SCDOT CONTRACTS</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Introduction</td>
<td>13</td>
</tr>
<tr>
<td>V.</td>
<td>PERFORMANCE BASED CONTRACTING VS METHOD BASED CONTRACTING</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Introduction</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Trends</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>Contracting Methods</td>
<td>20</td>
</tr>
<tr>
<td>VI.</td>
<td>FLORIDA DEPARTMENT OF TRANSPORTATION MAINTENANCE RATING PROGRAM</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Introduction</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>MRP Summary</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>MRP Compared to Current SCDOT Specifications</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Evaluation of FDOT MRP Program by SCDOT Personnel</td>
<td>27</td>
</tr>
</tbody>
</table>
Table of Contents (continued)

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>VII. NORTH CAROLINA PERFORMANCE BASED CONTRACT</td>
<td></td>
</tr>
<tr>
<td>Introduction</td>
<td>30</td>
</tr>
<tr>
<td>NC Contract Components</td>
<td>31</td>
</tr>
<tr>
<td>Conclusions</td>
<td>31</td>
</tr>
<tr>
<td>VIII. CONTRACTOR SURVEY</td>
<td></td>
</tr>
<tr>
<td>Introduction</td>
<td>51</td>
</tr>
<tr>
<td>IX. IMPROVING THE CURRENT CONTRACTING PROCESS</td>
<td></td>
</tr>
<tr>
<td>Introduction</td>
<td>50</td>
</tr>
<tr>
<td>Performance Specifications</td>
<td>51</td>
</tr>
<tr>
<td>Contractor Pre-Qualification</td>
<td>53</td>
</tr>
<tr>
<td>Action Plan</td>
<td>57</td>
</tr>
<tr>
<td>Training</td>
<td>58</td>
</tr>
<tr>
<td>Regional Specifications</td>
<td>60</td>
</tr>
<tr>
<td>Liquidated Damages</td>
<td>60</td>
</tr>
<tr>
<td>Miscellaneous Comments</td>
<td>61</td>
</tr>
<tr>
<td>X. SUMMARY AND CONCLUSIONS</td>
<td></td>
</tr>
<tr>
<td>Literature Review</td>
<td>63</td>
</tr>
<tr>
<td>Performance Based Contracting</td>
<td>64</td>
</tr>
<tr>
<td>Contractor Survey</td>
<td>66</td>
</tr>
<tr>
<td>Improving the Current SCDOT Contracting Process</td>
<td>68</td>
</tr>
<tr>
<td>Recommendations</td>
<td>69</td>
</tr>
<tr>
<td>APPENDICES</td>
<td></td>
</tr>
<tr>
<td>A. CONTRACTOR SURVEY</td>
<td>72</td>
</tr>
<tr>
<td>B. FLORIDA MRP HANDBOOK</td>
<td>72</td>
</tr>
<tr>
<td>C. DISTRICT MEETING MINUTES</td>
<td>72</td>
</tr>
<tr>
<td>REFERENCES AND BIBLIOGRAPHY</td>
<td>119</td>
</tr>
</tbody>
</table>
## LIST OF TABLES

<table>
<thead>
<tr>
<th>Table</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.1</td>
<td>Quality Credit Evaluation Factors for Technical Proposals</td>
<td>38</td>
</tr>
<tr>
<td>7.2</td>
<td>Weighting of NCDOT Technical Scores</td>
<td>39</td>
</tr>
<tr>
<td>7.3</td>
<td>Example of NCDOT Technical Score Weighting</td>
<td>40</td>
</tr>
<tr>
<td>8.1</td>
<td>Contractor Questionnaire Scores</td>
<td>46</td>
</tr>
<tr>
<td>8.2</td>
<td>Contractor Questionnaire Scores</td>
<td>48</td>
</tr>
<tr>
<td>8.3</td>
<td>Contractor Questionnaire Scores</td>
<td>49</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

South Carolina Department of Transportation (SCDOT) has traditionally accomplished the majority of its maintenance work with its own forces and equipment. However, in the past several years, an increasing amount of their maintenance activities have been privatized, and this trend is expected to continue into the future. Currently, SCDOT, with regards to maintenance activities, specifies to the contractor the procedures of how to perform the work. This process has been termed Method Based Contracting (MBC).

Most state agency maintenance departments use MBC. MBC has two main benefits which explain its widespread use. First, MBC allows the contracting agency significant control over the contractor. Often, there is the belief that a contractor will not be able to accomplish the task without having every aspect of the work requirements specifically detailed. Secondly, MBC is often considered the easiest process to develop and implement. These two causes allow MBC to reliably yield consistent results.

Ultimately, the contracting agency is looking to reach a desired end result, for example, maintaining effective line striping. Though MBC is often sufficient to complete the maintenance work, contracting agencies may find they are not satisfied with the results. There are a couple of fundamental flaws with MBC. First, the main problem with MBC is it specifies the maintenance work. Even though the contractor fulfills the contract, the desired end result is not met by the specified work. Also, MBC does not
allow the contractor to find the optimal and most efficient means and equipment to accomplish the desired end result. Lastly, MBC requires significant agency personnel to develop and award the contracts as well as to ensure the contractor is performing the specified work.

Performance Based Contracting (PBC), is often referred to as outcome-based contracting, addresses the three main shortcomings of MBC. Instead of letting a contract for the work, PBC places the responsibility on the contractor by specifying the end result desired by the agency. The benefits of this means the contracting agency will be more likely to receive the desired end result. Also, PBC allows the contractor more freedom to find the best methods and equipment for the work while reducing the agency personnel normally needed to award method based contracts.

While PBC addresses many of MBC’s shortcomings, it too is not without flaws. First, agency personnel must overcome the significant challenge in changing the mindset between MBC and PBC. The contracting agency must also develop a performance based contract and a performance based awarding process. This requires significant resources to develop as well as patience in gathering lessons-learned. Last, the contracting agency must be capable of awarding to contractors based on more than cost alone.

Over the last ten to fifteen years, a few states and other agencies have explored the use of Performance Based Contracting (PBC). Many of these states, plus a province in Canada, began their programs because they were mandated to do so by their legislature. As with all new major changes, nearly all of them have experienced some level of difficulty in implementation. In some cases, this difficulty has been severe
enough to cause the agency to cancel their program entirely. However, most agencies have continued their development and implementation of Performance Based Contracting.

Though PBC has potential as a solution for SCDOT, there are many obstacles the Department must face before it could be implemented. The Department needs to be able to select contractors based on qualifications, price, and abilities rather than price alone. Also, Department personnel must be able to overcome the engrained current contracting process. Last, SCDOT must develop a comprehensive performance based contract and awarding process.
CHAPTER II

METHODOLOGY

Research Steering Committee

David Cook, of SCDOT, led a Research Steering Committee composed of knowledgeable and helpful SCDOT personnel. This group provided direction and feedback to the research team on a regular basis. Progress reports were forwarded quarterly to the Research Steering Committee to update the Committee on the research team’s progress. During the course of this research, the Research Steering Committee and the research team met every three months to discuss recent progress and to decide a path for future progress reports. The Steering Committee also provided feedback on multiple areas of performance based specifications and helped arrange the district workshops.

Literature Review

The literature review was initiated by examining other states that have implemented PBC, as well as other research regarding PBC. Some of the states have had years of experience and success with this type of contracting. These states were very revealing, as the information was easy to obtain. However, others with less experience or poorer experiences were far more difficult to obtain information. Virginia and Florida, two states with positive experiences, attended AASHTO/TRB Maintenance conference in Charleston, SC the week of July 16th, 2006. At this conference, they gave presentations focusing on how they have successfully implemented PBC. During these presentations,
the speakers also discussed the motivations behind the implementation, some of the
difficulties experienced, and the advantages of PBC. These presentations led to the
pursuit of additional details and a comprehensive understanding of these and other states
with successful PBC programs.

**District Workshops**

During the course of this research, the Research Steering Committee and the
Clemson research team decided to expand the focus of the research project to include
other concepts of improving the current SCDOT contracting process. To fully
understand the current problems and to gather ideas of possible solutions, the research
team began by conducting district workshops at each of the seven SCDOT district
offices. These district workshops comprised of SCDOT personnel who work in the
districts and have hands-on knowledge of the current difficulties in the SCDOT
maintenance contracts. David Cook and others on the Research Steering Committee
provided the research team with contact information and help setting up these beneficial
meetings.

**Contractor Survey**

As another component of this research project, it was deemed necessary by both
the Research Steering Committee and the Clemson research team to examine the impact
of PBC on the maintenance contractors’ community. A survey was formulated and
distributed that provided contractor a brief explanation on the components of
performance contracts and then solicited opinion responses. This survey asked the
contractors to rate, from one to five, whether they strongly agreed or strongly disagreed
with the statements in the survey. Space was also provided to obtain additional written feedback. Since the Steering Committee had expressed the desire to explore PBC on an individual task basis, additional questions were asked relating to each of those components.
CHAPTER III

LITERATURE REVIEW

Introduction

A comprehensive literature survey was executed using sources such as the Federal Highway Administration (FHWA), the South Carolina Department of Transportation (SCDOT), the Transportation Research Board (TRB), the Transportation Research Information Services (TRIS) and the American Association of State Highway Transportation Officials (AASHTO). The purpose of this survey was to identify background information that would further define the scope of the project, assess the current status of SCDOT contracts, and compile lessons learned from other states that have undertaken PBC.

Concepts Utilized in Other States

According to an article, “Perspective on Maintenance and Operations,” Virginia, Florida, and Massachusetts have taken some of the most innovative approaches to road maintenance contracting. Florida has implemented several geography-based contracts, in which the contractor is responsible for almost all maintenance activities on designated road segments. Within three different sections of its interstate system, Virginia has implemented a performance-contracting approach, whereby the contractor is responsible for achieving specified system performance and outcomes instead of carrying out traditional work specifications. The Florida DOT has been measuring maintenance
performance by using the Maintenance Rating Program (MRP) for nearly 10 years (Hamilton). Further information on the MRP program can be found in chapter five.

Florida’s PBC is part of their Florida Highway Asset Management Program. This program is the:

Holistic approach used for decision making, investment analysis and management of transportation assets. Asset management is the entire process from programming and planning to preservation of the system and is characterized by a solid policy framework, measurable objectives, and continuous performance monitoring, resulting in sound investment decisions with a customer focus (FL Asset Management Program).

The objective of the contracts resulting from this Asset Management Program is to allow the contractor to manage and perform all routine maintenance activities in a certain geographic area associated with roadway, structures, drainage, roadside, rest areas, wayside parks, vegetation and aesthetics, traffic services, structure inspection and incident management. The contracts are lump sum contracts and usually have a duration of seven years, with a renewal option. The contractor is expected to meet the performance specifications of the maintenance activities consistently throughout this period. However, the contractor will be declared in default of the contract if there is continued poor performance or a failure to perform in accordance with the performance specifications. Florida developed the MRP program to rate the contractor’s work in accordance with the performance specifications (Highway Asset Management Contract).

The MRP program provides a uniform contractor evaluation for maintenance features on the State Highway System. The information contained in the MRP Handbook defines the method of conducting a visual and mechanical evaluation of routine highway
maintenance conditions (Barry). The State Maintenance Office randomly samples each period. Each random sample is evaluated at 30 points per facility type or a minimum of 3 per mile (Asset Management Contract, Asset Management Contracting & Handling of MRP Data). A maintenance rating of 80 out of 100 is considered acceptable. A team consisting of two people from a district office is responsible for collecting the MRP data and reporting the data as outlined by the MRP handbook (the MRP handbook can be found in Appendix B). These personnel are initially trained in the MRP system and attend yearly training that targets revisions. A yearly Quality Assessment Review (QAR) is conducted for each MRP team by a QAR team that consists of the State MRP Engineer and the MRP Team Supervisor (Barry). The MRP handbook is produced and made available by the State Maintenance Office and is not available for free nor online. The handbook provides the detailed information required for uniform and accurate data collection (Highway Asset Management Contract).

A similar PBC program is being undertaken in British Columbia. Information gathered from their department of transportation illustrates and promotes some of their long-term performance based projects. It appears that these contracts focus on highway construction but also include maintenance to meet a set standard for as long as 30 years (Gilbertson).

The Virginia Department of Transportation (VDOT) is undertaking a program termed Turnkey Asset Maintenance Services (TAMS), which is very similar to Florida’s PBC program. The first TAMS contract was issued on March 17, 2005. This contract was with a private company to manage the assets along a specified section of right-of-
way. For the first contract, the Virginia DOT issued a request for proposals that addressed all maintenance activities (roadway, drainage, structures, roadside, vegetation and aesthetics, traffic services, rest areas, and incident management) for 306 miles of right-of-way. The two proposals, most highly rated, were selected based on six weighted evaluation criteria. They were:

- Successful experience of similar projects
- Qualification and experience of key personnel
- Demonstrated understanding of the nature and scope of the work
- Soundness of approach in meeting the specified performance measures
- Cost
- Utilization of small, women, and minority businesses

Once VDOT executed the contract, it began conducting contractor evaluations based on approximately 120 different performance specifications that were established in the contract. These performance specifications required the contractor to assume all day-to-day management and administrative responsibilities. However, VDOT still oversees this process through regular performance evaluations. These evaluations will be performed using essentially the same Maintenance Rating Program (MRP) used by the FDOT (VADOT RFP #474-CH, RFP # 483-CH).

North Carolina is another state that has emerged as a leader in PBC. Though they do not have as much experience as some of the other states, they analyzed what has been successfully implemented and what has not worked for other agencies. They were then able to compile all relevant information into an impressive performance based contracting strategy. In 2006 and 2007, North Carolina began letting these contracts. A
formal evaluation of program success is pending. It appears that they should receive
good results as they have extracted the best parts from successful agencies, though much
of the success also lies in the hands of the personnel implementing these contracts. A
detailed description and breakdown of a North Carolina performance based contract can
be found in Chapter VI.

Current Research Initiatives

Currently there are a significant number of studies either still in their infancy or
recently completed. Most of the current and planned research directives focus on
maintenance and construction in one comprehensive contract. This puts complete control
and, therefore responsibility, on the contractor for selection of materials, methods, and
equipment for all maintenance activities.

One of the recently completed studies was an article “Performance Related
Specifications: Next Step in Pavement Quality,” which was written for the Federal
Highway Administration (FHWA). The article states that agencies are moving beyond
prescribed specifications to performance-related specifications (PRS). The FHWA
established a PRS team to create a program to advance the use and understanding of PRS.

A national workshop was held by the PRS team to begin a National PRS Action
Plan. There are two types of PRS models: performance-prediction models and
maintenance-cost models. Both of these models focus on the life-cycle of the pavement
and its surrounding components from design, to construction, to replacement. Though
components of these models can be utilized, neither of these models can be implemented
without SCDOT integrating the construction and maintenance divisions that are currently
separated. It is worth noting many state programs integrate their maintenance activities with their new construction to achieve better overall results (Performance Related Specifications).

Most of the studies concerning performance specifications are in the initial or proposed phases. An example of this is the research problem statement: “Establishment of Performance-Related Quality Assurance AASHTO Guide Specifications,” issued by The Transportation Research Board (Transportation Research Board Technical Activities Division). Further explanation of the problem statement specifies:

“the study should follow guidance that has been provided by the Federal Highway Administration for the development of PRS. Once the general structure of the PRS has been established, the researchers will collect and summarize needed information on costs in order to establish optimized acceptance criteria and assure truly cost effective PRS.

This research will present guidelines for establishing recommended levels of materials and construction quality to be specified, establishing the optimum number of acceptance samples, establishing optimum limits on the magnitude of allowable price reduction/increases, and assuring the PRS will satisfactorily provide for all desirable aspects of quality and performance.

The objective was to convert the current concrete portion of AASHTO QA Guide Specifications to performance-related specifications.”

Also, there is proposed research by AASHTO Standing Committee on Highways entitled “Task 218: Performance-Based Maintenance Contracting.” This task was started March 27, 2006 (Transportation Research Board).

ASSHTO-TRB Maintenance Management Conference

There was an ASSHTO-TRB Maintenance Management Conference held in the summer of 2006 in Charleston, S.C. Though there were many research presentations
made at the conference that revolved around performance based specifications and contracting, three presentations were particularly helpful. James W. Bryant with the Virginia Department of Transportation (VDOT) presented *Performance Based Maintenance Contracting in Virginia*. The Virginia House Bill 667 has required all maintenance of the Interstate Highway System in Virginia to be outsourced by July 1st, 2009. In order to being working towards this goal, VDOT entered into a 5 year (later extended another 5 years), negotiated contract for total asset management (this includes routine, preventative, and restorative work) for a section of their interstate system. There were five main “lessons learned” from these two contracts. First, with routine maintenance such as mowing and sweeping, the contractor generally performs well. Second, they found that the contractor does not have the needed incentive to achieve and maintain long life cycle pavement and bridge assets. VDOT also found they needed interim consequences for when the contractor was not achieving the performance targets of the contract. In order to achieve competition and therefore the best price, the contract requirements need to allow the contractor freedom in methods and in bonding requirements. Last, VDOT found they needed to allow the contractor to pursue 3rd party damages.

Jennifer Brandenburg with the North Carolina Department of Transportation (NCDOT) presented *Implementation of a Maintenance Management System in NC*. This presentation focused on the training of the agency’s personnel, software programs that assisted the maintenance management system, and performance measures as a component of the maintenance management system. It was obvious from this presentation that
putting together a performance based contract is only a small part of an effective program. New roles and responsibilities must be developed for nearly all agency personnel. A data tracking system and methods needs to be developed to allow agency personnel to track the performance of the contractor. Last, the financial division of the agency must be integrated with the maintenance management system to allow match fund planning with current and desired levels of service.

The Canadian province of Alberta was the third presentation directly related to PBC. This presentation, *The Evolution of Highway Maintenance Outsourcing in Alberta* by Moh Lali, detailed their experience with outsourcing 100% of their maintenance. This process began initially in the 1980’s with contracts that were more method based. Since then, their contracts, now called Request for Proposal (RFP), have progressively become more end product based. Now in the third round of these contacts, the competitive environment of the RFPs and the decrease in contract administration costs have shown an overall savings of 26% compared with the year prior to outsourcing.

Overall, these three presentations resulted in a better understanding of PBC and all that is required to implement a maintenance management program. They also showed that when an agency is committed to an outsourcing program that utilizes contractor performance targets, the agency can achieve positive results. Though Alberta has seen a reduction in overall costs from their program, the positive experience of other agencies stems from an overall better quality end product.
CHAPTER IV

RECENT SCDOT CONTRACTS

Four SCDOT contracts were analyzed: 31857 & 31858 (guardrail replacement), 4620610 (pavement markings), 382761 (concrete culvert/drainage improvements), 34641 & 34642 & 34643 (full depth patching, asphalt surface treatment, and pavement markings). It was confirmed that these maintenance contracts were method based and, therefore, would require a great deal of supervision and scrutiny by SCDOT to administer. The above mentioned contracts (with the possible exception of pavement markings and full depth patching) were deemed inapplicable to individual activity based PBC, as the SCDOT Research Steering Committee decided these maintenance activities were not high priorities for South Carolina (Proposals for Roadway Improvement, Pavement Markings, Precast Culvert and Bid Invitation).

SCDOT did not initially provide sample contracts related to vegetative control.. However, the 2000 version of the South Carolina Standard Specifications for Highway Construction, Division VI, Roadside Development was available. This division describes the current SCDOT specifications concerning all aspects of vegetative control. The main applicable topics include tree removal and trimming, seeding, planting, herbicide spraying, and mowing. All of these topics appear to be mainly method based in nature. The only slight deviation from this occurs with tree removal/trimming. The tree removal/trimming section still states the engineer will select the individual trees to be removed or trimmed. However, in contrast to the tree removal contract mentioned above,
it describes payment based on acreage instead of on quantity and size of trees. This makes this contract less of a method based contract, though still making it management intensive as the others (South Carolina Standard Specification for Highway Construction, Division VI, Roadside Development 2000).
CHAPTER V

PERFORMANCE BASED CONTRACTING
VS METHOD BASED CONTRACTING

Introduction

PBC is often referred to as outcome-based contracting. This is because the contract places the responsibility on the contractor by specifying the end result desired by the agency. This is different from method-based contracting that specifies how and when the contractor is to do the work, thereby placing the responsibility for the final product on the agency. The MBC process is to what most agency personnel are accustomed to and comfortable using. It has almost been engrained into their way of thinking. This often makes it difficult for agency personnel switching to PBC to adapt to this new way of thinking, as well as being able to give up the control (AASHTO, 2002).

In performance-based contracts, agencies specify the desired end result by requiring the contractor to meet performance specifications. The results of the literature review have shown that these contracts normally span multiple years, often 7 to 30 years with an option to renew. It has also revealed that essentially all agencies that use PBC apply it to the maintenance of all assets in a specified area. This is often referred to as Total Asset Management (TAM). These assets usually include: vegetation management, snow removal, pavement maintenance, sign maintenance, markings, striping, sweeping, guardrail, and chip seal (AASHTO, 2002).

Under TAM, the contractor has the freedom to decide what work needs to be done, when to do it, and the methods utilized to accomplish the work. All of this is done
to achieve the performance standards required by the agency. Given that the performance standards are thorough, affording the contractor this freedom should minimize costs while still achieving the required standards. This minimization of cost results from contractors being encouraged to be innovative in the way he or she performs the work. This encouragement stems from being more likely to be awarded the contract due to the time and/or money savings. Otherwise, these innovations may not surface if the contractor is not allowed to find the best way to meet the performance specifications (AASHTO, 2002).

In addition to the difficulties agencies face in changing their way of thinking, PBC requires the development of specific level of service (LOS) requirements for each of the assets. The contractor is then responsible for determining the effort and methods needed to achieve this LOS for the contract duration. Also, all of the work usually performed by the agency to obtain quantities, as well as the risk in estimating these quantities, is shifted to the contractor’s responsibility (AASHTO, 2002).

The contracting agency is responsible for monitoring the performance of the contractor throughout the contract duration. It is best to utilize existing data collection practices by linking them to the performance standards in the contract. Some of the early contracts using performance standards did not link data with pavement management efforts. These contracts experienced difficulties monitoring the contractor’s performance. It is critical that the agency be responsible and able to validate the performance of the contractor.
Although many times agencies have experienced an initial increase in costs, there have been some benefits realized through PBC. Agency personnel that are short staffed and overworked have been able to more effectively complete maintenance tasks within their designated areas. Often, agencies have experienced an increase in the level of service after the implementation of performance based contracts. Agencies have benefited from the fixed contract amount in these types of contracts. Despite higher initial costs, there have been instances of long term costs savings. Also, some of the cost increases experienced by agencies have been offset by a savings due to a reduction in personnel needed by the agency (AASHTO, 2002).

Trends

It appears to be a trend that more and more states are undertaking PBC. Although some have migrated in this direction voluntarily, most have been required by state legislation to outsource more of the agency’s work or to begin implementation of some manner of performance contracting. It is certainly feasible that the state of South Carolina could easily be faced with the same situation. Thus, it is critical that the SC DOT continually monitor the Best Practices of other states and agencies as they relate to PBC.

In general, states that have been required to outsource more of their work or to implement performance contracting, have been allowed the ability to select contractors and award contracts based, at least partially, on the past quality, experience, and qualifications of the contractor. Although initially disconcerting, most states that have
experience with performance contracting are effectively adjusting to the 7-30 year contracts that typically coincide with this type of contracting.

Contractors have also had to alter. As with any large-scale change, contractors have expressed some resistance to the switch to PBC. Contractors that have been working with these contracts for several years have become accustomed to the concept and often view it as beneficial as they are afforded more freedom and the required results are often clearer. However, with PBC in its present use (TAM), PBC seems to eliminate small contractors from winning contracts. These small contractors often only perform one component or feature, for example mowing, which makes them unqualified to bid on a TAM contract. However, these smaller contractors are instead awarded subcontracts from the contractor that has been awarded the agency’s contract.

It appears that mixed results have been obtained by some that have implemented regarding the success of PBC. British Columbia and Florida have reported highly successful implementation efforts. However, the verdict is inconclusive on many other states as they have only recently implemented their contracts. Though very little information is available, there have been a few sources that have mentioned that at least one agency had such a bad experience that they have completely terminated their performance program.

**Contracting Methods**

Since public funds are being used, many agencies are required to use the lowest responsive bid due to local regulations. This form of contracting method lends itself to MBC as it requires the contractor to furnish unit prices for the work stated in the contract.
The agency can then easily compare the bids to determine the lowest responsive bidder. Under this method, the agency has very little control over who wins the contract as long as the contractor is considered a responsive bidder. This method of determining the successful bidder does not work well when using performance based contracts. There were no agencies found that are using this contract awarding method with performance based contracts. There are, however, two other methods for awarding contracts that are being used. It must be determined if the agency wishing to pursue PBC is in a state that has flexibility to use one of these methods instead of the lowest responsive bidder (AASHTO, 2002).

The first method involves a technical submittal followed by negotiation. First, the contracting agency issues a Request for Proposals that details the desired scope of work. Interested contractors then put forward their technical submittals. From this a contractor is selected based on their technical abilities and qualifications. This is different from the lowest responsive bid method as the selection is not based solely on the unit cost factors. Once the contractor has been selected, further negotiation commences to render the final contract and price. If the agency feels that the negotiations are not leading to a mutually agreed upon contract, the agency will proceed with negotiations with the second highest ranked contractor (AASHTO, 2002).

The second contracting method combines the best of the previous method and the lowest responsive bidder method. First, the most qualified contractors are assembled on a short-list based on their technical qualifications, often referred to as the Statement of Qualifications. To these contractors a Request for Proposal is then issued. The interested
contractors then prepare and submit a technical proposal and a cost proposal to the awarding agency in two separate packages. A selection panel (made up of members of the awarding party) has already prepared an evaluation process that awards weight or points to what it considers the most important parts of the work. The panel then evaluates and reviews the technical proposals without referring to the cost proposals. Once some evaluation criteria for the technical proposals have been qualified, the cost proposals are opened and also given weight or points based on the unit prices. The totals for the technical proposals and cost proposals are then added together to designate the winning contractor (AASHTO, 2002).

There are a wide range of factors that need to be considered when evaluating the technical proposals and selecting the qualified contractors. These factors include, but are not limited to, past experience, qualifications of the staff, and performance on previous contracts. It is also important that the evaluation process ensure that the interested contractor fully understand the requirements of the work, has sufficient resources to complete the work on time, and can complete the project to the required standards. Often special weight or points are given to contractors that suggest potentially beneficial innovations (AASHTO, 2002).
CHAPTER VI

FLORIDA DEPARTMENT OF TRANSPORTATION

MAINTENANCE RATING PROGRAM

Introduction

The MRP (Maintenance Rating Program) is the program that the Florida Department of Transportation (FDOT) uses to provide a uniform evaluation for maintenance features on the State Highway System. The information contained in their MRP Handbook defines the method of conducting a visual and mechanical evaluation of routine highway maintenance conditions.

The FDOT State Maintenance Office produces and distributes random contractor evaluation samples each period. A team consisting of two people from a district office is responsible for collecting the MRP data and reporting this as outlined by the MRP handbook. These personnel are initially trained in the MRP system and attend yearly training that targets revisions. A yearly Quality Assessment Review is conducted for each MRP team by a QAR team that consists of the State MRP Engineer and the MRP Team Supervisor.

MRP Summary

The MRP Handbook provides methods of visual and mechanical evaluation of routine highway maintenance. This evaluation includes detailed requirements to meet a predetermined level of maintenance. The handbook is organized into five main sections: Drainage, Vegetation and Aesthetics, Traffic Services, Roadside, and Roadway. These
main sections, or elements, are further split into features. An example of a feature is Pavement Striping which falls under the element of Traffic Services. Each feature states the general requirements that meet the desired maintenance condition. The feature is then subdivided into detailed requirements, usually including multiple picture examples.

The information contained in this handbook defines a method of conducting a visual and mechanical evaluation of routine highway maintenance conditions. The purpose of this evaluation is to provide information that should be used to schedule and prioritize routine maintenance activities and provide uniform maintenance conditions that meet established Departmental objectives.

The type of maintenance required determines the classification of a particular facility.

The facility type classifications are:

- Rural Limited Access
- Rural Arterial
- Urban Limited Access
- Urban Arterial

Each of the highway facility types is divided into the following elements:

1. Pavement  
2. Roadside  
3. Traffic Service  
4. Drainage  
5. Vegetation/Aesthetics

Each element is then divided further into features which are unique to each element.
Due to the inconsistencies and resulting lower levels of maintenance experienced by FDOT, a systematic and formal method of making policy decisions for desired levels of maintenance was developed. This method, now called the Maintenance Rating Program (MRP), was implemented in April 1985. This program allows different levels of service for varying maintenance elements and highway classifications.

The MRP program uses survey samples to measure compliance, instead of rating every mile of the roadway. These samples are produced randomly, using a random number generator. The number of samples for each maintenance area will normally be 30 per facility type or a minimum of 3 samples per available mile. A sample is 1/10 mile or 528 feet in length. The survey is performed by a Maintenance Rating Program survey team that consists of two trained individuals.

Each element has its own section, which lists and describes its unique features that must be rated. The initial page of each element section is essentially a summary sheet of how to rate each feature. The rest of the section goes into greater detail for each feature and usually includes pictures to further illustrate the descriptions.

Components of the MRP Handbook have been collected and can be found in Appendix B.

**MRP Compared to Current SCDOT Specifications**

Under the Vegetation and Aesthetics MRP element, there are two features that directly relate to South Carolina DOT contracts. The first, Roadside Mowing, states that the mowing shall commence when the grass is 10” high and should be cut to between 4” and
6”. The Florida MRP Handbook differs in that it has separate requirements depending on the road type. Rural limited access roads are required to be maintained between 5” and 18”, rural arterial roads and urban limited access roads between 5” and 12”, and urban arterial roads are to be maintained at a 9” maximum. The similarities for roadside mowing are that no more than 1% of vegetation may exceed the stipulated height and this excludes allowable seed stalks.

The second MRP feature that relates to SCDOT contracts is tree trimming. The MRP Handbook requires a clear zone, a zone that is free of tree limbs and other vegetation of at least 14 ½ feet above the pavement. There must be a clear zone of 10 feet above sidewalks. The SCDOT contracts examined as part of this research effort, do not state a requirement above sidewalks but does require an 18’ clearance above the pavement.

The remaining 33 features stated in the Florida MRP Handbook can not be compared to the obtained SCDOT contracts. The Florida MRP Handbook was written to rate the performance of the contractors that Florida has hired to handle all aspects of highway maintenance. As described in the previous chapter, this contracting method is termed PBC. SCDOT does not extensively utilize this type of contracting at present. Instead, SCDOT districts decide when maintenance is required and then either self performs or lets a contract. However, it should be noted that the FDOT MRP Handbook can serve as a valuable reference or template, as SCDOT maintenance personnel examine the relative merits of performance based contracting.
Evaluation of FDOT MRP Program by SCDOT Personnel

It was decided that the Maintenance Rating Program, implemented by FDOT should be evaluated by SCDOT to determine potential benefits of implementation. Thus, a packet of MRP summary information was forwarded to twelve SCDOT maintenance professionals. This packet contained a brief explanation of the MRP program as well as details on the specifics of each maintenance feature. The following are comments received from SCDOT maintenance personnel pertaining to the MRP program.

Concerning the mowing maintenance feature, one evaluator commented that he was concerned about the different mowing height specifications that were dependant on the facility type (rural arterial, rural limited access, urban arterial, and urban limited access). Having different mowing height specification might be difficult for an inspector to track and may also be difficult for the contractor to keep up with the differences.

Another comment expressed was a concern that switching from MBC to PBC would require considerably more inspection. The information gathered during this research from experiences of other states have shown different results. Some have said they have experienced an overall decrease in workload as the contract administration has decreased. However, they have had to shift to more of an inspection role. Others have said that they shifted some of this responsibility to the contractor with the agency inspectors just simply ensuring the contractor self-inspections are adequate. Still agencies have had to substantially increase their number of inspectors.
One evaluator suggested that the reflectivity of the pavement striping needs to be measured as opposed to only a visual measurement. It was suggested that a retroreflectometer be used for a nonbiased measurement of reflectivity. This same evaluator also noted issues with the MRP sign specifications. He said that these specifications seem quite different from current SCDOT requirements and he felt that the installation methods should not be inspected because of the resulting liability.

There was a concern about mowing during wet conditions. The MRP specifies that the mowing area is not to be evaluated when wet condition prevent mowing. However, it does not state who determines this nor how it is determined. The implementing agency should evaluate their personnel and the contractors to determine the best way of determining this.

There were two comments pertaining to limb trimming. The first was made with respect the MRP specification regarding any dead or dying vegetation that could pose a hazard to vehicles or pedestrians which does not meet desired conditions. There was concern about how this is determined and who is responsible for this determination. The best solution for this is to leave the responsibility of this to the contractor. Otherwise this work should be considered for an on-call contract. The second comment was that currently, SCDOT does not allow rotary cutters for limb trimming because of the frayed limbs that are left behind. It is suggested that the performance guidelines define a clean cut.

One of the most interesting results from the evaluation of the FDOT MRP Program was the difficulty the SCDOT personnel had in shifting the mindset from MBC
to performance based. Many of the changes or suggestions they made were, in essence, changing the specifications back to MBC. Another difficulty they had was with the comparison of existing SCDOT specifications to the MRP specifications. The SCDOT specifications are for new construction while the MRP specifications deals with the level the contractor must maintain for the length of the contract. These two should not be compared. Instead, the MRP requirements need to be measured against the level of service for which SCDOT decides that a maintenance feature (mowing, striping, etc.) needs to be let to contract to remediate the condition.
CHAPTER VII

NORTH CAROLINA

PERFORMANCE BASED CONTRACT

Introduction

The North Carolina Department of Transportation (NCDOT) is relatively new to PBC. However, they have extensively researched this type of contracting and have extracted concepts from the knowledge and experience of other agencies utilizing performance based programs. Thus, NCDOT appears to have implemented a performance based contracting program. This program merges the standard, but necessary, parts of every contract with the components required to make a contract a performance based contract. This issue is further addressed in Chapter VII. The following list is a brief synopsis of what each of these components contain.

1. Contract Period
2. Basis for Contractor Selection
3. Annual Price Adjustments
4. Damage Reimbursement
5. Liquidated Damages
6. Contractor Prequalification
7. Contract Performance and Payment Bonds
8. Alterations to Contract
9. Subletting of Contract
10. Availability of Funds-Termination of Contracts
11. Submission of Proposal
12. Bid Documentation
13. Twelve-Month Guarantee
14. Books and Records
15. Vegetation Management
16. Contractor Proposal and Evaluation-General
17. Approval of Personnel
18. Scope of Work
19. Work Plans and Reports
20. Technical Proposal Evaluations
22. Selection Procedure
23. Opening of Price Proposals
24. Evaluation Procedures
25. Phased Performance Targets
26. Partial Payments Based on Performance
27. Timeliness Targets
Contract Period

This section states the date the contract begins, the duration of the contract, and the completion date of the contract. Typically the duration of these contracts is at least five years and can stretch to as long as 15 to 25 years. Also, these contracts typically have options that allow the contracting agency to renew for another contracting period.

Basis for Contractor Selection

Contractor selection is based on both the Price Proposal and the quality of the Technical Proposal. The contractor’s bid amount is adjusted, based on the weighted calculation of the quality of the Technical Proposal. Specifics on this calculation can be found under Selection Procedure.

Annual Price Adjustments

For the first 12 months of the contract, the contractor will be paid at the unit price bid by the contractor, given that the performance of the contractor meets all required criteria and utilizing the timeliness criteria. For the second year, the unit price will be adjusted based on the unadjusted index of the “Consumer Price Index for Urban Wage Earners and Clerical Worker” with a maximum adjustment of five percent. This adjustment at 12 month increments will continue for the remainder of the contract.

Damage Reimbursement

All expenses incurred from natural disasters, catastrophic or emergency response, or collision with bridges, retaining walls, noise walls, and overhead sign structures will be considered part of the contract responsibilities. The only additional funds the contractor will receive from the contracting agency will be from qualifying Federal
Highway Administration (FHWA) funds the contracting agency receives. The contractor is responsible for pursuing claims of reimbursement and to provide all information needed for the claim. However, there is a cap on reimbursement. The contractor responsibility for damage repairs is limited to 20% of the contract amount for that 12 month period. This “extra-work” is reimbursed through a supplemental agreement.

**Liquidated Damages**

*Pavement* – The contractor has two days from notification or discovery to temporary repair pavement failures or a $500 per day penalty will be enforced. The contractor has 60 days to permanently repair all pavement failures or a $500 per day penalty will be enforced.

*Guardrail* – The contractor has seven days to repair and 30 days to replace impact attenuators from notification or discovery. The penalty is $750 per day.

*Signs* – The contractor has two hours from notification or discovery to mitigate damaged signs or sign structures that pose imminent risk to the public with a penalty of $1,000 per hour; 60 days to repair damaged but functional overhead signs with a penalty of $500 per day; 8 hours to repair or replace all non-functional Stop, Do Not Enter, Wrong Way, and Yield signs with a penalty of $1,000 per hour; 5 days to repair or replace all other damaged or missing signs, including posts with a penalty of $200 per day.
Contractor Prequalification

All subcontractors must be on the contracting agencies approved subcontractor list.

Contract Performance and Payment Bonds

Bonds shall be in an amount equal to the initial unit price bid, multiplied by six. The bonds shall be for one year and renewed annually.

Alterations to Contract

“The Engineer reserves the right to make, at any time during the contract period, such alterations in the contract requirements as may be found necessary or desirable.”

Subletting of Contract

The contractor is permitted to sublet a portion of the work but must perform with its own organization at least 15 percent of the total original contract amount.

Availability of Funds-Termination of Contract

“Highway maintenance and construction appropriations may be obligated in the amount of allotments made to the Department of Transportation by the Office of State Budget and Management for the estimated payments for maintenance and construction contract work to be performed in the appropriations fiscal year. The allotments shall be multi-year allotments and shall be based on estimated revenues and shall be subject to the maximum contract authority contained in the subdivision above. Payment for highway maintenance and construction work performed pursuant to contract in any fiscal year other than the current fiscal year will be subject to appropriations by the General
Assembly. Highway maintenance and construction contracts shall contain a schedule of estimated completion progress and any acceleration of this progress shall be subject to the approval of the Department of Transportation provided funds are available. The State reserves the right to terminate or suspend any highway maintenance or construction contract and any highway maintenance or highway contract shall be so terminated or suspended if funds will not be available for payment of the work to be performed during that fiscal year pursuant to the contract. In the event of termination of any contract, the Contractor shall be given a written notice of termination at least 60 days before completion of schedule work for which funds are available…”

Submission of Proposal

The Proposer must comply with the following:

1. The Proposer shall deliver the Proposal to the place indicated, and prior to the time indicated in the Request for Proposals.
2. The Proposal documents shall be signed by an authorized employee of the Proposer.
3. The Proposal shall be accompanied by Bid surety in the form of a Bid bond or Bid deposit.
4. The Proposer shall complete the for listing the Minority Business/Women Business.
5. The Proposal shall address all the requirements as specified in the Request For Proposal document.
Bid Documentation

“Bid documents are to be placed in escrow with a banking institution or other bonded document storage facility selected by the Department.” “Bid documents includes, but is not limited to, Contractor equipment rates, Contractor overhead rates, labor rates, efficiency or productivity factors, arithmetical calculations, any manuals used in reference by the Proposer, and quotations from subcontractors and material suppliers to the extent that such rates and quotations were used by the Proposer in formulation and determining the Price Proposal.”

Twelve-Month Guarantee

“The Contractor shall guarantee materials and workmanship against latent and patent defects arising from faulty materials, faulty workmanship or negligence for a period of twelve months following completion of the initial, and if applicable, second term, of the contract.”

Books and Records

“The Contractor shall retain all books, records and other documents relative to this Contract for three years after expiration of the last contract term.

Vegetation Management

“All mowing cycles shall be clean-up cycles. Vertical trimming shall be pre-approved by the Engineer and shall result in a neat appearance with debris disposed of properly. Proper disposal includes mulching and spreading or disposal offsite.”
Contractor Proposal and Evaluation-General

The Contractor has complete responsibility for the “accuracy and completeness of all work performed under this contract and shall save the State harmless and shall be fully liable for any additional cost and all claims against the State which may arise due to errors, omissions and negligence of the Contractor or its subcontractors in performing the work. The Contractor shall certify any required plans, specifications, estimates and engineering data furnished by the Contractor’s team.”

Approval of Personnel

“The Contractor shall not change team members or subcontractors identified in the Technical Proposal without written consent of the Engineer. In addition, subcontractors not identified in the Statement of Qualifications or Technical Proposal shall not perform any work without written consent of the Engineer. The Department will have the right to approve or reject any personnel assigned to the project by the Contractor.

Scope of Work

A contract for interstate transportation facilities within the state road right-of-way would represent a typical contract. Such a contract would state: “The Contractor shall manage and perform maintenance and repair activities associated with roadways, drainage, structures, roadside, vegetation and aesthetics, traffic services, emergency response and as otherwise contained herein. The Contractor shall also be responsible for any traffic control, design, shop drawings, and permits required to satisfy the duties required by this contract.” This particular contract is for approximately 131 centerline
miles. “The scope of the contract is not to bring all facilities up to current design standards. However, if an asset must be replaced then that asset must be replaced in a manner such that current design standards are met.”

“Areas of work required for this project shall include, but are not limited, to routine maintenance, minor repairs, collision damage repairs, and emergency repairs for the following items as detailed in the Performance Criteria contained elsewhere in the RFP:

1. Shoulder and Ditches
2. Drainage
3. Roadside
4. Roadside Appurtenances
5. Traffic
6. Pavement
7. Bridge
8. Timeliness of Performance

Note that this North Carolina contract includes a number of project limits as well as exclusions.

**Work Plans and Reports**

The Contractor is required to prepare and submit the following at various times during the contract. Failure to do this results in monthly payment withholdings.

1. Quality Management Plan
2. Quality Management Reports
3. Annual Implementation Work Plan
5. Weekly Work Plan
6. Customer Service Response Log
7. Emergency Response Plan
8. Public Information Plan
Technical Proposal Evaluations

The purpose of the Technical Proposal is to document the Contractor’s understanding of the project, their selection of appropriate subcontractors, and their approach for completing all maintenance and repair activities. The Technical Proposals are to address the routing maintenance of the project and are to include narratives, tables, charts, plots, drawings, and sketches as appropriate. The Technical Review Committee will consider the understanding of the project, the anticipated problems and the solutions to those problems. The Technical Proposals will be evaluated according to the breakdown as described below in Table 7.1:

Table 7.1
Quality Credit Evaluation Factors for Technical Proposals

<table>
<thead>
<tr>
<th>Factor</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Management</td>
<td>20</td>
</tr>
<tr>
<td>Responsiveness to Request for Proposal</td>
<td>40</td>
</tr>
<tr>
<td>Maintenance of Traffic and Safety Plan</td>
<td>20</td>
</tr>
<tr>
<td>Timeliness Requirements of Tracking</td>
<td>15</td>
</tr>
<tr>
<td>Oral Interview</td>
<td>5</td>
</tr>
</tbody>
</table>

Technical Proposal Evaluation Criteria

In this section, the North Carolina contract gives specifics on what the Technical Review committee will examine each of the Evaluation Factors listed above.

Selection Procedure

The selection of a Contractor is based on both the technical quality of the Technical Proposal and the bid price. The Technical Review Committee (TRC), which is composed of knowledgeable DOT personnel from that state, is responsible for evaluating the Technical Proposal against the requirements in the Request for Proposals. Based on
this evaluation, each member of the TRC will submit a technical proposal score for each Contractor. The Contractor’s overall technical proposal score is found by added up each one of the TRC members’ scores.

The maximum weight the technical proposal score has depends on the individual factors of that particular project. If the project is a very high profile project then this score may have a higher weight compared to the bid price. For this particular NCDOT contract, the maximum technical proposal weight was set for 20%. Table 7.2 below shows how the technical score by the TRC is weighted.

Table 7.2
Weighting of NCDOT Technical Score

<table>
<thead>
<tr>
<th>Technical Score</th>
<th>Quality Credit (%)</th>
<th>Technical Score</th>
<th>Quality Credit (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>20</td>
<td>89</td>
<td>9</td>
</tr>
<tr>
<td>99</td>
<td>19</td>
<td>88</td>
<td>8</td>
</tr>
<tr>
<td>98</td>
<td>18</td>
<td>87</td>
<td>7</td>
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<td>97</td>
<td>17</td>
<td>86</td>
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<td>1</td>
</tr>
<tr>
<td>91</td>
<td>11</td>
<td>80</td>
<td>0</td>
</tr>
<tr>
<td>90</td>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Below, in Table 7.3, is an example of how the technical proposal weight is combined with the bid price to find the winning Contractor.
Table 7.3

Example of NCDOT Technical Score Weighting

<table>
<thead>
<tr>
<th>Proposal</th>
<th>Technical Score</th>
<th>Quality Credit (%)</th>
<th>Price Proposal ($)</th>
<th>Quality Value ($)</th>
<th>Adjusted Price ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>95</td>
<td>15</td>
<td>3,000,000</td>
<td>450,000</td>
<td>2,550,000</td>
</tr>
<tr>
<td>B</td>
<td>90</td>
<td>10</td>
<td>2,900,000</td>
<td>290,000</td>
<td>2,610,000</td>
</tr>
<tr>
<td>C</td>
<td>90</td>
<td>10</td>
<td>2,800,000</td>
<td>280,000</td>
<td>2,520,000</td>
</tr>
<tr>
<td>D</td>
<td>80</td>
<td>0</td>
<td>2,700,000</td>
<td>0</td>
<td>2,700,000</td>
</tr>
<tr>
<td>E</td>
<td>70</td>
<td>0</td>
<td>2,600,000</td>
<td>0</td>
<td>2,600,000</td>
</tr>
</tbody>
</table>

* Successful Contractor – Contract Cost $2,800,000

Evaluation Procedures

North Carolina formulated its performance criteria and targets in seven tables, each representing an element (ex. Roadside, Roadside Appurtenances, etc.). Each element is then broken down into features specific to that maintenance element and each feature is assigned a weight in order to compute the performance rating. The performance criteria as well as the procedures for assessing contractor performance are virtually the same as the Florida MRP Program. Specifics on the MRP procedures can be found in Chapter V of this thesis.

Phased Performance Targets

The main difference between the Florida DOT MRP and the North Carolina program is that the North Carolina contract has rising Performance Targets (%) depending on the year of the contract, for example Landscape Plant Beds: 70% Target for 2007 increases to 80% for 2008-2012. North Carolina decided to adopt this concept because they were looking to increase their present level of service. The contract states that the overall performance target for 2007 is 88 while 2008 increases to 90 and 2009-
2012 increases again to 92. If a contractor misses four consecutive assessments by more than 5 points below the overall target, the Department has the right to declare the Contractor in default of contract. Also, if the contractor misses any element target by more than 15 points in four consecutive assessments, the Department can declare the Contractor in default of contract.

**Partial Payments Based on Performance**

The North Carolina Performance Based contract also addresses partial payment based on Contractor performance. This partial payment process can be quite confusing, but the contract does a good job of explaining the basics in paragraph form. If an individual feature is 1-5 points below the target value, then the payment will be 75% of the feature weight multiplied by the bid amount. If an individual feature is 6-10 points below the target value, then the payment will be 50% of the feature weight multiplied by the bid amount. If the feature is more than 10 points below the target, then the contractor will receive no payment for that feature. The North Carolina contract helps to further explain this by providing a spreadsheet that gives examples of these calculations. This spreadsheet is included in a table in the contract.

**Timeliness Targets**

The last performance evaluation component is the timeliness targets. North Carolina set performance targets for seven areas (Debris/Road Kill Removal and Litter Removal, Customer Response, Pavement Repairs, Guardrail, Signs, Winter Weather Events, and Emergency Maintenance Repairs). The timeliness targets are enforced through liquidated damages instead of reduced partial payments.
Conclusions

The North Carolina contract serves two main purposes. First, it serves as a contract template for other states, including SCDOT, if they should decide to implement such a program. Second, the contract can be used as an educational tool to show other agencies the differences between what they currently have and a performance based contract. The Evaluation Procedures and Partial Payments Based on Performance sections can be particularly helpful in explaining how a contractor is selected as well as how the contractor will be evaluated over the contract duration.
CHAPTER VIII

CONTRACTOR

SURVEY/QUESTIONNAIRE

A possible switch from the current South Carolina DOT MBC to PBC will strongly impact both the state agency personnel as well as the contractors that are bidding on the work. During one of the quarterly meetings between the Research Steering Committee and the research team, it was decided that opinions and feedback was needed from current South Carolina DOT contractors.

The research team then formulated a short questionnaire to survey the reaction of the contractors to the switch from method to PBC, as well as opinions with respect to the specifications for nine different maintenance activities. These activities included mowing, limb trimming, guardrail, raised pavement markers, striping, pavement symbols, signs, rigid joints, and rigid cracking. For each of the nine activities, plus the PBC subject, three questions were asked. First, the contractor was asked if the change will increase the contract cost. The second question asked was whether or not the change will require additional training of the contractor’s staff. The last question was whether or not the change would be easy to implement. In order to gather numerical information, the contractor was asked to rank each answer from one to five, with one meaning they strongly agree and five meaning they strongly disagree. This survey can be found in Appendix A.
Once the questionnaire was formulated, the questionnaires were mailed out to 30 contractors that have previously performed work for the South Carolina DOT. This list of contractors was assembled with the help of David Cook with South Carolina DOT and mailing lists from past research projects for Dr. Lansford Bell. In order to help increase the contractor response to this questionnaire, the contractors were informed that their name and the name of the company would be kept confidential. However, from the 30 that were mailed, only 8 contractors completed and returned the questionnaires. Since some of the participating contractors did not perform all of the activities included in the questionnaire, there were not eight answers for each question. However, some contractors added additional comments and all eight contractors answered the first question concerning PBC.

The first subject the contractors were asked about dealt with the possible switch from MBC to the PBC. Data on this question appear in Table 8.1. The average response to the first question (will PBC increase contract cost) was a 2.6. This means that most contractors slightly agreed with this statement. However, it is interesting to note that there was a wide variation in responses, from strongly disagree all the way to strongly agree. With a average response of 1.75, the second question (will PBC require additional training of your staff) indicated the contractors agreed with this statement. The responses were much more uniform with this question. With regards to ease of implementation, the average score was 2.4. This question had a uniform response and indicated, on average, contractors slightly agreed that PBC should be easy to implement. Overall, these responses seem to show that the contractors that participated in this survey have some
reservations as far contract cost and ease of implementation. It also conveys a relatively strong indication that they believe it will require them to provide additional training to their staff. With regard to PBC, one company stated, “Implementation will be difficult; however, results could be favorable. The state will still need to be involved with work to ensure quality, safety, and compliance.” Another company stated that they felt “Specific contract costs may increase, but overall cost to the State should be reduced.”

The first specific activity the contractors were asked about dealt with mowing. Summary responses for this question appear in Table 8.1. The average response to the first question (will this mowing spec increase the contract cost) was a 3.6. This means that most contractors that answered this survey slightly disagreed with this statement. The second question (will this mowing spec. require additional training of your staff) had an average response of 3.4, also indicating that the contractors slightly disagreed with the statement. Ease of implementation had a very neutral 2.8 average score. Overall, these responses seem to show that the contractors believe the mowing specification will probably not result in an increase in cost nor require additional training. The contractors indicated that they believe this mowing specification would not be too difficult to implement.

The second specific activity the contractors were asked about concerned limb trimming. Summary responses for this question appear in Table 8.1. The average response to the first question (will this limb trimming spec. increase the contract cost) was a 2.75, showing that the participating contractors slightly agree that this could cause the contract cost to increase. The second question (will the limb trimming spec. require
additional training of your staff) resulted in all participating contractors responding with a neutral answer of 3. The last question (will the limb trimming spec. be easy to implement) averaged 2.75, showing that the contractors slightly agreed that implementation should be easy. Overall, these responses were pretty neutral with contractors slightly agreeing that the cost could increase but the implementation should be easy with regards to this limb trimming spec.

The third activity the contractors were asked about concerned the new guardrail specification. Data on this question are summarized in Table 8.1. Most of the participating contractors indicated that they slightly disagreed that the new guardrail specification will increase contract cost and that it will be easy to implement. The average scores for these were both 3.3. With regards to whether the guardrail specification would require additional training, the contractors had a slightly stronger indication of disagreement with an average of 3.5.

Table 8.1
Contractor Questionnaire Scores

<table>
<thead>
<tr>
<th>Question #</th>
<th>Perf.-Based Contracting Overview</th>
<th>Mowing</th>
<th>Limb Trimming</th>
<th>Guardrail</th>
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<tr>
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<td></td>
</tr>
<tr>
<td>Company 6</td>
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<td>4 4 2</td>
<td></td>
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<tr>
<td>Company 7</td>
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<td>n/a n/a n/a</td>
<td>n/a n/a n/a</td>
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<tr>
<td>Company 8</td>
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<td>3 3 4 n/a n/a n/a</td>
<td>5 4 4</td>
<td></td>
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<tr>
<td>Average</td>
<td>2.63 1.75 2.38</td>
<td>3.6 3.4 2.8</td>
<td>2.75 3 2.75</td>
<td>3.25 3.5 3.25</td>
</tr>
</tbody>
</table>
The fourth activity the contractors were asked about concerned raised pavement markers. Summary data for this question can be found in Table 8.2. Most of the participating contractors indicated that they slightly agree that the proposed raised pavement markers will increase price with an average score of 2.5. With an average score of 3, the contractors indicated they were neutral to the question asking if the proposed raised pavement markers would require additional training of their staff. A 2.75 average showed that the contractors slightly agreed that the implementation of this proposed spec. would be easy.

The fifth activity the contractors were asked about concerned the striping specification. Data for this question are summarized in Table 8.2. On average, the participating contractors indicated they slightly disagreed that the striping change would increase cost and would require additional training of their staff with both scoring a 3.2. The contractors also indicated slightly agreed, with a score of 2.4, that the change would be easy to implement.

The sixth activity the contractors were asked about concerned pavement symbols. Data for this question can be found in Table 8.2. On average, the participating contractors indicated they slightly disagreed that the pavement symbol change would increase cost and would require additional training of their staff with scores of 3.2 and 3.4 respectively. The contractors also indicated slightly agreed, with a score of 2.2, that the change would be easy to implement.

The seventh activity the contractors were asked about concerned the signs specification. Data on this question are summarized in Table 8.2. On average, the
participating contractors indicated they slightly disagreed that the signs change would increase cost and would require additional training of their staff with both scoring a 3.25. The contractors also indicated slightly agreed, with a score of 2.0, that the change would be easy to implement.

Table 8.2

<table>
<thead>
<tr>
<th>Question #</th>
<th>Raised Pavement Markings</th>
<th>Stripping</th>
<th>Pavement Symbol</th>
<th>Signs</th>
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<tr>
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<td>2.75</td>
<td>3.2</td>
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</table>

The eighth activity the contractors were asked about concerned rigid joints. Data on this question can be found in Table 8.3. The results showed that the average response from the contractors was a very neutral score of 3 when asked if the change would increase the contract cost. The results also showed that they felt the specification change would not require additional training and would be easy to implement. The scores for these two questions were 3.6 and 2.2 respectively.

The ninth activity the contractors were asked about concerned rigid cracking. Data on this question can be found in Table 8.3. The results for the rigid cracking
activity indicated the contractors slightly agreed that the change may increase the contract cost (2.6), but would be easy to implement (2.2). They disagreed with the question asking if the change would require additional training of their staff with a score of 3.8.

Table 8.3

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<thead>
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CHAPTER IX

IMPROVING THE CURRENT

CONTRACTING PROCESS

Introduction

It was decided that the next step in the research was to perform brainstorming sessions with all seven districts. The initial intention of these meetings was to receive feedback on the concept of SCDOT adopting performance specifications as well as information pertaining to problems with current SCDOT maintenance contracts and possible solutions.

District personnel turnout was excellent with as many as 18 people attending these sessions. The attendees were very helpful in suggesting issues that may not have surfaced without the knowledge and experience of those administering the contracts in the field. While each session had some district specific problems, a number of common themes emerged as typical throughout the state. Minutes from the district workshop meetings are provided in Appendix C.

Initially copies of the “MRP vs SCDOT” document were issued to the districts prior to the scheduled sessions. This document explained the performance specifications as used by the Florida DOT and also described the differences between the FDOT specifications and those currently used by SCDOT. This handout provided sufficient space for attendees to make comments concerning these differences.
Initially, the intent of the district meetings was twofold. The first was to obtain feedback on the concept of performance specifications and how they could be modified for SCDOT use. The second objective was to examine additional ways of improving the current contracting process.

The feedback on performance specifications was not what was expected. There were some general comments revealing there are some aspects that could be beneficial to the SCDOT. However, the overwhelming response was quite negative. There were four main problems that began to surface. They were lack of controllability, budget concerns and “budget yo-yo”, contractor performance, and strong job security concerns. After receiving this feedback from the initial district workshops, it was decided to focus strictly on other ways to improve the current contracting process.

The feedback pertaining to other ways to improve the current contracting process was also not exactly as expected. For the most part, district personnel believed there were no problems with the actual contract specifications. Instead, most of the problems were with the administration of the maintenance contracts and using appropriate measures to ensure contractor compliance with the contract specifications.

**Performance Specifications**

The response from the districts concerning performance specifications was quite interesting. A few individuals expressed some positive interest as they believed some parts of Florida’s performance specifications could benefit SCDOT. They indicated that performance specifications would be beneficial in two ways. First, it would help with the current start and completion dates problems. Second, it would assist districts that are
currently overworked, as it would diminish the administrative strain the current process imposes.

However, the overwhelming majority of the feedback was quite negative. The first main issue dealt with budget concerns. One individual noted that Florida DOT has a comparably large budget and that performance specification implementation is not practical in South Carolina because it does not have a comparable budget. Another individual used what he called the “budget yo-yo”. He went on to explain that his district (and he is sure most of the state) has to pick and choose which roads will receive maintenance attention depending on the amount of money they have been allocated.

The second issue dealt with a lack of control the district can have on the mowing cycles. Performance specifications would require the contractor to keep the grass at a specified level of service which is paid at a flat price for the year. The concern is that it takes away the ability of the district to eliminate a cycle if they need the money elsewhere.

The third issue dealt with the performance of the contractor. Multiple districts felt the contractors would have a difficult time conforming to performance specifications in general. One district stated that they have a hard enough time getting the contractor to start and finish when required by contract. Asking a contractor to be responsible to decide, on its own, when to start and finish mowing, would simply not work. One district also felt it would be hard to get a contractor to mow more cycles than he had anticipated if it was an unusually rainy year. Also, they felt it would be difficult to justify paying a contractor for a full year in which it was dry and thus required fewer cycles.
The last issue was verbally conveyed by some districts and others suggested it without actually stating it. This concern was with job security. They believed performance specifications would in some ways pass their administrative duties on to the contractor. This may eliminate their jobs or at least diminish the number of administrative positions required. This mindset would undermine the implementation of a pilot program utilizing performance specifications.

**Contractor Pre-Qualification**

The concept of maintenance contractor pre-qualification evolved from initial discussions with the Research Committee. The committee stated that they believed some districts were having problems with contractors not being capable of performing the work and others that were just hard to deal with. Thus, the concept was put forth to have a maintenance contractor pre-qualification process that is perhaps similar to the one used for construction contracts.

When mentioned to the districts, nearly all of them agreed that they have had problems with “bad” contractors. The districts were essentially unanimous in agreeing that some sort of contractor pre-qualification was needed. One district specifically stated they have had many problems with contactors who have been awarded a contract that have no idea what they are doing and do not have the necessary equipment.

All of the districts approved the suggestion of having some way of screening under performing contractors. However, there were some concerns as to whether a pre-qualification list would work. One district felt it would be too easy for a contractor to get qualified and it would be too difficult to remove a poor performing contractor from the
list. The same district had another concern that it would be hard or impossible to require a contractor to have a certain type or size of equipment. A similar concern was raised by a different district that some contractors rent their equipment and thus will not own it or have the equipment on hand when going through the pre-qualification process. Further, a large company may own hundreds of mowers but may only utilize a few personnel to execute a large contract.

There were many suggestions that addressed these concerns. The first suggestion was to give the power to remove a contractor from the list to the district maintenance engineer. The purpose of this is to reduce the number of “hoops” one must go through to remove an under performing contractor. Another suggestion was to limit the number of delinquent status reports a contractor can have to still be included on the pre-qualified list.

Another suggestion was to require the contractor to undergo some minimal mandatory training as to what the contracts entail before they can bid. Further, they felt that the person completing this training should be the on-site supervisor, not someone that does not have direct control of the awarded contract.

Almost all of the districts had concerns about how to specify what constitutes a qualified contractor. Requirements such as a minimum of five years of related experience may eliminate some very good contractors that have relatively few years of SCDOT contracting experience. Likewise with manpower and equipment, the firm may not have those resources on hand until it is awarded a contract. To address this issue, many districts thought it might be better to not have a pre-qualification list but a
certification list. This list would be for contractors that have completed mandated training. This training could include topics related to traffic control and contract specifications. Most all the districts believed some sort of traffic control training for the contractors was needed.

Despite the concerns and difficulties with implementing a pre-qualification or certification list, nearly all the districts felt that it would be well worth screening out a few potentially good contractors if this would help eliminate or restrict the consideration of the marginally performing contractors.

In addition, to the information gathered from the district workshop sessions, the final report for a previously executed SCDOT research project was examined. In 2003, Irvin Anderson and Dr. Lansford Bell completed this research project for the SCDOT. This project recommended implementing a rating system for contractor prequalification. The result of this project was an objective rating section as well as a subjective rating section.

Per recommendation by the Research Steering Committee, the research team contacted Mr. Greg Peck, SCDOT Construction Data Support Engineer. As a result of this meeting, they have since implemented a rating program for contractor prequalification called the Contract Performance Evaluation System. However, Mr. Peck said the SCDOT was not completely comfortable with having a subjective rating as part of the program. Instead, the focus is primarily on the objective ratings. It is recommended that personnel within SCDOT adopt a similar rating program for contractor prequalification. However, implementing a more extensive subjective section
is also recommended. Below is more detail on the experience the construction side of SCDOT had when implementing their prequalification program.

Mr. Peck said that a SCDOT auditor goes to the areas where the contractor is to be performing the work and goes through all of the objective ratings. This auditor is often the Resident Construction Engineer (RCE). Mr. Peck also said that initially there was some grumbling by the contractors because they felt it was just more paperwork they had to perform. Since then the opinions of most contractors have changed. In fact, according to Mr. Peck, even those contractors that have scored badly on the rating program still feel the SCDOT should continue the program. Most contractors feel that they presently do a better job than the other contractors and they feel this program would be a good way of proving it. If a contractor is scoring low on the rating program, SCDOT brings the contractor in to discuss why they scored that way, as well as instructing them with ways to improve. In addition, Mr. Peck said that even contractors that have been scoring well have asked to come in for a meeting to find out how they could score even higher.

These meetings, combined with the rating program, have proven to be very helpful in opening up communication between the contractors and SCDOT. This has resulted in contractors having a better understanding of exactly what SCDOT wants as well as information on how they are performing in relation to other contractors.

In addition to the meetings, evaluation forms specific to SCDOT were issued to the contractor to rate how SCDOT was performing.
Action Plan

During the course of the district meetings there was a suggestion that was put forth that addresses some of the concerns with contractor pre-qualification. This suggestion was called an “Action Plan”. The idea was that the contractors are required to submit an Action Plan along with their bids for the contract. Two general objectives were suggested for this Action Plan. The first is to address the concern about requiring a contractor to have a specified workforce or equipment to become pre-qualified. The Action Plan will include the equipment and workforce the contractor is planning to utilize, how they are to be obtained, and their schedule. This leads to the second purpose of the Action Plan. Based on the information included in the Action Plan, SCDOT can then determine if the contractor would be capable of accomplishing the work. It also forces the contractor to do their due diligence. In addition, one district stated that the RME or ME should have the power to approve changes to the Action Plan once the work had commenced.

However, there were some concerns expressed related to this suggestion. The first problem, noted in one district workshop, is confidentiality. They were concerned that bidders would be afraid that other contractors would find out their methods or trade secrets. One participant proposed that the Action Plans be kept confidential by treating them like sealed bids. This should allow the information to reside within the DOT.

The second concern was that an Action Plan would be too objective and a poor Action Plan would not be sufficient to permit a bid to be legally disqualified. This is something that could be examined further if other states have used this concept, and if
there could be a way to structure this Action Plan so that it could allow disqualification. Despite the possible inability to disqualify a bidder for a poor Action Plan, many districts stated that this was a concept with exceptional potential and it should be incorporated into the bid package if possible.

**Training**

For the most part, the districts believed there were not many problems with the current contract specifications. However, nearly every district had some concern about the administration of maintenance contracts, specifically the inspection of the contractors’ work and the understanding of the current contract specifications. The problem dealt with not uniformly inspecting and not uniformly holding the contractors to the specifications. There were two main causes for these concerns that were examined during the district meetings.

The first cause deals with a lack of understanding. Some district personnel stated that they themselves do not have a good comprehension of the current specifications. Other districts had a mixture of people, some that felt they understood the contract and some that did not. A few participants in the meetings stated they did not know exactly what power they were granted in the specifications to require the contractor to perform. From this, it was proposed that there should be a state-wide annual training meeting for the inspectors. This training meeting should establish what contractual power they have and establish a uniform understanding of the contracts. In addition the meeting would serve as a mechanism to communicate recent changes in contracting polices and
procedures. The fact was stressed by a district that this meeting needs to be held annually.

One district stated they currently have training for their inspectors and feels that it has helped. Three districts specifically stated they believed the annual training meeting should not be just for the inspectors. Instead, it should also be for the RMEs and MEs since they are responsible for writing the letter to the contractor informing him of not performing once the inspector has witnessed non-conforming work.

The second cause for non-uniformity stems from varying levels of strictness by the inspectors. The districts believed part of this problem originated from the above mentioned varying level of understanding. However, they believed having a state-wide meeting to establish state policy on “strictness” would help. By “strictness” the districts were referring to how tightly the inspector holds the contractor to the contract specifications.

However, there were some concerns with having a state-wide annual training meeting. The first concern is that all inspectors have different personalities. Some inspectors will be more lenient whereas some are naturally, by virtue of their personality and experiences, more strict. However, most districts agreed that establishing a state-wide policy and conveying general guidelines on an annual basis would be extremely beneficial. The last concern was that some districts are currently administering multiple versions of the mowing contracts. They felt this could be confusing at a state-wide meeting unless there were training classes focused on each specific version currently in
use. They also commented that this point may be mute as the current schedule has all contract cycles starting over in 2009.

**Regional Specifications**

One district stated they were having a problem with one of the requirements in the current contract specification. The specific specification required the contractor to mow on 1/1 slopes. In that part of the state, the only 1/1 slopes they have are on fill areas. These fill areas are usually soft and this causes the tractor to sink. The district stated this requirement may make sense in another part of the state but was not feasible in their part. From this discussion came the idea of having regional specific specifications. This implies there would perhaps be three regions that would have specifications tailored to their climate, soils, and vegetation.

The concept of having regional specific specifications would address multiple issues. The first issue and one that was repeated at nearly all district meetings was contractors have been complaining the requirements in one contract differs from one they are performing in a different district. This should bridge the gap between allowing the districts to feel they have a specification that is detail to their area while still retaining some uniformity throughout the state.

**Liquidated Damages**

The issue of liquidated damages surfaced early in the district workshops. The initial district meeting personnel stated they were concerned that it may be less expensive for a contractor to perform non-conforming work than to go back and fix it or do it right the first time. The idea of raising the traditional assessment was a concern for some
districts as it would be too large of a fine and could hinder a contractor too much on a small contract. After some discussion, an idea was put forth to assess liquidated damages as a percentage of the contract value.

Another issue raised in one district dealt with excessive grass growth. The concern was how to require the contractor to address grassy areas that may experience excessive grass growth after a large rain storm. There was no real suggestion on how to best address this issue. Other district personnel stated that these situations do not occur very often and should probably be addressed on a situation-by-situation basis. Another participant stated that it is easier to dispatch a SCDOT crew to handle these small areas than to expend the effort of requiring the contractor to address these issues.

Miscellaneous Comments

An idea was purposed for a future research was the possibility of implementing large scale on-call contracts. One district mentioned this type of contract could address the problem of obtaining different levels of service for varying locations and conditions. It would allow the district to execute more control over what work is performed and when it is performed.

One district felt the drawings concerning the treeline need more specific clarification. District personnel stated there is currently too much room for interpretation with the current drawings.
Another comment was that there currently are no gasoline adjustments for snow removal contracts. They felt that this definitely needed to be addressed in snow removal contracts.

A suggestion was made that the Wages and Equipment Rental rate sections of the standard specifications need to be updated.

One district added that the contractor needs to be required to make communication with the RME at least once a week. They felt that better communication would help with most problems they are facing.

One meeting participant stated that his district was having a problem with contractors using mowers that were too large. This caused extensive amounts of grass and litter to be thrown onto the highway. A comment was made that SCDOT can not specify a certain type of mower as it might favor a certain contractor. An idea was presented to have a requirement that, at no time, should a certain percentage of the road be occupied by the mower. Fifty percent was put forth as a more reasonable percentage.

One district noted that the sweeper specifications need to be changed so that they do not specify a certain sweeper. There has been a problem with trash being stuck between different resurfacing levels. The current specified sweeper is not capable of cleaning these areas.
CHAPTER X

SUMMARY AND CONCLUSIONS

Literature Review

The literature review conducted as part of the research described herein indicated a strong interest within state departments of transportation, with respect to the relative advantages associated with performance based specifications. Florida was apparently the first state to implement performance based specification, with Virginia following a short time thereafter. The main difference between Florida and Virginia approaches is that Virginia has focused more specifically on maintenance performance specifications, whereas Florida has implemented a combination of maintenance and construction/maintenance performance specifications. Although these two states have been the leaders in implementing performance based specifications, many other states are in the initial phases of implementation.

Another state completing initiation efforts is North Carolina. The NCDOT has only recently (during 2006 and 2007) began letting performance based contracts. The NCDOT has successfully implemented a performance based contracting approach after completing extensive research related to successful PBC Programs and then extracting the best components from other states.

Current SCDOT maintenance contracts are method based in nature. Since the SCDOT Steering Committee expressed the desire to focus this research mainly on individual PBC, only some of these activities lend themselves to individual performance
contracts. Most of the existing/completed research has focused on the “whole package,” meaning performance construction and maintenance specifications. As of this writing, no states have implemented performance specifications for individual activities. Currently, all of the contracts focus on a specific area and then include all applicable maintenance activities for that area.

This research has found very little information of PBC that focuses on individual maintenance activities. This is because the focus of other states and research has been on Total Asset Management (TAM) for a given area. Not all of the agencies and research publications have commented on why they are doing TAM instead of PBC for individual activities. The purpose of PBC is to save the Department on administrative duties (i.e. contract administration). By splitting up the contracts into individual contracts, based on the type of work, this eliminates some of the benefit of PBC.

Performance Based Contracting

Currently, most state DOT agencies (including South Carolina DOT) are using MBC. This is a concept whereby an agency specifies when and how the contractor is to do the work. Using interstate mowing as an example, a method based specification would stipulate when the contractor is to start work, when the work is to be completed, the number of “passes” with the equipment per season, and the type or size equipment to be used. Ultimately, the responsibility of the end result (ensuring the grass is sufficiently mowed) lies with the contracting agency.

PBC is different from MBC in that it shifts the responsibility of the final outcome from the contracting agency to the contractor. Again, using the interstate mowing
example above, a performance based contract would simply require the contractor to keep the grass between two heights (ex. 5” and 12”). The contractor then has the freedom to decide when to work, how the work is to be accomplished, and the type and quantity of equipment. The contracting agency, which normally monitors that the contractor is performing the work as instructed under a method based contract, must now monitor the desired end result specified in the performance based contract. This is accomplished using a rating system the contracting agency has developed. Florida DOT has developed and excellent and comprehensive rating system termed the Maintenance Rating Program (MRP). An inspector uses this rating system to monitor how well the contractor is meeting the desired end results. Payments to the contractor are influenced by the results of the inspector’s ratings.

In order for a contractor to be awarded a contract using the PBC method, the contractor must first meet pre-qualification requirements. If the contractor meets these requirements, a technical proposal and a price proposal must then be submitted to the contracting agency. The qualified contractor with the lowest weighted score of the technical and price proposals is the selected contractor. The weighting of scores is assigned by the agency depending on their needs and the public’s perception of importance of the contract.

There are numerous benefits related to PBC. One of the primary benefits is the fact that, the contracting agency is assured that the contract will produce the desired end results. The second main advantage is the potential for lower costs associated with contract administration. The theory behind the savings is that the contractor can perform
the work in the way he or she feels is the most efficient. Cost savings can also stem from the contractor being allowed the freedom to implement new and innovative methods to complete the work.

There are, however, some drawbacks associated with PBC. The primary drawback is the fact that the contracting agency needs to first formulate the comprehensive performance based contract. Without a comprehensive contract, a performance based program will not be successfully implemented. The contracting agency must also be granted the ability to select contractors based abilities, price, and qualifications as opposed to low bid price.

Another issue that can impact program implementation is the concerns of employees of the contracting agency. These employees must fully believe that this program will be beneficial to the agency, as well as not threaten their job security. Another concern of employees of both the contracting agency and the contractor is a difficulty in changing their mindset from the current MBC to the new PBC. During the course of this research, it was evident through comments and suggestions received during the workshop sessions that this change is more difficult than one may realize.

**Contractor Survey**

Both the Research Steering Committee and the research team believed it was important to obtain contractor opinions relative to a SCDOT implementation from MBC to PBC. Thus, a questionnaire consisting of ten activities, 3 questions each, was forwarded to thirty different contractors that have worked for the South Carolina DOT. Eight contractors responded to the survey.
The first question contained within the survey was the most important as it related specifically to the change between MBC and PBC. The contractors strongly agreed that this change would require them to train their staff on these changes. On the next question, the survey showed a wide variation in opinion to the question of whether this change will increase the contract cost. The average score showed that the contractors slightly agreed that the change will cause an increase. Despite these two answers, the contractors slightly agreed that the switch from Method to PBC should be easy to implement. Mowing is a critical activity within SCDOT, in that it comprises a large part of the maintenance budget.

The other interesting activity dealt with mowing as it is a large budget activity. The responding contractors slightly disagreed that the change in mowing specification would increase cost and require additional training of their staff. They slightly agreed that the change would be easy to implement.

The results of this questionnaire paralleled the information gathered from other states that have implemented PBC. These states have found that the contractors have been reserved and somewhat resistant to such a change. This may in turn negatively impact contract cost. However, as contractors become more accustomed to performance based contracting, contract costs will likely decrease. Such a change has also required the contractors to alter the way they think and work as well as train their staff on these changes. However, from the contractor’s point of view, such a change would not be overly difficult to initiate.
Improving the Current SCDOT Contracting Process

The other major component of the research was to research, described herein, explores how to improve the current SCDOT contracting process, and recommend whether or not PBC could or should be implemented. To address this research component, brainstorming meetings were held with district level personnel to identify problems, concerns, and potential problem solutions. These meetings were held at each of the South Carolina DOT district offices. These meetings showed that each district had a few local problems, but four main common concern themes emerged as typical throughout the state.

The first concern was with unqualified contractors. It was nearly unanimous that the districts wanted a prequalification requirement before the contractor is allowed to bid on work. It was found that the construction program within SCDOT had recently implemented a prequalification program. A similar program for the maintenance operations would simplify performance specification implementation.

It became evident from these meetings, that there is not an universal understanding of the current South Carolina contracting process. Thus, the districts suggested and agreed that annual training was needed. This would provide a uniform understanding of the contract and the “power” it entails, help establish more uniform inspections, and keep everyone informed with respect to changes in new contracts.

Along with the uneven understanding of the contract was an unclear grasp of the liquidated damages clause in the contract. Most personnel believed the current clause
does not sufficiently penalize the contractor and is very time consuming and difficult for the district personnel to utilize.

The district personnel stated that some contractors were unqualified and it was unrealistic to expect the contractor to complete the work as specified. Also, there have been some problems with agency inspectors not being able to track down a contractor so the inspector can be present while work is underway. A solution was proposed that could help both problems. This solution would require the contractor to submit an action plan along with the bid. This action plan would inform the contracting agency of the number of personnel and the number and type of equipment to be used as well as where and when the work will take place. Although, it may not enforceable by the contracting agency to hold the contractor to the action plan, most district personnel believe such a plan would be very beneficial.

Recommendations

The general perception among SCDOT main is that the current contract maintenance specifications place very little accountability with the contractor and requires significant effort to administer. Issues such as these could be addressed through the implementation of PBC. There appears to be a trend within state agencies of adopt programs that include performance based specifications. Thus, South Carolina DOT needs to be prepared should such a mandate occur. However, South Carolina does not appear to be ready to implement such a program. SCDOT will first need to be able to select contractors based on qualifications, cost, and abilities rather than cost alone. Second, the personnel with South Carolina DOT as well as interested contractors need to
be thoroughly shown the differences, advantages, and disadvantages between the current MBC and PBC. This should not be taken lightly as experiences throughout this research have shown that MBC is deeply engrained within the SCDOT culture.

SCDOT personnel need to be “on-board” with this program for it to have a chance of succeeding. Discussions with numerous maintenance personnel have shown that this may be difficult as it involves change and may affect their job security. Finally, South Carolina would be required to examine and utilize contract provisions and programs from other successful states to assemble their own contracts and programs. This is essentially the approach taken by the North Carolina DOT.

SCDOT personnel guiding and contributing to this research have stated that if PBC were to be implemented, they would like to do so on an individual activity bases. Although this limited engagement may serve the purpose of “getting their feet wet”, it will not allow the full advantages of reduced administrative effort that often accompanies PBC.

One primary focus of this research was to investigate how to improve the current contracting process until South Carolina DOT is fully capable of adopting PBC. Until then, it is advocated that SCDOT implement the contractor pre-qualifications and other recommendations generated from this research. The construction program within SCDOT has recently implemented a contractor prequalification program. A similar program should be implemented for maintenance operations. An annual training program should be implemented within SCDOT to help establish an improved level of
understanding of contract provisions, establish more uniform inspections, and monitor changes in the maintenance contracts.
APPENDICES
APPENDIX A
Performance Based Contracting - Contractor Survey

Company Name:___________________________________________________

Contact Information:_______________________________________________

A. PERFORMANCE BASED CONTRACTING OVERVIEW

Performance based contracting is often referred to as outcome-based contracting. This is because the contract puts the responsibility on the contractor by specifying the end result desired by the agency. The contractor has the free ability to decide when to start work and the equipment to use as long as the performance specifications are met. This is different from method-based contracting which specifies how and when the contractor is to do the work. These contracts span for multiple years, often 7 to 30 years with an option to renew. Most current state agencies using performance based contracting apply it to the maintenance of all assets in a specified area (Total contract Maintenance). However, this survey is to look at the assets individually.

Questions:

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Comments:

B. MOWING

Under this work feature, the contractor must keep the grass in the desired height range. Not more than \( \frac{1}{2} \)% of vegetation exceeds (varies) inches high. This excludes seed stalks which are allowed and decorative flowers are allowed to remain for aesthetics. Below are the desired height ranges for the type of facility.

<table>
<thead>
<tr>
<th>FACILITY TYPE</th>
<th>CLASSIFICATION</th>
<th>DESIRED HEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rural Limited Access</td>
<td>5 inches - 18 inches</td>
</tr>
<tr>
<td>2</td>
<td>Rural Arterial</td>
<td>5 inches - 12 inches</td>
</tr>
<tr>
<td>3</td>
<td>Urban Limited Access</td>
<td>5 inches - 12 inches</td>
</tr>
<tr>
<td>4</td>
<td>Urban Arterial</td>
<td>9 inches maximum</td>
</tr>
</tbody>
</table>

Questions:

<table>
<thead>
<tr>
<th>Strongly Agree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
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<tr>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

Comments:
D. LIMB TRIMMING

The contractor must ensure there is no encroachment of trees, tree limbs or vegetation lower than 14-1/2 feet onto or beyond the shoulder point, face of curb, face of guardrail or back of shoulder gutter. There is no encroachment of trees, tree limbs or vegetation lower than 10 feet over sidewalk. There shall be no vegetation that violates the horizontal clearance (clear zone).

Questions:
1) Will the above increase the contract cost? 1 2 3 4 5
2) Will the above require additional training of your staff? 1 2 3 4 5
3) Will the above be easy to implement? 1 2 3 4 5

Comments: __________________________________________
____________________________________________________
____________________________________________________

E. GUARDRAIL

The contractor is responsible for ensuring each single run functions as intended. If there is less than 25 feet of guardrail in a sample, then 50% or more of the guardrail must meet the height requirement for this sample point to meet maintenance conditions. All other guardrail criteria shall be rated no matter what the length.

Questions:
1) Will the above increase the contract cost? 1 2 3 4 5
2) Will the above require additional training of your staff? 1 2 3 4 5
3) Will the above be easy to implement? 1 2 3 4 5

Comments: __________________________________________
____________________________________________________
____________________________________________________

F. RAISED PAVEMENT MARKERS

The contractor is responsible for ensuring 70% of the rebuked markers are functional (reflective) at a distance of 528 feet. No more than 100 feet of continuous centerline or lane line is without a reflective marker.

Questions:
1) Will the above increase the contract cost? 1 2 3 4 5
2) Will the above require additional training of your staff? 1 2 3 4 5
3) Will the above be easy to implement? 1 2 3 4 5

Comments: __________________________________________
____________________________________________________
____________________________________________________
G. STRIPING

The contractor is responsible for ensuring 90% of the length and width of each line is reflective and functions as intended.

<table>
<thead>
<tr>
<th>Questions:</th>
<th>Strongly Agree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Will the above increase the contract cost?</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2) Will the above require additional training of your staff?</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3) Will the above be easy to implement?</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Comments:____________________________________________________________________

H. PAVEMENT SYMBOL

The contractor is responsible for ensuring 70% of existing symbols function as intended.

<table>
<thead>
<tr>
<th>Questions:</th>
<th>Strongly Agree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Will the above increase the contract cost?</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2) Will the above require additional training of your staff?</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3) Will the above be easy to implement?</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Comments:____________________________________________________________________

I. SIGNS

The contractor is responsible for ensuring:

SIGNS LESS THAN OR EQUAL TO 30 SQ. FT.: 95% of the signs are functioning as intended.

SIGNS GREATER THAN OR EQUAL TO 30 SQ. FT.: 85% of the signs are functioning as intended.

<table>
<thead>
<tr>
<th>Questions:</th>
<th>Strongly Agree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Will the above increase the contract cost?</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2) Will the above require additional training of your staff?</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>3) Will the above be easy to implement?</td>
<td>3</td>
<td>4</td>
</tr>
</tbody>
</table>

Comments:____________________________________________________________________
### J. RIGID JOINT

The contractor is responsible for ensuring 85% of the length of transverse and longitudinal joint material appears to function as intended.

<table>
<thead>
<tr>
<th>Questions:</th>
<th>Strongly Agree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Will the above increase the contract cost?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>2) Will the above require additional training of your staff?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>3) Will the above be easy to implement?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
</tbody>
</table>

Comments: __________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

### K. RIGID CRACKING

The contractor is responsible for ensuring 90% of the roadway slabs have no unsealed cracks wider than 1/8 inch.

<table>
<thead>
<tr>
<th>Questions:</th>
<th>Strongly Agree</th>
<th>Strongly Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) Will the above increase the contract cost?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>2) Will the above require additional training of your staff?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
<tr>
<td>3) Will the above be easy to implement?</td>
<td>1 2 3 4 5</td>
<td></td>
</tr>
</tbody>
</table>

Comments: __________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
APPENDIX B
**FLORIDA MRP HANDBOOK**

**Mowing**

**ROADSIDE MOWING:** Not more than 1% of vegetation exceeds (varies) inches high. This excludes allowable seed stalks and decorative flowers allowed to remain for aesthetics.

<table>
<thead>
<tr>
<th>FACILITY TYPE 1</th>
<th>CLASSIFICATION</th>
<th>DESIRED HEIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Rural Limited Access</td>
<td>5 inches - 18 inches</td>
</tr>
<tr>
<td>2</td>
<td>Rural Arterial</td>
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</tr>
<tr>
<td>4</td>
<td>Urban Arterial</td>
<td>9 inches maximum</td>
</tr>
</tbody>
</table>

**Roadside Mowing** - This characteristic is the control of planted or natural grasses and vegetation for protection of soil shoulders and slopes, safety and aesthetics purposes.

**Evaluation:** Determine the mowing area in the sample point. Measurements with a rule or stick marked at the appropriate heights should be made throughout the sample. Determine the area of the vegetation that does not meet the standards. If more than 1% of vegetation, EXCLUDING allowable seed stalks and decorative flowers which have been allowed to remain for aesthetics, exceeds the appropriate measurement as listed in the standard, then this characteristic does not meet the desired maintenance condition. Allowable is defined as any vegetation not listed as undesirable in turf condition standard. Except for turf mowed by adjoining property owner, turf mowed at less than 5 inches on Facility Types 1, 2 and 3 does not meet desired maintenance conditions. Do not evaluate mowing areas where wet conditions prevent mowing.
Calculate the percentage of vegetation that does not meet the standard by dividing the area of vegetation that does not meet the standards by the total mowing area in the sample and multiplying by 100.

Roadside Mowing does not meet MRP standards when any of the following exist:

1. More than 1% of the vegetation varies from the standard height.
2. The turf is mowed less than 5 inches on facility types 1, 2 and 3, except turf mowed by adjoining property owner.
**Slope Mowing**

**SLOPE MOWING:** Not more than 2% of vegetation is less than 5 inches or more than 24 inches in height. This excludes allowable seed stalks and decorative flowers allowed to remain for aesthetics. The area shall be maintained in accordance with the mowing guide.

**Slope Mowing** - This characteristic is the control of planted or natural grasses and vegetation for protection of soil slopes, safety and aesthetic purposes.

**Evaluation:** Only evaluate the slope mowing areas as shown in the FDOT Guide to Roadside Mowing. Measurements should be made throughout the sample. Slope mowing shall not be evaluated if vegetation has been planted to eliminate the need for slope mowing. Allowable is defined as any vegetation not listed as undesirable in turf condition standard. Except for turf mowed by adjoining property owner, turf mowed at less than 5 inches, on all facility types does not meet desired maintenance conditions.

Determine the slope mowing area in the sample point. Calculate the area of vegetation that does not meet the standard. Determine the percentage of vegetation that does not meet the standard by dividing the area of vegetation that does not meet standards by the total slope mowing area in the sample and multiplying by 100.
**Slope Mowing does not meet MRP standards when the following exist:**

1) More than 2% of the vegetation is less than 5 inches in height except for turf mowed by an adjoining property owner.

2) More than 2% of the vegetation is more than 24 inches in height, except allowable seed stalks and decorative flowers allowed to remain for aesthetics.
**Limb Trimming**

**TREE TRIMMING:** There is no encroachment of trees, tree limbs or vegetation lower than 14-1/2 feet onto or beyond the shoulder point, face of curb, face of guardrail or back of shoulder gutter. There is no encroachment of trees, tree limbs or vegetation lower than 10 feet over sidewalk. There shall be no vegetation that violates the horizontal clearance (clear zone) of the right of way.

**Tree Trimming** - This characteristic is the encroachment control of trees, tree limbs or brush within the right-of-way.

**Evaluation:** All samples are to be evaluated for tree trimming. Dead or dying vegetation next to or over the travel way or clear zone that could fall or present a hazard to vehicles or pedestrians does not meet desired conditions.

For MRP purposes, trees to be evaluated should have a diameter greater than 4 inches as measured 6 inches above the ground. Also evaluated for tree trimming, are tree limbs greater than 1 inch in diameter greater than 3 feet above the ground.

In areas with curb and gutter, there should be no vegetation over the roadway lower than 14-1/2 feet from the face of curb to the face of curb.

In areas without curb and gutter, there should be no vegetation over the roadway and shoulder lower than 14-1/2 feet.

In cases where guardrail is present, there should be no vegetation over the roadway and shoulder lower than 14-1/2 feet from the face of guardrail. See detail.
In areas with sidewalk, there should be no encroachment of trees, tree limbs or vegetation over the sidewalk lower than 10 feet.

Encroachment onto the sidewalk is considered to meet conditions as long as at least 4 feet is clear of vegetation.

In an area with a bike path, there should be no encroachment of trees, tree limbs or vegetation over the bike path lower than 10 feet. Encroachment onto a bike path is considered to meet conditions as long as at least 4 feet is clear of vegetation.

**Tree trimming does not meet MRP standards when any of the following exist:**

1) In curb and gutter areas, vegetation is lower than 14-1/2 feet over the roadway from the face of curb to the face of curb.

2) In areas without curb and gutter, vegetation over the roadway and shoulder is lower than 14.5 feet.

3) In areas with guardrail, vegetation over the roadway and shoulder is lower than 14.5 feet from face of guardrail.

4) Vegetation encroachment of trees, tree limbs or vegetation over the sidewalk is lower than 10 feet.

5) Encroachment of trees, tree limbs or vegetation onto the sidewalk where less than 4 feet is clear.

6) Encroachment of trees, tree limbs or vegetation over a bike path lower than 10 feet.

7) Encroachment of tree, tree limbs or vegetation onto a bike path where less than 4 feet is clear.
This picture is an example of vegetation growing over the sidewalk. This obstructs the use of the sidewalk by pedestrians. If there is encroachment of trees, tree limbs or vegetation onto the sidewalk, so that less than 4 feet is clear, it does not meet desirable MRP conditions.
**Guardrail**

**GUARDRAIL:** Each single run functions as intended.

**Guardrail** - Guardrail is installed to guide a vehicle away from various hazards in and adjacent to the travel way and, in most cases, where fill slopes exceed 3:1.

**Evaluation:** Determine the general condition of the guardrail. Check the guardrail height. Check for damaged rail, missing or damaged posts or blocks, connecting hardware and end sections. Check to make sure guardrail is lapped correctly.

If there is less than 25 feet of guardrail in a sample, then 50% or more of the guardrail must meet the height requirement for this sample point to meet maintenance conditions. All other guardrail criteria shall be rated no matter what the length.

Consideration should be given to what Design Standards were used during original construction of guardrail.

A previous minor collision may not prevent a guardrail system from functioning as designed and would not cause failure. Installations may vary from roadway to roadway because of design standard changes and should be evaluated using the appropriate design standard.

**Guardrail does not meet MRP standards when any of the following exist:**

1. Any missing posts, offset blocks, panels or connection hardware.
2. Nuts fully threaded within 1 inch of the anchor plate on end treatment cables and anchor rods (measurements should be checked with end treatment cable taunt).
3. Any section that is 3 inches above or 1 inch below the desired elevation for 25 continuous feet.
4. The backup plate does not fit snugly behind the rail. There should be some point of contact.
5. Damaged end sections.
6. The rail has been penetrated.
7. More than 10% of the guardrail blocks are twisted.
8. More than 10% of the wooden posts or blocks are rotten or deteriorated.
9. Any panel lapped incorrectly.

**Handrail does not meet MRP standards when any of the following exist:**

1. The handrail is bent or misaligned and does not function as intended.
2. One or more anchor bolts, nuts, or neoprene/resilient pads are missing on the base plate.
3. If fence is attached to the handrail, the fence must be in place and securely fastened to the handrail.
4. It is obvious that handrail was installed but is now missing.
**Raised Pavement Markers**

**RAISED PAVEMENT MARKERS:** 70% of the rebuked markers are functional (reflective). No more than 100 feet of continuous centerline or lane line is without a reflective marker.

**Raised Pavement Marker** - Raised pavement markers are reflective white, amber or red. Some markers are designed with a reflector on one side only. Raised pavement markers are effective aids for night driving, especially on wet pavement. They are required on ALL FDOT highways to delineate centerline, some curbs, traffic islands and for the transition of roadway or lane width changes.

**Evaluation:** Daytime - Check to make sure the correct number of markers are installed. Count all the markers that should be present. Then count the number of missing markers. Determine the percentage of markers missing by dividing the number missing by the total number that should be present.

No more than 100 feet of continuous centerline or lane line should be without a reflective marker.

If RPM'S are required on edge lines, they should be rated.

Nighttime - Conduct nighttime reflectivity checks using LOW BEAM headlights only.

Ride the same roadway in both directions to check the reflectivity of the RPM's. The survey vehicle headlights should be adjusted periodically. The nighttime reflectivity check should be conducted when the pavement is dry.
At least 70% of the required markers should be functional (reflective) at a distance of 528 feet.

Designed breaks in pavement lines (crossovers, intersections) shall not be included in the 100 feet.

Raised Pavement Markers do not meet MRP standards when the following exist:

1) If more than 30% of the required raised pavement markers are missing.
2) If more than 30% of the required markers are not functional (reflective) at a distance of 528 feet.
3) If more than 100 continuous feet of centerline or lane line is without a reflective marker.
4) If the raised pavement markers are installed incorrectly.
Stripling

**STRIPING:** 90% of the length and width of each line is reflective and functions as intended.

**Striping** – Pavement striping is a 6 inch wide centerline; skip line or edge line.

**Evaluation:** Daylight and nighttime inspections shall be done. Each line is evaluated independently.

Solid lines - Determine the length and width of each solid line in the sample point. A minimum of 5.4 inches of each line width should be present, visible and reflective at night with low beam headlights. Determine if the lines are reflective at night for a distance of 160 feet. Due to changes in design standards, striping may have been installed at certain locations on some roadways where no striping is installed at similar locations on other roadways. Do not evaluate striping at locations where it has not been installed.

Skip lines - Determine the length and width of each skip line in the sample point. A minimum of 5.4 inches of each line width should be present, visible and reflective at night with low beam headlights. Only evaluate the stripe and not the skip. Black lines are used for contrast only and should not be evaluated for reflectivity.

Refer to Design Standard Indices 17345 and 17346 for Interchange markings and special marking areas.

**Striping does not meet MRP standards when the following exist:**

1) If more that 10% of the length of any line is less than 5.4 inches wide during daylight inspection.
2) If more than 10% of the length and width of any line is not visible for a distance of 160 feet at night.
3) If more than 10% of the length of any line is missing.
4) If more than 10% of the length of any line is covered by soil, grass or debris.

Striping on a typical four lane divided highway.

Shows painted edgeline installed on a newly constructed or resurfaced roadway. Evaluate according to the striping characteristics.

Worn out edgeline

Edgeline obscured by soil or other debris does not meet MRP standards.
Pavement Symbol

PAVEMENT SYMBOL: 70% of existing symbols function as intended.

Pavement Symbol - Pavement symbols are used to communicate certain meanings at specific locations.

Evaluation: Determine the total square footage of all symbols within the sample point. Symbols that appear to be abandoned should be verified as such with the area engineer and not be evaluated if determined to be abandoned. Curb markings and crosswalks on connecting side streets are not to be evaluated for nighttime reflectivity. Standard Index 17346 or the MMS Handbook can be referenced to determine the square footage of symbols.

Pavement Symbols do not meet MRP standards when the following exist:

1) If more than 30% of the cumulative symbol area is not functioning as intended during daylight observation.

2) If more than 30% of cumulative symbol area is not reflective for a distance of 160 feet using low beam headlights during nighttime observation.
SIGNS

SIGNS LESS THAN OR EQUAL TO 30 SQ. FT.: 95% of the signs are functioning as intended.

SIGNS GREATER THAN OR EQUAL TO 30 SQ. FT.: 85% of the signs are functioning as intended.

Signs - Signs are used to convey information to the motorist so they can travel safely and efficiently on the highway.

According to the Manual on Uniform Traffic Control Devices, Placement of a traffic control device should be within the road user's view so that maximum visual acuity is provided. To aid in conveying the proper meaning, the traffic control device should be appropriately positioned with respect to the location, object, or situation to which it applies. The location and legibility of the traffic control device should be such that a road user has adequate time to make the proper response in both day and night conditions."

Evaluation: Determine the number of signs within the sample point. Inspect the signs and determine the number of signs that do not meet desired MRP conditions. Divide the number of signs that meet MRP conditions by the total number of signs in the sample point. Multiply by 100 to get the percentage of signs that function as intended. If the percent is less than the standard, then the signs do not meet MRP standards.
For the purposes of evaluating individual sign installations, the following criteria shall apply:

**Sign Height:**

1. **Rural roads and limited access ramps:**
   12 feet minimum offset from edge of driving lane and where 12 feet cannot be met.
   6 feet minimum from edge of paved shoulder to edge of sign.

2. **Limited access mainline:**
   30 feet minimum offset from edge of mainline driving lane to edge of sign.

3. **Roads with curb and gutter:**
   2 feet minimum offset from face of curb to edge of sign.

4. **Signs behind guardrail:**
   2 feet minimum from the face of the rail to the edge of sign.

**Sign Lateral Clearance:**

1. **Rural roads and limited access ramps:**
   12 feet minimum offset from edge of driving lane and where 12 feet cannot be met.
   6 feet minimum from edge of paved shoulder to edge of sign.

2. **Limited access mainline:**
   30 feet minimum offset from edge of mainline driving lane to edge of sign.

3. **Roads with curb and gutter:**
   2 feet minimum offset from face of curb to edge of sign.

4. **Signs behind guardrail:**
   2 feet minimum from the face of the rail to the edge of sign.

**Sign Tolerances:**

1. **Height Tolerance:**
   - A. 3 inch tolerance for all signs except signs over sidewalk.
B. 12 inch tolerance for Type 1 and III object markers.

2. **Lateral Clearance Tolerance:**
   A. 3 inches in curb and gutter sections and behind the guardrail.
   B. 6 inches on limited access ramps and arterial roads.
   C. 12 inches on limited access mainline.

The Department's Design Standards contain information on installation and placement of signs.

The evaluation of signs greater than 30 sq. ft. includes all over-lane signs with the exception of overhead school signs and county/city signs on signal cables.

Many cities and counties and some state and federal agencies install traffic signs and devices adjacent to or on FDOT right-of-way. Warning, Regulatory and Information signs and devices installed and maintained by FDOT are normally identified (front and back) as property of the Florida Department of Transportation and should have an installation date painted on or attached to the sign. **Evaluate only FDOT signs and devices.**

**NOTES:**

1) Highway signs shall be evaluated using two characteristics:
   - Ground signs greater than 30 square feet (including all over-lane signs).
   - Ground signs 30 square feet or less.

2) **MRP definition of a secondary sign:** A secondary sign is mounted below a primary sign and its message is not related to the primary sign message. Example: A "Do Not Block Intersection" sign mounted with a no u-turn sign below it.

3) The height to the bottom of a secondary sign mounted below another sign may be one foot less than the appropriate height except where signs are over sidewalks (a route marking assembly consisting of a route marker with an auxiliary plate is treated as a single sign).
4) Do not rate overhead school signs or county/city signs on signal cables.
5) Do not rate logo signs or signs on call boxes.
6) For purposes of these guidelines, a turn lane will be considered a driving lane. Merge, rest area, signs on islands and exit gore signs shall be evaluated under Design Standard Index No. 17302.
7) If it is obvious the minimum lateral clearance cannot be met, the sign shall be considered to meet acceptable maintenance conditions. The presence of sidewalk by itself shall not be considered a reason a sign cannot meet the minimum lateral clearance.
8) A sign less than 30 square feet mounted to a sign greater than 30 square feet is evaluated as part of the sign greater than 30 square feet.
9) For MRP purposes, two post installations with round aluminum tubing less than or equal to 3-1/2 inches meets maintenance conditions.
10) Signs in the median, as outlined in Index 17346 are not evaluated for lateral clearance.

**Signs do not meet desired maintenance conditions when any of the following exist:**

1) Sign installations including panels and posts leaning more than 1 inch per foot.
2) There is missing connecting hardware, nuts and bolts.
3) Sign panels are attached to columns below a fuse cut (Index 1 1200).
4) Bottom of sign panel is installed more than 1 inch above or below the fuse cut (Index 1 1200).
5) Aluminum "C" clamps are used to attach a sign panel to a post.
6) Cantilever signs are not installed according to Index 11860.
7) Brackets are installed improperly.
8) A cantilever sign is wider than 4 feet.
9) Sign rotation causes the sign message to become unreadable. (Note: In urban areas, "NO PARKING" signs may be rated 30° to 40° toward traffic).
10) Signs fail to convey the intended message due to lack of reflectivity, fading or surface accumulations. (Note: All signs shall be reflectorized or illuminated to
show the same shape and color in day and night conditions).

11) Height and offset of mile markers are not according to Case IX of Index 17302. (Note: For MRP purposes, a height tolerance of up to 3 inches and an offset tolerance of up to 12 inches are permitted).

12) Aluminum posts greater than 3-1/2 inches in diameter are not installed on a slip base (Indices 11861 to 11864).

13) A slip base or breakaway support is covered with soil.

14) A slip base or breakaway support more than 3 inches above the smashed ground as measured at the center (index 11860).

15) A single post installation is prohibited by Index 11860. (Note: Details found on Sheet 3 of Index 11860 shall not be considered during MRP evaluations).

16) Single post installations of a sign wider than 48 inches unless specifically allowed by Index 11860.

17) A sign on a slip base is installed without a concrete footing.

18) The edge of a sign panel is installed less than 2 feet from the face of guardrail.

19) The height and lateral offset of a sign panel is not installed according to Index 17302.

20) Damage to a sign column that compromises its function.

21) U-channel steel posts heavier than 3 pounds per foot have no breakaway support.

22) Steel post support stubs protrude more than 4 inches above the ground.
Do not rate logo signs.

Do not rate signs on call boxes.

Signs should not lean more than 1 inch per foot.

Measuring a sign that is leaning more than 1 inch per foot. This sign does not meet desired maintenance conditions.

Incorrect bracket installation.

This sign column has been damaged and does not meet desired maintenance conditions.
Cantilevered signs must be installed on a breakaway device and have a concrete foundation. Sign does not meet desired maintenance conditions.

Slip base more than 3 inches above the ground. This does not meet desired maintenance conditions.

Measuring a sign post. This post is 4 inches and should be installed with a concrete foundation and breakaway assembly. This sign installation does not meet desired maintenance conditions.

This sign foundation is non-standard and, therefore, does not meet desired maintenance conditions.
Rigid Joint

RIGID JOINT: 85% of the length of transverse and longitudinal joint material appears to function as intended.

Rigid Joints - Joints are placed in rigid pavement to control cracking and to allow for year-round contraction and expansion. Joints should be sealed to restrict the intrusion of water and incompressibles into the joint. Sealed joints extend the life of the rigid pavement.

Evaluation: To determine if this characteristic meets MRP standards, you must first calculate the total length of transverse and longitudinal joints in the sample. This can be accomplished by computation or actual measurement.

Transverse joints are generally about 20 feet apart but an on-site verification should be done. Count the number of transverse joints and multiply by the width of the road. Count the number of longitudinal joints and multiply by the length of the joints. To obtain the total length of joint material, add the length of transverse and longitudinal joints together. Generally, it is easier to multiply the total joint length to be evaluated by 0.15 (15%) to determine what length is allowed below the desired maintenance condition and then measure those joints that do not function as intended. A cumulative length greater than 15% of the total does not meet the desired maintenance condition.
On multi-lane divided sections, with paved shoulders, BOTH the paved median shoulder and paved outside shoulder joints are to be evaluated. DO NOT rate the longitudinal joint between the rigid pavement and asphalt shoulder if it was never sealed.

Rigid Joints do not meet MRP standards when the following exist: 1) More than 15% of the total transverse and longitudinal joint length is missing.

**Rigid Joints do not meet MRP standards when the following exist:**

1) More than 15% of the total transverse and longitudinal joint length is missing.

This picture shows two traverse joints and a slab that has two unsealed cracks

Do not rate the longitudinal joint between the Rigid pavement and the asphalt shoulder if it was never sealed.
**Rigid Cracking**

**RIGID CRACKING:** 90% of the roadway slabs have no unsealed cracks wider than 1/8 inch.

**Rigid Cracking** - A slab is defined as that area within the existing control joints. Do not include the control joints in the evaluation.

**Evaluation:** Determine the total number of slabs within the evaluation area. Then determine the number of slabs that have unsealed cracks wider than 1/8 inch. Divide the number of slabs with unsealed cracks wider than 1/8 inch by the total number of slabs within the evaluation area to determine the percentage of slabs with unsealed cracks wider than 1/8 inch. If this percentage is more than 10%, then this characteristic does not meet desired conditions.

**Rigid Cracking does not meet MRP standards when the following exist:**

1) More than 10% of the slabs have unsealed cracks greater than 1/8 inch.

These pictures show an unsealed crack wider than 1/8 inch in rigid pavement.
DISTRICT MEETING MINUTES

District A

- They are currently having problems with 1/1 slopes. The specs require the contractor to mow these slopes but the only places here that have 1/1 slopes are fill areas. The tractors end up sinking and getting stuck as the fill areas are usually soft.

- For the most part they like the requirements in the current specs.

- They have recently ‘tightened-up’ on the current mowing contract

- General consensus was that there needs to be district specific contracts to better handle regional specific problems/issues.
  
  o This district loved the idea of having general specs for the whole state and then has three or four regional supplemental specs.

- They are currently having problems with contractors complaining that they were not required to do something in another district even though they have the same contract in both districts. They commented that this is probably due to the varying ‘strictness’ of the inspectors of the different districts.
  
  o This district currently has training for their inspectors when changes are made in the contract specs. They have seen that the inspectors generally understand the specs but may lack knowledge in their power to enforce

- The current specifications require the contractor to sign-in to the pre-bid. This district proposes that the requirement be expanded to include a sign-out requirement to make sure the contractor stays for the entire meeting.
• This district does not feel there is anything wrong with the specs requiring the site visit. However, they said that they need to tighten-up on this; enforce the contract stating that the contractor must actually visit the site.

• This district has not seen any issues with “incapable” contractors

• They felt that the current penalties were a little light, especially concerning start work and completion time requirements

• This district felt that performance specs like those used in Florida are a great idea as it will help with the start and completion date problems and with SCDOT workload issues. However, they felt that performance specs would not work in South Carolina due to the “budget yo-yo”. Performance contracts require the state to have the money for all the contracted areas. Currently, this district and probably the rest of the state have to pick and choose which roads will receive maintenance depending on the amount of money they have.
**District B**

Performance Specs

- With regard to the MRP the state of Florida uses, this district had concerns that if the contractors would be capable of conforming to the new style of specs.
  - As is, the districts are having hard enough time getting the contractors to start when they are supposed to and complete the work when required.
  - With performance specs there are no set number to mowing cycles. Instead the weather dictates how fast the grass grows and therefore how many cycles are needed. The district has concerns that the contractors will have a big problem with not getting enough pay if they get paid only when cycles are needed.
    - It was proposed that instead of paying by the cycle, payment be made on an annual basis, meaning that the contractor will get paid the same amount whether they perform three cycles or five cycles. This district had a problem with this as they felt it would be hard to justify paying the same amount for fewer cycles.
- This district had some strong reservations against using performance specs as they felt that this would outsource their jobs to contractors.
- This district felt that state maintenance budget would be a very big obstacle to performance specs
- This district does not like the fact that performance specs do not allow the district to cut a mowing cycle if they need the money elsewhere or simply do not have
enough money.

**General Issues**

- This district is having problems with trim work under guardrail. They felt that they need a fine for the contractor not doing the trim work within a certain timeframe after mowing. They have experienced contractors that perform mowing cycles every six weeks and do the trim work three weeks after the initial mowing. They do this so that they only have to trim once for both mowing cycles.

- This district says that they are in bad need of more inspectors. They felt that this is where most of their contract issues are from. The one inspector they do have is not capable of monitoring all 1400 miles of road that have five cycles each year. The district is therefore incapable of monitoring if the contractor has missed areas or not done trim work. This also limits their ability to track when damage is done by the contractors.

- This district loved the idea of having a centralized inspector meeting each year. This would allow the state to have uniform ‘strictness’ levels as well as keep the inspectors up-to-date as to spec changes and to make sure they know what contractual power they have.
  
  o They added that the RME (resident maintenance engineer) and ME (maintenance engineer) should also attend these centralized meetings as they are responsible for writing the letter to the contractor informing him of not performing once the inspector has witnessed non-conforming work.
• This district loved the idea of having general specs for the whole state and then has three or four regional supplemental specs

• This district felt that someone needs to look at making the liquidated damages enough to ensure that it is cheaper for the contractor to perform the non conforming work that to pay the damages.
District C

- Central Training/Strictness Meeting
  
  o This district felt very strongly that training is needed especially for MEs and RMEs. Some felt that they had a good “handle” on the contracts, while some did not feel as comfortable. Training would help to provide a uniform understanding of the contracts.

  o With regards to strictness, this district felt that establishing a statewide strictness level for various components would help. However, there were concerns that this would not totally fix the problem as this only addresses part of the problem, the other part being differences in personalities.

- A comment was made that the Pre-Bid tells what is in the contract and that the RMEs need to go to this meeting.

- This district had a concern that there currently are no gas adjustments to snow removal contracts.

- A comment was made that the Wages and Equipment Rental rates need to be updated.

- When asked to comment on the idea of having a pre-qualification for contractors, this district liked the idea of it

  o This district did have concerns whether a contractor pre-qualification would actually work. They felt that it would be too easy for a contractor to get qualified and too hard to knock a poor performing contractor off of the list.
A suggestion was made that there be a limit on the number of delinquent status’s that a contractor can have and still be on the pre-qualified list.

It would be hard to require the contractor to have a certain amount or type of equipment before he bids. This contractor may not own the needed equipment but is planning on purchasing or renting the equipment if the contract is won.

- It was suggested by the district that the contractor be required to submit an “Action Plan” that describes how the contractor plans on accomplishing the work. This addresses the equipment rental problem with the pre-qualification list. This “Action Plan” should be submitted along with the bid package.

- It was suggested that an “on-call” contract be used instead of the current contract which is done by the acre.
  
  - This type of contract was suggested to address the problem with obtaining different levels of service required for certain roads.
  
  - This may be a good topic for future research as to the feasibility of this type of contract.

- This district felt that the drawings concerning the treeline need to be cleared up. There is currently too much room for interpretation with these drawings.

- It was suggested that the whole state cycle through a version of the mowing contract before implementing a new version. There were concerns that people were confusing the different versions and that a central training meeting would further confuse people that were administering a different version than was being
taught.

- This district felt very strongly that the contract should be based on shoulder mile and not acre.

- There were concerns with having a state-wide or even regional specifications as each district has different amounts of money and different desires as far as level of service.
**District D**

- This district has had problems with contractors hitting guardrail cables.
- This district has had problems with knowing when the contractor is coming to perform the work.
- Contractor Pre-Qualification
  - This district felt that the contractor should undergo some training as to what the contract entails before they can be qualified. Further, the felt that the one going through the training should be the on-site supervisor, not someone that does not have direct control over the workers.
  - This district has problems with “mom & pop” contractors (small company that may not be capable of accomplishing the contract.
  - Equipment
    - This district had concerns that it would be hard to pre-qualify some of the contractors based on equipment on hand as the contractor may be planning on renting equipment and will not obtain the equipment unless the contract was won.
    - There were also concerns with large companies that have huge fleets of equipment but still only send two guys to accomplish a large contract.
  - This district felt that the power to remove a contractor from the pre-qualification list should lie with the district maintenance engineer, not someone high up in the DOT that does not know what is really going on in
the field.

- “Action Plan”
  - It was suggested by the district that the contractor be required to submit an “Action Plan” that describes how the contractor plans on accomplishing the work. This addresses the equipment rental problem with the pre-qualification list. This “Action Plan” should be submitted along with the bid package.
  - A comment was made that the RME or MEs should have the power to approve changes to the plan.

- It was stressed that the contractor needs to be required to make communication with the RME at least once a week. This district felt that better communication would help with most of the problems they are facing.
**District E**

- “Action Plan”
  - This district likes the idea of an action plan.
  - There were some concerns over confidentiality. By this they meant that other contractors could find out how they were able to place such a low bid, trade-secrets, etc.
    - Later discussion decided this could be addressed by treating these action plans like seal bids, where the information is kept within the DOT.
- This district has experience problems with simultaneously administering different versions of the mowing contracts. It was commented that the contract cycle will be starting over in 2009.
- This district liked the idea of pre-qualification for contractors. They preferred the term certification as they felt that the contractor needs to go through some training during the pre-qualification.
  - It was suggested that only contracts of a certain size or larger be required to have pre-qualified contractors.
  - They felt that all the contractors need to be required to go through some sort of traffic control certification.
- There were concerns over the fines for non-performance as well as for excessive grass growth. After extensive discussion there was no suggestion that addressed everyone’s concerns.
• This district has had problems with contractors using too large of mowers that caused extensive amounts of grass and litter to be thrown onto the highway
  o A comment was made that when addressing this issue, the DOT needs to be careful not to favor certain contractors by requiring a certain type of mower.
  o A possible solution was to have a requirement that only a certain percentage of the road can be occupied by the mower.
• This district said that the sweeper spec needs to be changed so that it does not specify the sweeper. There has been a problem with trash being stuck between different resurfacing levels. The specified sweeper is not capable of cleaning these areas.
• This district liked the idea of having the liquidated damages based on a percentage of the contract. The intent is to address very large contracts with a flat fine for being late. The flat fine does not “hurt” this contractor enough. However raising the flat fine would hurt the contractor on a small project too much.
**District F**

- This district has had only a limited amount of experience letting out mowing contracts.
- For the most part this district has been pleased with the current mowing specs.
- This district has let out quite a few catch basin contracts. They have been very please with these contracts.
- **Annual training:**
  - This district specifically mentioned that there needs to be annual training meetings at a centralized place in South Carolina for inspectors.
  - They stated that this meeting needs to be centralized and yearly to establish a uniform “strictness level”.
  - They also stressed that it must be annual and not every three or four years because there is a fair amount of SCDOT personnel turnover. Further this will diminish the variation in interpretation of the specs as well as allow the districts to become “up-to-speed” with recent changes in the specs.
- **Prequalification:**
  - This district loves the idea of contractor prequalification.
  - There was a concern that it would be difficult to specify what constitutes a qualified contractor (experience, manpower, resources, background)
  - There was a concern that if a prequalification stated that the contractor must have at least 2 years experience performing this type of work then it would not address the contractors background (ex. if he had not performed
a mowing contract but had been farming for the last 15 years)

- This district felt that even though a strict prequalification would screen out some potentially good contractors it would be well worth while as it could cut out the bad ones.

- This district felt very strongly that there should be a certification process incorporated into the prequalification that dealt with traffic safety.

• **Action Plan:**

  - This district liked the idea of an action plan as it would help establish if a contractor knows what the job entails

  - There was a concern that the action plan would be too objective and would not allow a bid to be legally disqualified

  - Despite the inability to disqualify a bidder, this district felt that the action plan should definitely be incorporated.

• This district felt that the liquidated damages should be based on a percentage of the contract and not a flat amount.
**District G**

- This district has had problems with contractors bidding on work that they are not capable of doing. They stated that prequalification could help this problem.

- **Action Plan:**
  - When asked about an Action Plan, they said they have had problems with “mom & pop” contractors. They felt an Action Plan could be used to evaluate if he is capable.

- **Training:**
  - They felt that traffic safety training was needed. They stated that the right people, meaning the people doing the work, need to be the ones attending this training.
  - This district felt that there should be training for both SCDOT staff as well as for the contractors. They were adamant that this training be held annually.
  - They believed that establishing a strictness standard at the annual meeting could help level the standard across the state.

- This district is currently having problems administering two different versions of the contract specifications.

- **Liquidated Damages:**
  - This district is having problems with contractors hitting signs.
  - There was a lack of understanding concerning the amounts and how liquidated damages were carried out.
They felt that the liquidated damages should be based on a percentage of the contract and not a flat fee.

- This district feels that the fuel price adjustments are not done often enough. They also felt that the fuel adjustment process is confusing and it should instead follow the process used by the construction side.

- There were concerns that the sweeping specifications were not very clear.
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