
Program Audit: MoDOT Construction

*Prepared for the Committee on Legislative Research
by the Oversight Division*

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September, 1997

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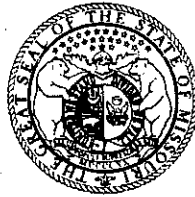
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Members of the General Assembly:

As authorized by Chapter 23, RSMo, the Committee on Legislative Research adopted a resolution in May, 1997 directing the Oversight Division to undertake a program audit of the Road and Bridge Construction and Monitoring which included the examination of records and procedures in the Department of Transportation to determine and evaluate program performance in accordance with program objectives, responsibilities, and duties as set forth by statute or regulation.

The accompanying report includes Oversight's comments on internal controls, compliance with legal requirements, management practices, program performance and related areas. We hope this information is helpful and can be used in a constructive manner for the betterment of the state program to which it relates.

Respectfully,


Senator Harry Wiggins, Chairman


Representative Larry Thomason, Vice Chairman



EXECUTIVE SUMMARY

The Missouri Department of Transportation (MoDOT) is charged with the location, design, construction, and maintenance of the connecting state highways in the state. To accomplish this, the MoDOT has ten outlying district offices, each containing roughly 10% of the roads in the state highway system, employing a total of approximately 600. In addition, the Division of Design, with a staff of twenty-two, and the Division of Construction, with a staff of nineteen, participate in the contracting and contract monitoring activities of the Department.

During the audit period, January, 1994 through June, 1997, the MoDOT awarded 1,245 contracts totaling approximately \$1.6 billion. These contracts were for added lanes, four laning, new two laning, major resurfacing, non-major resurfacing, major bridges, and non-major bridges. While the highway miles are spread evenly between the ten districts, funding is not. Over half of the \$2.8 billion included in the Short-Term Action Plan for the period from 1996 through 1999 is being sent to only two districts, District 4 in Kansas City and District 6 in Chesterfield. According to MoDOT, the distribution of funds during the audit period was based on the outstanding "Proposition A" projects. However, District Engineers are allowed to substitute other projects for construction in lieu of "Proposition A" projects after their funding has been allotted.

Were construction contracts completed on time? Oversight determined that projects were being completed on time for the most part, with an average deviation from the days specified in the contract of ten days. However, the deadlines were developed by the MoDOT at the district level and were incorporated into contract provisions. MoDOT's written contract deadlines were too lax in at least one instance, resulting in a delay for road users and additional costs to the state. In fact, a grading contractor did no work for 52 days, 20% of the contract, and still completed the contract on time. The paving contractor, the next phase of construction, experienced delays and price increases due to the slowness of the completion of the grading. The MoDOT agreed to subsidize the price increases of the second contractor by \$65,000. MoDOT "intuitively" estimated the time line for road construction, largely at the district level. Since incurring problems with this method, the MoDOT is in the process of changing to a more scientific method of estimating construction deadlines.

Were costs of construction within the budgeted or planned contract amounts? Oversight's analysis of the project files indicated the average construction project was completed for 2.26% less than the contracted amount. This can occur because construction contracts are based on the "cost per unit of materials" bid and the estimated amount of materials to complete the job. If less materials are actually used, the total cost



of the contract is less. The MoDOT did offer 'bonuses' for contractors who performed paving contracts in a superior manner resulting in an extra smooth road surface. However, 67-81% of the contracts during the audit period resulted in bonuses being paid. In total, over \$1.6 million was paid for extra smoothness in pavement of highways. Oversight has suggested that, if up to 81% can achieve this goal, then perhaps it is more the norm than the exception. MoDOT had recognized this problem and has already revised their specifications, which should reduce the number of bonuses awarded.

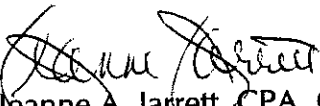
Were contract procedures adequate to secure the lowest and best bids for the state? Oversight noticed potential conflicts of interest in the bidding process for construction projects. Related companies (over 10% common ownership) were allowed to bid against one another on the same jobs. Oversight obtained evidence of two related companies bidding against one another more than 111 times from 1991 to 1996. Oversight's analysis indicated an average of only 2.6 contractors bid on each project; therefore, if two of the companies are related, there would be an appearance of competition when it does not exist. Additionally, the MoDOT was not following statutory guidance which provides that a contractor's prior performance be considered in the awarding of contracts. Even though MoDOT evaluates each contractor's performance on every job, they never use the information when determining whether that contractor be awarded future contracts with MoDOT.

Were monitoring efforts by the MoDOT successful in keeping projects on track?

By their own internal procedures, MoDOT states that construction progress schedules shall be submitted by contractors, yet they have not consistently enforced this policy. Construction progress schedules would aid the MoDOT engineers in determining whether construction is progressing sufficiently to meet contract deadlines.

This audit includes detailed findings and recommendations for changes in management practices and procedures related to Contracting and Contract Monitoring Procedures administered by the Missouri Department of Transportation. The MoDOT's official responses to the findings and recommendations are incorporated into the report. Our audit was done in accordance with accepted government auditing standards as they relate to program and performance audits. Departmental financial statements were not examined by us and accordingly we do not express an opinion on them.

We acknowledge the cooperation and assistance of staff of the Missouri Department of Transportation in the audit process.


Jeanne A. Jarrett, CPA, CGFM
Director, Oversight Division



Introduction

The Joint Committee on Legislative Research directed the Oversight Division to conduct a management audit of the Missouri Department of Transportation's (MoDOT) road and bridge construction and construction monitoring practices. The purpose of the audit was to determine whether the MoDOT has bid and awarded construction contracts in compliance with applicable laws, rules, and regulations and to determine whether construction contracts are adequately administered to ensure construction projects are completed as specified with regard to costs and completion dates.

Background

The Missouri Department of Transportation (MoDOT) has authority over all transportation programs and facilities in the state. The department is responsible for administering the connecting state highways, including their location, design, construction, and maintenance. The MoDOT is also charged with developing and implementing a plan for meeting the total transportation needs of the state.

The State Highway and Transportation Commission is the governing body of the MoDOT. It is made up of six commissioners appointed by the Governor and approved by the Senate with no more than three commissioners from the same political party.

The MoDOT consists of ten outlying district offices and a central headquarters in Jefferson City. Each district contains approximately ten percent of the roads in the state highway system. There is a district engineer in each district who oversees all district activities. Construction activities in the districts are carried out by approximately 600 district staff.

The Division of Design, with a staff of 22 full-time employees, processes all roadway plans and advertises projects for bid. The Division is also responsible for developing specifications, cost estimates and time budgets for each project prior to soliciting for bids. Additionally, the Division evaluates bids received using a computerized Bid Analysis Management System.

The Division of Construction, with 19 full-time employees, supports the District Engineers in administering construction contracts. After a contract has been awarded, the project is assigned to a project engineer in a District office to oversee. Division engineers visit the field to ensure uniform contract administration statewide.

From January 1, 1994 through June 1, 1997, the MoDOT awarded 1,245 contracts totaling approximately \$1.6 billion. Information provided by MoDOT indicated the following contracts or projects were let during the audit period.

Added lanes	43 miles
Four laning	151 miles
New two laning	40 miles
Major resurfacing	855 miles
Non-major resurfacing	2,812 miles
Major Bridges	7 bridges
Non-major bridges	113 bridges

Allocations

The passage of Proposition A increased the motor fuel tax from seven cents per gallon to eleven cents per gallon, effective June 1, 1987. House Bill 1247, which became law in 1992, provided for three two-cent per gallon tax increases bringing the current motor fuel tax rate to seventeen cents per gallon. In February 1995, the MoDOT surveyed the district engineers in each of the ten districts regarding the status of unfinished projects from Proposition A, as well as other priority projects in their district that were not Proposition A projects. According to MoDOT personnel, each district engineer responded to the survey. The district staff deals with the public on a daily basis through public hearings, public meetings, correspondence, and phone calls. Therefore, on April 7, 1995, the director of MoDOT told the Commission MoDOT personnel believed the projects submitted were the ones that were most important to those who use and/or benefit from the highway system as determined at the District level.

At their April 7, 1995 meeting the Commission approved a three year list of projects known as the "Short-Term Action Plan" (STAP). The STAP included funding for all unfinished projects from Proposition A which the district

estimated could be let prior to Fiscal Year 1998 after consideration of environmental requirements, right-of-way, utilities, design and staffing. The distribution of funds was based on the dollar value of the unfinished Proposition A projects approved for funding within each district; however, the districts have been allowed to substitute other high-priority projects in lieu of the Proposition A projects initially approved.

Prior to finalization MoDOT extended the plan to include an additional year. Therefore, MoDOT approved a \$2.8 billion allocation for the Short-Term Action Plan for the period from 1996 through 1999, as shown below. MoDOT personnel are currently reviewing other options for future fund allocations.

**Allocation in "Short Term Action Plan"
 Anticipated Funding of \$2.8 Billion for 1996 - 1999**

<u>District</u>	<u>Percent Allocation</u>	<u>Approximate Allocation</u>	<u>1996 District Road Miles</u>
District 1, St. Joseph	3.9%	\$109,200,000	3,393
District 2, Macon	2.9%	81,200,000	3,851
District 3, Hannibal	6.1%	170,800,000	3,467
District 4, Kansas City	22.9%	641,200,000	2,910
District 5, Jefferson City	5.8%	162,400,000	3,889
District 6, Chesterfield	34.0%	952,000,000	1,891
District 7, Joplin	4.1%	114,800,000	3,543
District 8, Springfield	7.7%	215,600,000	3,908
District 9, Willow Springs	5.3%	148,400,000	3,861
District 10, Sikeston	7.2%	201,600,000	4,165

Bonuses

The MoDOT uses two types of bonuses in construction contracts. A bonus for the early completion of a project is built into some contracts for projects that are deemed to have high Road User Costs. Road User Costs are defined as the cost for one vehicle to travel one mile. They include the cost of the additional travel time, operating costs, and accident costs. Early completion bonuses are requested by the District when a project is submitted for bid. When it is determined in the central office that Road User Costs are sufficiently high, the incentive bonus is incorporated into the contract. In

our sample of 87 projects let for bid from July 1, 1995 through June 30, 1997, no contracts included incentive bonuses.

The other type of bonus used by the MoDOT in the administration of their construction contracts is a profilograph bonus. Profilograph bonuses are awarded to contractors when the pavement laid is smoother than the minimum required in the contract. It is based on a profilograph index which measures the smoothness of the road. The index is applicable to all mainline paving, auxiliary lanes, turning lanes and ramps. The index is also used by numerous other states including Kansas, Arkansas, Oklahoma, and Illinois. According to MoDOT personnel, smoother roads result in reduced road maintenance and vehicle operating costs. In our sample of 87 projects let for bid from July 1, 1995 through June 30, 1997, nine included profilograph bonuses totaling \$273,013.

The bonuses are calculated using a profilogram machine which is walked on the road and draws a trace. A trace is a single horizontal line. The index is calculated based on the trace line deviations from a straight center line, referred to as a band. The Missouri Standard Specifications for Highway Construction 1993 allowed for profilograph bonuses based on 105% of contract unit prices for asphaltic concrete pavement with a profile index of 3.0 inches or less per mile and for portland cement concrete pavement with a profile index of 5.0 inches or less per mile. Asphaltic concrete pavement and portland cement concrete are paid at 100% for profile indices less than 10.0 and 12.0, respectively, and deductions of contractor payments result when the indices are greater than 10.0 and 12.0, respectively.

In 1996, MoDOT decided to use a zero blanking band, as opposed to a 0.2 inch band used previously. The zero blanking band refers to the amount of initial roughness that is blanked out. As a result, The Missouri Standard Specifications for Highway Construction 1996 uses stricter profilograph index measurements for awarding bonuses.

Objectives

Oversight had three principal objectives. The first objective was to determine whether the Missouri Department of Transportation (MoDOT) has efficiently bid and awarded construction contracts in accordance with applicable laws, rules, and regulations and whether the MoDOT develops

requests for bids to secure the best proposal for the state. The second objective was to determine whether construction contracts were adequately monitored to ensure construction projects are completed as specified with regard to costs and completion dates. The audit also sought to ascertain MoDOT's method for funding construction projects in the various geographic areas of the state.

A statistically representative sample of construction project files was reviewed to determine whether projects were completed as specified in the contract with respect to construction costs and completion dates. Our analysis of the project files indicated the average construction project was completed for 2.26% less than the contracted amount. A review of the sampled files also shows the average deviation from the days specified in the contract for project completion was ten days.

Scope

The scope of the audit was the process of bidding and awarding construction contracts and the administration and monitoring of construction projects from January 1, 1994 through June 30, 1997. The main areas considered in the audit were the bidding, awarding, and monitoring of construction contracts.

Methodology

The Oversight Division conducted the audit in accordance with Government Auditing Standards issued by the Comptroller General of the United States as those standards relate to performance audits. The methodology used by the Oversight Division included tests of samples of transactions and evaluations of management controls to the extent necessary to fulfill audit objectives. Extensive personal interviews with agency personnel were conducted. The auditors performed tests of MoDOT controls and procedures. MoDOT provided documentation as requested. Bid solicitation and award files, construction project files and supporting documentation were reviewed for compliance with applicable laws and policies.

Findings
Recommendations
Agency Responses

FINDING #1: MoDOT awards contracts to the lowest responsible bidder, failing to consider the other criteria outlined by statute.

MoDOT awards contracts to the overall lowest responsible bidder on each project, disregarding other criteria outlined by statute including the contractor's prior performance. MoDOT considers the possession of a valid surety bond to be the only requirement needed to meet the criteria of responsible bidder.

Section 227.105, RSMo, establishes the minimum qualifications to determine the types of work and the maximum amount of work on which a contractor may submit a bid. Statutes require the minimum qualifications to be in regards to, but not limited to the following: 1) the contractor's experience in performing the type of work project to be bid; 2) the contractor's ability to complete the project; 3) the types of work the contractor is qualified to perform; 4) the contractor's insurance coverage; 5) the contractor's designation of a Missouri resident as its agent for the receipt of legal process; 6) the contractor's listing of all current projects in process, including the value of projects not yet completed and their completion dates; and 7) the equipment the contractor has available for the project.

MoDOT personnel evaluate each contractor's performance on each job. The contractors are rated as superior, above average, average, or poor; however, MoDOT actually considers these ratings to be comparable to "approve" or "disapprove." MoDOT has never taken action to disqualify a contractor from bidding based on a performance rating. Therefore, contractors with poor performance are not excluded from future solicitations.

MoDOT does not give any preference to contractors for experience, quality of work on prior projects, or ability to complete a project. MoDOT personnel assume they are unable to award a contract to a bidder other than

the lowest bidder without legal repercussions and therefore disregards the other qualifications outlined by statute.

Although MoDOT may be attempting to obtain the best deal for the state, this may not always be the end result. A contractor with a history of slow or poor performance may actually cost more in terms of monitoring, supervision and public inconvenience.

Additionally, as MoDOT does not consider contractor performance ratings when awarding contracts, there is little incentive for the contractors to improve the quality of their work.

RECOMMENDATION TO FINDING #1

Oversight recommends MoDOT modify the contract award procedures to incorporate contractor ratings and exclude poor performers from the bidding.

Agency Response to Finding #1

Missouri Department of Transportation

In June 1991, MoDOT implemented the Contractors Performance Rating to establish guidelines and procedures to eliminate poor performing contractors. The system evaluated contractors for; quality of work, cooperation/contract compliance, prosecution/progress of work, supervision, adequacy of equipment, adequacy of work force, safety, and financial responsibility. A combined rating was obtained from the above criteria. Rating limits were set to take commission action against contractors who failed to perform satisfactorily in the overall combined total.

The Construction Division has tracked the effectiveness of the system. Some problems that were identified were: the system rating guidelines were arbitrarily defined, the system formula had an averaging effect, was subjective in content, and no disciplinary action was established for contractors who performed poorly in each category. Since the system was implemented, no contractor has been eliminated from bidding or have been placed on probation.

A new task force was formed in June 1995 to review the rating system problems and concerns and to make recommendations to address those issues. A presentation to management was made in March 1997. The new process rates contractors using standard deviation comparisons for both overall performance and the individual category performance. The categories of the new system are Quality, Prosecution and Progress, Contract Compliance, and Safety. Contractors who perform poorly in the overall and individual categories are subject to probation, suspension, or disqualification.

The new system is being piloted this year to address concerns and flaws that may be evident. The new rating process will be fully implemented in 1999 after completing the legislative rulemaking process in 1998.

FINDING #2: MoDOT allows related companies to bid against one another which gives the appearance of competition, when it may not actually exist.

Section 102.14 of the 1996 Missouri Standard Specifications for Highway Construction establishes that a bidder may be disqualified for the following reasons: 1) more than one bid is received for the same work from related individuals, firms, or corporations; or 2) there is reason to believe that collusion exists among the bidders.

The Division Engineer of Design determines all conflict of interest based on his determination that "common ownership or control" means over 50% ownership. This definition is not outlined in the specifications. The contractor prequalification questionnaire requires contractors to list the owners with "over 10% ownership," however, there is no duty to disclose the actual percentage of ownership. MoDOT has no means to determine when a company has "common ownership or control." Furthermore, there have been no bidders disqualified due to a conflict of interest.

MoDOT allows related companies to bid against one another on the same project. Oversight obtained evidence of two related companies bidding against one another more than 111 times from April 1991 through January 1996. Oversight's analysis of a sample of 87 contracts indicated an average of only 2.6 contractors bid on each project; therefore, if two of the

companies are related, there would be an appearance of competition when competition does not exist.

RECOMMENDATION TO FINDING #2

Oversight recommends MoDOT define the term "related companies" and that MoDOT closely monitor bids submitted by related companies and reject bids on the same job by related companies. Furthermore, Oversight recommends that contractors be required to disclose the percentage of ownership by the individual owners on their prequalification questionnaire so MoDOT can make an informed decision regarding common ownership.

Agency Response to Finding #2

Missouri Department of Transportation

Our contractor questionnaire will be modified to require companies to list percent ownership of the company and list personnel who perform management or supervisory functions for other businesses. Routinely, following each bid opening, a review is conducted to show firms that had bid which may have common ownership. This information is reviewed to determine if an actual conflict of interest exists. When necessary, the secretary of state's office is contacted to determine the exact amount of ownership of a firm.

We are aware of several companies which have common ownership. However, these instances represent a small percentage of ownership and not control. It has been determined by the department this does not represent sufficient control to be construed as reducing bid competition.

The department is however considering other ways to increase our information concerning ownership of construction companies. We understand the importance of this issue and will be giving attention to improvements in our current processes to detect instances of common ownership, and not arbitrarily eliminate independent and competitive bids.

FINDING #3: MoDOT accepts bids and awards contracts to contractors who have outdated contractor questionnaires.

Contractor Questionnaires contain information about the contractor's experience and the ownership of the company. This information is intended to be used by MoDOT to ensure the contractor is a responsible bidder. Of the projects sampled, 13% of the contractors awarded bids had outdated contractor questionnaires. Oversight further observed 27% of the contractors bidding at the June 20, 1997 bid opening did not have current contractor questionnaires on file.

Section 102.2 of the 1996 Missouri Standard Specifications for Highway Construction states that each prospective bidder must file a contractor questionnaire on forms furnished by MoDOT. It is MoDOT's policy that bids will not be opened and read unless a fully responsive contractor questionnaire is on file with the Commission at least seven days prior to the time set for the opening of the bids. It further states that a new contractor questionnaire is to be filed annually.

It is MoDOT's practice to consider the contractor's questionnaire current until the last day of the third month following the annual renewal date. Specifically, MoDOT considers contractor questionnaires to be valid for up to sixteen months.

By requiring contractor questionnaires annually as required in the construction specifications, the MoDOT would have more current information to ensure bidders are responsible and to evaluate ownership information to prevent conflicts of interest.

RECOMMENDATION TO FINDING #3

Oversight recommends MoDOT require contractors to file an updated questionnaire annually prior to opening and reading the contractor's bid.

Agency Response to Finding #3

Missouri Department of Transportation

In the past, the department has granted a 3 month grace period after the end of the 12 month period, in which the contractor may submit their annual contractor questionnaire. This grace period was provided to lessen the burden for the contractor of preparing documents for our 12 month period, which may be different than their fiscal reporting period.

Under this procedure, all contractors that bid in the June 29, 1997 bid opening had valid contractor questionnaires on file. It is true seven of the contractors who submitted bids at this opening were in the 3 month grace period.

The department will consider modifications to this process that will permit contractor questionnaires to be updated on an annual basis as suggested.

FINDING #4: Failure to properly estimate construction deadlines resulted in additional costs to taxpayers.
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The MoDOT allowed an excessive number of days to complete one phase of a construction project. Accordingly, MoDOT incurred additional costs to complete the second phase of the project.

MoDOT added two additional lanes to a 12-mile stretch of Highway 36 between Cameron and Hamilton. MoDOT divided this job into two projects, one two-year project for grading, and one two-year project for paving.

The grading contract was to be completed within 270 working days after the notice to proceed date which was August 2, 1993. Since MoDOT does not count weekends and winter months, it is assumed that a 270-day project would equate to approximately two years. The grading project took 270 working days to complete; however, as of August, 1995, the grading contract had not returned to work since the winter shut-down on December 15, 1994. As on March 16, 1995, the beginning of the 1995 construction

season, the grading contractor had 109 working days remaining in the contract to complete the job which was already 84% complete.

The grading contractor did no work for 52 working days, 20% of the contract, but completed the project within the number of working days specified in the contract and under budget. However, the lack of progress on grading prevented work from starting on the paving project. The paving contractor's original schedule anticipated finishing paving either at the end of the 1995 construction season or soon after the beginning of the 1996 construction season. However, the paving contractor was unable to finish paving until June 1997, resulting in material cost increases to the paving contractor.

MoDOT agreed to pay 50% of the increased cost for 1996 to the paving contractor. The total cost increase was \$131,976, with MoDOT's portion being \$65,988.

The terms of contracts, including the amount of days allowed should be written to provide for sufficient competition, low bid prices, high production, and minimal inconvenience to the public.

Prior to 1994, the MoDOT had been intuitively estimating the amount of time to allow for construction. Partly as a result of the problems with the grading project, the MoDOT surveyed districts and the Association of General Contractors to ascertain the production rates of major construction functions. The Design Division compiled the results of the survey and developed guidelines for determining the time to be included in contracts. The guidelines are to be used by the Districts in determining the number of days to specify in contracts. The Design Division reviews the estimates provided by the districts and recommends adjustments to ensure the most cost effective contracts for the state.

RECOMMENDATION TO FINDING #4

Oversight recommends MoDOT continue efforts to ensure contracts are written to obtain the most cost effective contracts with the shortest practical inconvenience to the public.

Agency Response to Finding #4

Missouri Department of Transportation

This finding specifically refers to one project, which provided a large number of days for its completion. Different procedures were used to specify the number of workdays at the time this project was initiated. Improved procedures now in place, developed with input and support of the Associated General Contractors, are used to provide reasonable workdays for the completion of projects. These work days are determined to provide a cost efficient project to the public without unduly limiting the amount of time available for the contractor to finish their work. We will continue efforts to ensure contracts with the shortest practical completion time are initiated, thereby minimizing inconvenience to the public.

FINDING #5: Progress schedules are not consistently required in accordance with the MoDOT specifications.

MoDOT resident engineers are not requiring work schedules for all projects as required in the Missouri Standard Specifications For Highway Construction. Section 108.4 of the 1996 version of the MoDOT construction specifications requires contractors to submit a progress schedule at least seven days prior to the pre-construction conference. The construction manual further states, " ... the progress schedule shall contain an activities schedule chart and written narrative which shall break down into detail the time in working days, calendar days or completion date involved in performing all construction activities for the duration of the project, and shall be in suitable scale as to indicate the percentage of work scheduled for completion at any time."

Section 107.5.1 of the 1993 version of the MoDOT construction specifications state, "To ensure the work will proceed continuously through the succeeding operations to its completion with the least possible interference to traffic and inconvenience to the public, the contractor shall, at the request of the engineer, submit for approval a complete schedule of his proposed construction procedures, stating the sequence in which various operations of work are to be performed."

Detailed work schedules would aid engineers in determining whether projects will be completed within the time required by the contracts.

RECOMMENDATION TO FINDING #5

Oversight recommends the department require contractors to submit work schedules for the resident engineers' use in monitoring the progress of construction projects as outlined in the specifications.

Agency Response to Finding #5

Missouri Department of Transportation

The 1996 edition of the Missouri Standard Specifications for Highway Construction, which became effective with projects included in the October 1996 bid letting, contained provisions requiring the contractor to provide an in-depth progress schedule of the proposed construction procedures to be used on the project. This requirement was a significant change from the provisions of the 1993 Missouri Standard Specifications, which required the contractor to submit a progress schedule only if requested by the engineer.

Because of concerns expressed by contractor associations, MoDOT agreed in March 1997 to revert back to provisions of the 1993 Missouri Standard Specifications concerning progress schedules. Since that time, representatives from MoDOT and contractor associations have met and agreed that the progress schedule provisions of the 1996 Missouri Standard Specifications will be used for complex projects and major bridge projects, and a special provision for progress schedules will be substituted in non-complex projects which require less schedule coordination.

Under these new progress schedule provisions, MoDOT is requiring contractors to submit approximate work schedules for our engineers' use in monitoring project progress and determining whether projects will be completed within the time required by contract.

FINDING #6: MoDOT awarded profilograph bonuses on between 67% to 81% of the concrete projects (excluding concrete overlays), resulting in over \$1.6 million in bonuses paid to contractors.

Profilograph bonuses are awarded to contractors when the pavement laid is smoother than the minimum required in the contract. The bonuses are calculated using a profilogram machine which draws a trace line as it is walked on the road.

The following schedule shows the profilograph results for the 1996 construction season, based on the 0.2 blanking band. (The contracts for the projects completed and profilographed during the 1996 construction season would have been written prior to 1996 and the more stringent standards.)

	Asphaltic Concrete Pavement	Portland Cement Concrete
Total tons/square yards profilographed	348,800	1,121,869
Percent tons/square yards paid in bonus	66.69%	81.19%
Percent resulting in deductions	3.93%	2.98%
Percent with no bonus or deductions	29.38%	15.83%
Bonuses paid	\$321,420	\$1,299,018
Deductions taken	\$19,388	\$43,597

Since bonuses were paid in 67 to 81% of the contracts, it appears the minimum requirements in the contract may have been set too low. In effect, the contracts allowed for bonuses to be paid for average performance rather than exceptional performance. In 1996 MoDOT opted to tighten their standards by adopting a zero blanking band rather than a 0.2 blanking band.

MoDOT personnel expect the zero blanking band to save on bonuses, since the measurement is stricter; however, this indexing method has not been in use long enough for any reports to have been compiled to document a savings. They did, however, compare the bonuses on two projects under the zero and 0.2 blanking bands, and these projects would have resulted in significantly reduced bonuses under the zero blanking band.

RECOMMENDATION TO FINDING #6

Oversight recommends the MoDOT continue to monitor the percentage of tons and square yards of concrete profilographed which result in bonuses. The Oversight Division recommends the MoDOT reserve the profilograph bonuses for exceptional work rather than awarding bonuses to the majority of projects subject to profilograph indexing.

Agency Response to Finding #6

Missouri Department of Transportation

We agree. MoDOT has revised the profilograph specification to a zero blanking band standard. This was done because MoDOT is of the opinion we were paying bonus and still not having the total smoothness desired. We made comparison of results of previous projects using both 0.2 and zero blanking bands and decided to rewrite the specification to the zero standard. We are in the process of monitoring the results under the new specifications and will continue to do so.

Under the zero blanking band specifications, we have noticed a substantial reduction in bonuses being paid. When this construction season is completed, we will complete a report to see if we have obtained the desired results. If the bonuses increase again we will adjust the specifications by possibly reducing the inches per mile limit on each bonus area to ensure we are not paying unreasonable amount of bonus.