STATE OF ILLINOIS

OFFICE OF THE AUDITOR GENERAL

MANAGEMENT AUDIT

ILLINOIS DEPARTMENT OF TRANSPORTATION'S ROAD CONSTRUCTION PROGRAM

MAY 1998

WILLIAM G. HOLLAND

AUDITOR GENERAL

To the Legislative Audit Commission, the Speaker and Minority Leader of the House of Representatives, the President and Minority Leader of the Senate, the members of the General Assembly, and the Governor:

This is our report of the Management Audit of the Illinois Department of Transportation's Road Construction Program.

The audit was conducted pursuant to Legislative Audit Commission Resolution Number 111, which was adopted May 5, 1997. This audit was conducted in accordance with generally accepted government auditing standards and the audit standards promulgated by the Office of the Auditor General at 74 Ill. Adm. Code 420.310.

The audit report is transmitted in conformance with Section 3-14 of the Illinois State Auditing Act.

WILLIAM G. HOLLAND
Auditor General

Springfield, Illinois
May 1998

REPORT DIGEST

Management Audit of the ILLINOIS DEPARTMENT OF TRANSPORTATION'S ROAD CONSTRUCTION PROGRAM

Released: May 1998

State of Illinois
Office of the Auditor General

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SYNOPSIS

LEGISLATIVE AUDIT COMMISSION RESOLUTION 111

LAC Resolution Number 111 directed the Auditor General to conduct a management audit to determine whether costs paid by the Illinois Department of Transportation (IDOT) for roadbuilding materials are comparable with costs paid by other midwestern states, why there are cost differences, and whether changes in IDOT's procurement methods are warranted. Based on a review of calendar year 1996 data for Illinois and six other midwestern states (Indiana, Iowa, Kentucky, Missouri, Ohio, and Wisconsin), we found:

- **IDOT's average unit costs for selected pay items were higher than other midwestern states' average unit costs for 9 of 10 major roadbuilding pay items examined, including excavation, asphalt, and portland cement concrete.**
- **Factors contributing to these cost differences included Illinois' higher labor costs, limited availability of certain materials, differences in project requirements, and differences in cost reporting among the states.**
- **A lack of competition also resulted in higher roadbuilding costs in Illinois. Award amounts for IDOT's 106 single bid contracts in 1996 averaged 0.64 percent above IDOT's estimated cost, while 783 multiple bid contracts averaged 10.88 percent below the estimated cost. If the single bid contracts had come in at 10.88 percent below the estimate (as occurred on multiple bid contracts), the award amount would have been reduced by $8.9 million.**
- **The accuracy of cost estimates, which serve as the benchmark to determine whether a project will be awarded, could be improved. Fifty-four percent of IDOT's estimates were not within 10 percent of the low bid. There were also wide variations between IDOT districts.**
- **Although IDOT's process for receiving, opening, and recording bids is generally well controlled, some changes could make the process stronger, such as discontinuing the practice of publishing the list of potential bidders prior to the bid opening date, increasing the number of lettings, and centralizing the collection of bids.**

This audit makes 12 recommendations to help control roadbuilding costs through the procurement process. IDOT fully or partly concurred with all of the recommendations.

REPORT CONCLUSIONS

The Illinois Department of Transportation (IDOT) is responsible for constructing the State's highway system. IDOT uses contractors for most road construction activities. In 1996, IDOT awarded 889 construction contracts for a total contract amount of $896 million. We compared IDOT's roadbuilding material costs with those of six other midwestern states: Indiana, Wisconsin, Iowa, Missouri, Kentucky, and Ohio. Comparison of unit costs between states is complex because of a variety of factors.

We found considerable variations in the unit cost of selected pay items reported by IDOT and the other six states reviewed. A pay item is comprised of several types of costs, including labor, materials, equipment, and contractors' overhead. In general, IDOT's pay item unit costs were higher. For example, Illinois' unit cost for a ton of surface course asphalt was almost 30 percent higher than the average unit cost reported by the other states. Illinois' unit cost for a square yard of portland cement concrete pavement was 17 percent higher than the other six states' average. In contrast, IDOT's unit cost for structural steel was 12 percent below the average paid by the other states.

There are a number of factors which contribute to these cost differences. In general, Illinois' highway construction labor costs were higher than other midwestern states. Other factors, such as selected higher material costs, labor practices, quantity of the pay item purchased, and differences in project requirements, also affect Illinois' pay item unit costs.

States also report costs differently which accounts for some unit cost differences. For example, Illinois includes certain costs in selected pay items, such as mobilization and quality control/quality assurance, which some other states report separately.

The amount of the cost differences attributable to these factors is difficult to project because of the varying nature and composition of pay items, size and type of the projects, and ways in which contractors structure their bids.

There are, however, several factors related to IDOT's contracting process that may also contribute to Illinois' higher costs. While the number of contracts IDOT awarded to single bidders has decreased from 18 percent in the period 1987 through 1991 to 12 percent in 1996, further improvement is warranted. For all contracts awarded in 1996, when there were multiple bidders, the award amount averaged 10.88 percent *below* IDOT's estimated cost for the project. When

there was only one bidder, the award amount averaged 0.64 percent *above* IDOT's estimate. If the single bid contracts had come in at 10.88 percent below the estimate (as occurred on multiple bid contracts), the award amounts would have been $8.9 million less.

IDOT's current efforts to increase competition are limited. For example, IDOT does not routinely contact companies that received bid authorization but did not bid to determine why they did not bid. Also, while IDOT has general guidelines to govern its award decisions, it has not developed formal award policies or procedures, such as when to rebid a project if all proposals exceed the State's estimate. We reviewed 43 projects rebid by IDOT in 1996. When these projects were rebid, the new low bid total ($21.2 million) was 8 percent lower than the original low bid total ($23.1 million), yielding a savings of $1.9 million. In 31 of the 43 projects, the original low bidder submitted an even lower bid when the project was rebid.

Other aspects of IDOT's contracting process which may limit competition include publishing the names of contractors authorized to bid and releasing project estimate amounts after the bid opening. Both practices provide contractors with information they can use to limit competitive proposals.

Finally, the accuracy of IDOT's project estimates could be improved. We found wide variation in the accuracy of estimates by IDOT district. Forty-six percent of IDOT's estimates were within 10 percent of the lowest bid in 1996. Project estimates serve the critical role of controlling contract award amounts.

IDOT'S ROAD CONSTRUCTION PROGRAM

In 1996, IDOT awarded 889 road construction contracts for a total contract amount of $896 million.

The Illinois Department of Transportation is responsible for constructing the State's highway system. IDOT uses outside contractors for most roadbuilding activities. Digest Exhibit 1 summarizes road construction contracts by IDOT district. During calendar year 1996, IDOT awarded 889 road construction contracts totaling $896 million. Just over 40 percent of all the contract dollars awarded were for projects located in IDOT District One (Cook & surrounding counties). (Report pages 3-6)

Digest Exhibit 1
CONTRACTS BY IDOT DISTRICT
Calendar Year 1996

District	Number of Contracts	% of Total Contracts	% of Total $	Total Award
1	201	22.61%	40.29%	$361,088,343
2	128	14.40%	10.25%	$91,871,619
3	92	10.35%	8.81%	$78,973,269
4	78	8.77%	6.60%	$59,146,039
5	68	7.65%	6.19%	$55,498,488
6	93	10.46%	10.16%	$91,091,115
7	74	8.32%	3.90%	$34,992,823
8	103	11.59%	8.89%	$79,671,829
9	47	5.29%	4.62%	$41,412,250
Statewide	5	.56%	.28%	$2,543,219
Total	889	100%	100%	$896,288,995

Note: Percentage totals may not add due to rounding
Source: OAG analysis of IDOT data

ROADBUILDING MATERIAL COSTS

In 1996, Illinois' average unit costs were higher than other midwestern states in 9 of 10 categories compared.

Digest Exhibit 2 shows that when comparing calendar year 1996 statewide average unit costs for the most used road construction materials, Illinois' unit costs were higher than the average of the other midwestern states in 9 of 10 categories compared, including excavation, asphalt products, reinforcing steel, and concrete products. For example, Illinois' unit cost for a ton of surface course asphalt was almost 30 percent higher than the average unit cost reported by the other states. Illinois' unit cost for a square yard of portland cement concrete pavement was 17 percent higher than the other six states' average. In contrast, IDOT's unit cost for structural steel was 12 percent below the average paid by the other states.

A comparison of individual projects also found that Illinois' unit costs per pay item were generally higher than the unit costs paid by other states. Unit costs for roadbuilding pay items also varied within regions of Illinois. (Report pages 13-39)

REASONS FOR VARIANCES IN ROADBUILDING COSTS

Many factors contribute to differences between the unit cost of road construction pay items, such as higher labor costs in Illinois, differences in project specifications, and differences in cost reporting.

Many factors contribute to differences between the unit cost of road construction pay items in Illinois and other midwestern states. Unit costs are based on the average of all low bidders' costs and include not only material costs but also job-specific costs such as labor and equipment. Because each road construction job is unique, the unit costs for individual projects may vary considerably.

The notes to Digest Exhibit 2 address factors affecting pay item average unit costs. IDOT has limited control over some factors, such as the generally higher labor costs in Illinois (e.g., higher prevailing wage rates, labor practices, and workers' compensation rates).

Other cost variables include whether the project is in a predominantly urban or rural area, the amount of competition in the area, the quantity of each material used in the project, the availability and quality of materials, differences in cost reporting among states (such as whether mobilization and quality control/quality assurance costs have separate pay items or are included as part of other pay items), differences in project requirements, and varying legal requirements among states. (Report pages 41-54)

COMPETITION FOR ROAD CONTRACTS

The amount of competition for road contracts affects construction costs.

The amount of competition for road contracts affects construction costs. While the number of contracts IDOT awarded to single bidders decreased from 18 percent in the period 1987 through 1991 to 12 percent in 1996, further improvement is warranted. Single bid contracts awarded in 1996 had significantly higher award amounts relative to IDOT's estimate than did multiple bid contracts.

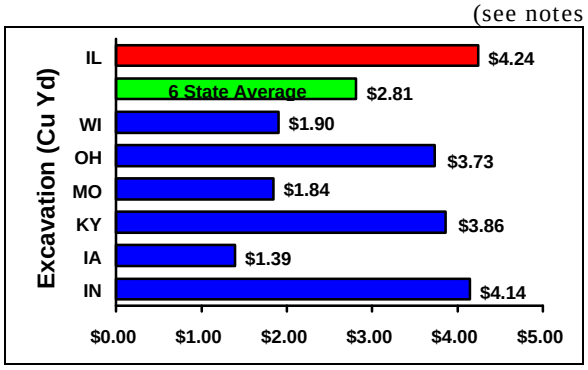
Digest Exhibit 3 shows that the award amount for IDOT's 106 single bid contracts in calendar year 1996 averaged 0.64 percent *above* IDOT's estimate, but the 783 multiple bid contracts were 10.88 percent *below* IDOT's estimate. If single bid contracts had come in at 10.88 percent below the estimate, the total amount awarded would have been reduced by approximately $8.9 million.

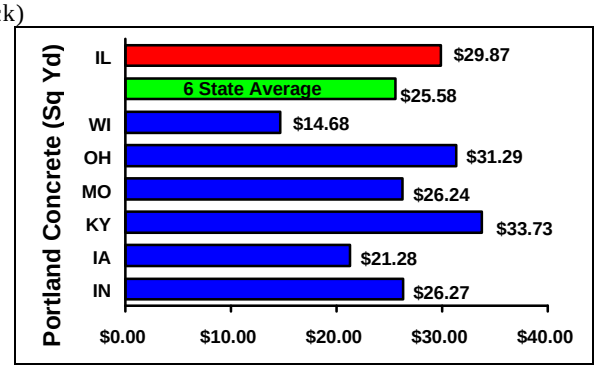
Single bid contracts were generally concentrated in IDOT Districts 3, 5, and 7. These districts are located in eastern Illinois along the Indiana border.

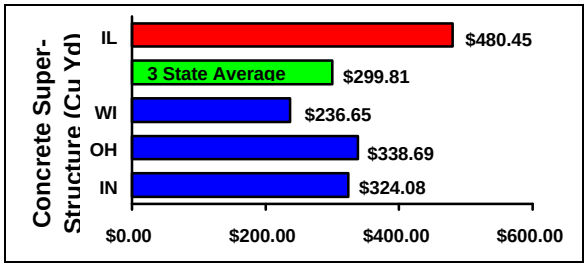
Digest Exhibit 2

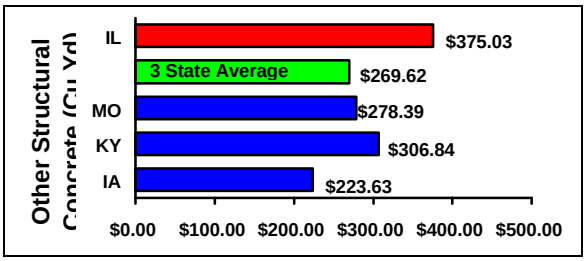
COSTS OF SELECTED CONSTRUCTION MATERIALS
ILLINOIS AND OTHER MIDWESTERN STATES

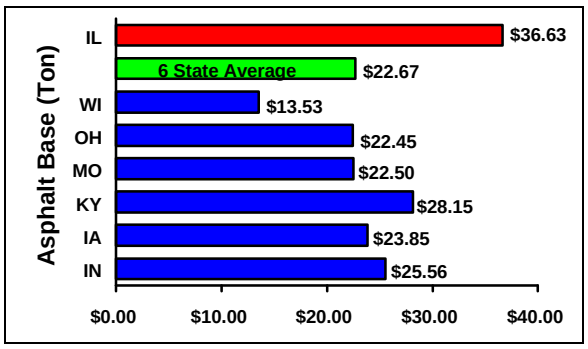
(see notes on back)

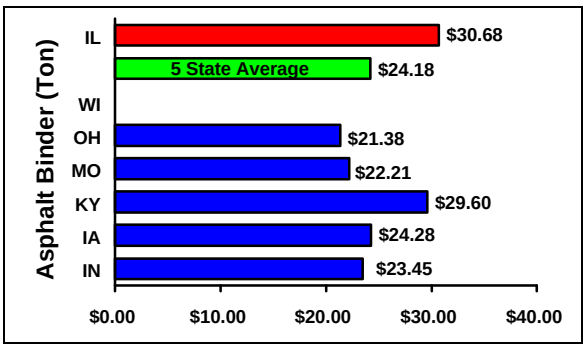


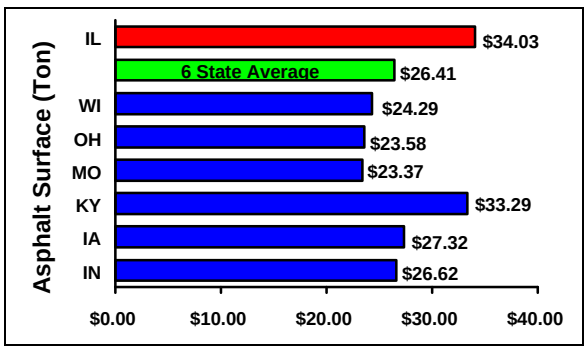


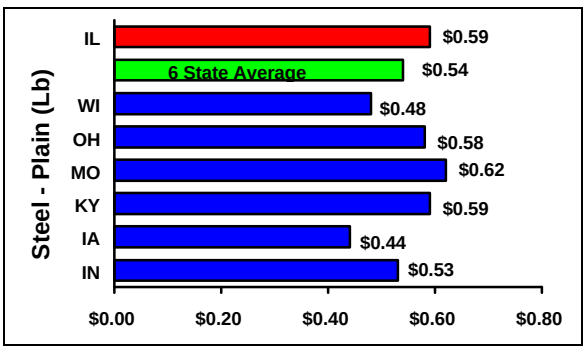


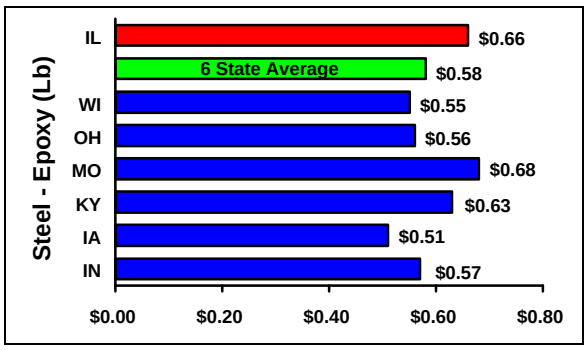


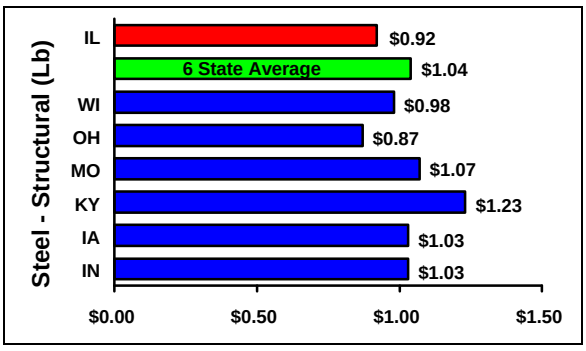












FACTORS AFFECTING PAY ITEM AVERAGE UNIT COSTS SHOWN ON DIGEST EXHIBIT 2

The differences in average unit costs by specific pay item shown in Exhibit 2-4 can be attributable to a number of factors. A pay item is comprised of several types of costs, including labor, materials, equipment, and contractors' overhead. There are many factors which impact pay item costs reported by the various states. For example, Illinois generally has higher labor costs than the other states. Consequently, the higher cost of labor in Illinois can increase IDOT's pay item unit costs versus those in other states. Other factors which impact costs include:

- Higher workers compensation rates in Illinois
- Work rules and local preference requirements regarding the staffing of road projects
- More strict project requirements and specifications
- Inability to obtain high quality aggregate from local supplies, thereby requiring more costly transport of this material
- Quantity of a pay item used on a project

The amount of cost differences attributable to these factors is difficult to project because of the varying nature and composition of pay items, size and type of projects, and ways in which contractors structure their bids.

There were also differences in pay item reporting between Illinois and the other states reviewed. For example, Illinois does not separate mobilization costs from its pay items, which other states report separately. Consequently, the cost for some IDOT pay items may be higher because of the inclusion of mobilization costs. Other differences identified based on our review and a recent survey conducted by IDOT included:

Surface Course and Binder Course Asphalt: Unit costs for Missouri and Wisconsin exclude aggregate certification costs (about $1.00 per ton in Illinois). Also, Wisconsin unit costs for surface course asphalt exclude QC/QA (estimated at $1 - $2 per ton). Conversely, Illinois unit costs do not include anti-strip costs whereas Kentucky and Missouri unit costs do (estimated by IDOT at about $0.65 per ton).

Base Course Asphalt: Illinois uses base course asphalt primarily for temporary roads, side streets, or detour roads which can be a more costly use than new construction, according to IDOT.

Portland Cement Concrete: Unit costs for Indiana exclude the cost of sealing contraction joints. Indiana, Iowa, Kentucky and Missouri unit costs exclude subgrade preparation. Conversely, Illinois unit cost does not include QC/QA costs whereas Kentucky unit costs do. In addition, the thickness of the portland cement pavement varied among the states, with Illinois' 9 ½ inch pavement being the thinnest of the states reviewed.

Structural Concrete: Unit costs for Indiana, Iowa, Missouri, and Wisconsin exclude parapet costs; Missouri also excludes sidewalk costs. Kentucky and Wisconsin unit costs exclude the cost of protective shields. Conversely, Illinois unit cost does not include admixtures whereas the Iowa unit cost does. Also, Illinois unit cost does not include QC/QA whereas Kentucky and Ohio unit costs do.

Earth Excavation: Illinois unit costs for excavation include the costs of clearing, undercutting, compaction, dust control, overhaul, borrow material, settlement platforms, and disposal of unsuitable materials. Many of these items are paid for separately in other states, and may, therefore, lower their unit costs for excavation.

For a more detailed discussion of the pay items reviewed and the various factors affecting pay item unit costs, see chapters two through five of the audit report.

Digest Exhibit 3
VARIANCE OF AWARD AMOUNT FROM ESTIMATE FOR IDOT'S SINGLE BID AND MULTIPLE BID CONTRACTS
Calendar Year 1996

	Contracts Awarded	Estimate Amount	Award Amount	Variance from Estimate
Single Bids	106	$ 77,194,790	$ 77,692,326	0.64% above
Multiple Bids	783	$918,558,994	$818,596,669	10.88% below

Source: OAG analysis of IDOT data

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IDOT's current efforts to increase competition are limited. For example, IDOT does not routinely contact companies that received bid authorization but did not bid to determine why they did not bid. Also, while IDOT has general guidelines to govern its award decision, it has not developed formal award policies or procedures, such as when to rebid a project if all proposals exceed the State's estimate. We reviewed 43 projects rebid by IDOT in 1996. When these projects were rebid, the new lowest bid total was 8 percent lower than the original low bid total, yielding a savings of $1.9 million. In 31 of the 43 projects, the original low bidder submitted an even lower bid when the project was rebid.

We recommended that IDOT increase its efforts to encourage and develop competition on road construction projects in the State, and establish formal guidelines governing when to award roadbuilding contracts. (Report pages 55-67)

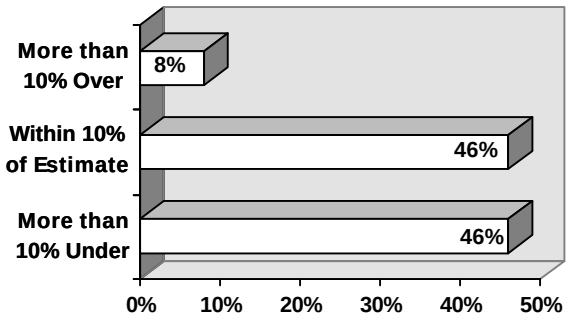
OTHER PROCUREMENT ISSUES

There are several changes IDOT can make to its procurement process to help control road construction costs.

There are several other changes IDOT can make to its procurement process to help control road construction costs. These changes include improving the accuracy of cost estimates to avoid accepting inflated bids or rejecting valid ones. As shown in Digest Exhibit 4, 46 percent of the low bids on the 948 projects let by IDOT in 1996 were within 10 percent of estimate. The Federal Highway Administration's contracting guidelines state that at least 50 percent of the project cost estimates should be within 10 percent (plus or minus) of the actual low bids. We also found wide variations among IDOT Districts in the frequency that low bids were within 10 percent of the estimate.

Regarding other procurement-related issues, we recommended IDOT should discontinue the practice of releasing cost estimates to the public, continue its efforts to identify and evaluate differences in project requirements between Illinois and other states to identify where cost savings can be realized, contact contractors whose prequalification lapses to determine the causes or reasons, improve controls over the letting process, take steps to avoid unnecessary change orders, and continue to explore the uses of value engineering and other innovative contracting procedures. (Report pages 69-87)

Digest Exhibit 4
COMPARISON OF LOW BIDS TO DEPARTMENT ESTIMATE
948 Projects Let in 1996



Source: OAG analysis of IDOT data

RECOMMENDATIONS

The Department fully or partly concurred with all of the recommendations.

The audit report includes 12 recommendations to the Department of Transportation. In their written response, the Department fully or partly concurred with all of the recommendations. Excerpts of their response are included after each recommendation, and their entire response is in Appendix G of the audit report.

WILLIAM G. HOLLAND
Auditor General

May 1998

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CHAPTER FOUR: COMPETITION FOR ROAD CONTRACTS

APPENDICES

EXHIBITS

GLOSSARY

AASHTO - The American Association of State Highway and Transportation Officials.

Aggregate - Any of several hard materials, such as sand or gravel, used for mixing with a cementing material to form pavements.

Asphalt - A type of pavement, also known as bituminous concrete. When asphalt is placed on a road, the bottom layer is called base course, the middle layer is called binder course, and the top layer is called surface course.

Award - The decision of IDOT to accept the proposal of the lowest responsible bidder.

Bidder - Any individual, firm, partnership, or corporation submitting a bid proposal.

Bituminous Concrete - Pavements made of asphalt. Bituminous Concrete is referred to in this report as "asphalt."

Change Order - A change in contract terms to authorize an increase or decrease in the cost of the contract or the completion time.

Contract - The written agreement between IDOT and a contractor setting forth the obligations of both parties.

Excavation - The movement of earth and related materials.

FHWA - The Federal Highway Administration.

Force Account - An account used to pay unforeseen expenses not associated with the original contract. Extra work at IDOT is paid either at a lump sum price, an agreed unit price, or on a force account basis.

IDOT - The Illinois Department of Transportation.

Joint Venture - When two or more prequalified contractors combine their available bidding capacities to bid for a single contract.

Letting - The process of advertising and receiving road contract bids.

Mobilization - Work necessary to move personnel, equipment, supplies, and incidentals to the project site.

Pay Item - A specifically described unit of work for which a price is provided in the contract.

PCC - Portland Cement Concrete.

Portland Cement Concrete - A type of concrete commonly used to pave highways.

Prequalification - A process IDOT uses to ensure that contractors have the financial and technical capabilities necessary to complete construction contracts.

Proposal - The offer of a bidder to perform work for IDOT at a specified price.

Reinforcing Steel - A type of steel used to reinforce concrete structures or pavements.

QC/QA - Quality Control/Quality Assurance. A program designed to ensure that roadbuilding materials meet specified quality standards.

Single Bid Contract - A contract for a project where only one bid is received.

Structural Concrete - A type of concrete commonly used in bridges.

Structural Steel - A type of steel commonly used in bridges.

USDOT - The United States Department of Transportation.

INTRODUCTION AND BACKGROUND

Chapter One

REPORT CONCLUSIONS

The Illinois Department of Transportation (IDOT) is responsible for constructing the State's highway system. IDOT uses contractors for most road construction activities. In 1996, IDOT awarded 889 construction contracts for a total contract amount of $896 million. We compared IDOT's roadbuilding material costs with those of six other midwestern states: Indiana, Wisconsin, Iowa, Missouri, Kentucky, and Ohio. Comparison of unit costs between states is complex because of a variety of factors.

We found considerable variations in the unit cost of selected pay items reported by IDOT and the other six states reviewed. A pay item is comprised of several types of costs, including labor, materials, equipment, and contractors' overhead. In general, IDOT's pay item unit costs were higher. For example, Illinois' unit cost for a ton of surface course asphalt was almost 30 percent higher than the average unit cost reported by the other states. Illinois' unit cost for a square yard of portland cement concrete pavement was 17 percent higher than the other six states' average. In contrast, IDOT's unit cost for structural steel was 12 percent below the average paid by the other states.

There are a number of factors which contribute to these cost differences. In general, Illinois' highway construction labor costs were higher than other midwestern states. Other factors, such as selected higher material costs, labor practices, quantity of the pay item purchased, and differences in project requirements, also affect Illinois' pay item unit costs.

States also report costs differently which accounts for some unit cost differences. For example, Illinois includes certain costs in selected pay items, such as mobilization and quality control/quality assurance, which some other states report separately.

The amount of the cost differences attributable to these factors is difficult to project because of the varying nature and composition of pay items, size and type of the projects, and ways in which contractors structure their bids.

There are, however, several factors related to IDOT's contracting process that may also contribute to Illinois' higher costs. While the number of contracts IDOT awarded to single bidders has decreased from 18 percent in the period 1987 through 1991 to 12 percent in 1996, further improvement is warranted. For all contracts awarded in 1996, when there were multiple bidders, the award amount averaged 10.88 percent ***below*** IDOT's estimated cost for the project. When there was only one bidder, the award amount averaged .64 percent ***above*** IDOT's estimate.

If the single bid contracts had come in at 10.88 percent below the estimate (as occurred on multiple bid contracts), the award amounts would have been $8.9 million less.

IDOT's current efforts to increase competition are limited. For example, IDOT does not routinely contact companies that received bid authorization but did not bid to determine why they did not bid. Also, while IDOT has general guidelines to govern its award decisions, it has not developed formal award policies or procedures, such as when to rebid a project if all proposals exceed the State's estimate. We reviewed 43 projects rebid by IDOT in 1996. When these projects were rebid, the new low bid total ($21.2 million) was 8 percent lower than the original low bid total ($23.1 million), yielding a savings of $1.9 million. In 31 of the 43 projects, the original low bidder submitted an even lower bid when the project was rebid.

Other aspects of IDOT's contracting process which may limit competition include publishing the names of contractors authorized to bid and releasing project estimate amounts after the bid opening. Both practices provide contractors with information they can use to limit competitive proposals.

Finally, the accuracy of IDOT's project estimates could be improved. We found wide variation in the accuracy of estimates by district. Forty-six percent of IDOT's estimates were within 10 percent of the lowest bid in 1996. Project estimates serve the critical role of controlling contract award amounts.

INTRODUCTION

On May 5, 1997, the Legislative Audit Commission passed Resolution Number 111, which directs the Auditor General to conduct a management audit of the Illinois Department of Transportation's Road Construction Program (see Appendix A). The resolution asks the Auditor General to answer the following determinations:

- Whether the costs paid by the Illinois Department of Transportation for road building materials are comparable with costs paid by other midwestern states;

- If Illinois' costs are significantly different than other midwestern states, determine the cause for such differences; and

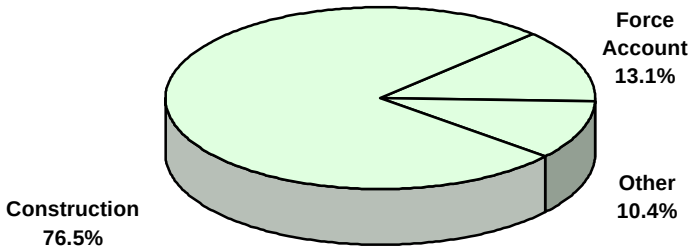
- Whether changes in the Department of Transportation's procurement methods are warranted.

IDOT'S ROAD CONSTRUCTION PROGRAM

The Illinois Department of Transportation (IDOT) is responsible for constructing roads on the State Highway System, which consisted of 42,462 lane miles at the end of calendar year 1996. We use the term "construction" to include building, resurfacing, restoring, rehabilitating, and reconstructing highways or parts thereof.

IDOT's total expenditures for the road construction program were $1.08 billion in fiscal year 1996. Exhibit 1-1 shows that IDOT expended 76.5 percent ($830 million) of this total on road construction contracts, 13.1 percent ($143 million) for force account payments, which are payments for unforeseen costs not associated with the original contract, and 10.4 percent ($112 million) for items such as rights of way, consultants, and research.

Exhibit 1-1
IDOT EXPENDITURES FOR THE ROAD CONSTRUCTION PROGRAM
Fiscal Year 1996



Source: OAG analysis of IDOT data

The primary sources of IDOT's revenues are the Road Fund (011) and the State Construction Fund (902). Revenue for these funds comes from vehicle registration and license plate fees, diesel fuel fees, motor fuel tax transfers, investment income, and the federal government (from the Highway Trust Fund).

According to IDOT, the Road Program's emphasis has been shifting away from new construction over the past 25 years. As shown in Exhibit 1-2, more than 95 percent of the State's highway expenditures focus on preserving and modernizing the existing system. According to data collected by IDOT, other states reviewed had more new construction.

Exhibit 1-2
PERCENTAGE OF CONTRACT AWARDS FOR NEW CONSTRUCTION, RECONSTRUCTION, AND REHABILITATION/RESURFACING
1996 Construction (in thousands)

State	Total	New	%	Reconstruction	%	Rehab/ Resurfacing	%
Illinois	**$ 883,628**	**$ 37,030**	**4.19%**	**$ 227,877**	**25.79%**	**$ 618,721**	**70.02%**
Indiana	527,947	107,247	20.31%	161,546	30.60%	259,154	49.09%
Iowa	419,030	92,187	22.00%	180,183	43.00%	146,660	35.00%
Kentucky	381,805	41,999	11.00%	152,722	40.00%	187,084	49.00%
Missouri	444,600	211,359	47.54%	98,304	22.11%	134,937	30.35%
Wisconsin	398,500	116,100	29.13%	163,900	41.13%	118,500	29.74%

Source: IDOT (unaudited)

Exhibit 1-3 shows the number of contracts let and awarded by IDOT in calendar years 1995 and 1996. The number of contracts let are those projects that IDOT advertised for bid and the number of contracts awarded is where one or more bids were received and a contract was subsequently awarded.

Exhibit 1-3
CONSTRUCTION CONTRACTS LET AND AWARDED BY IDOT

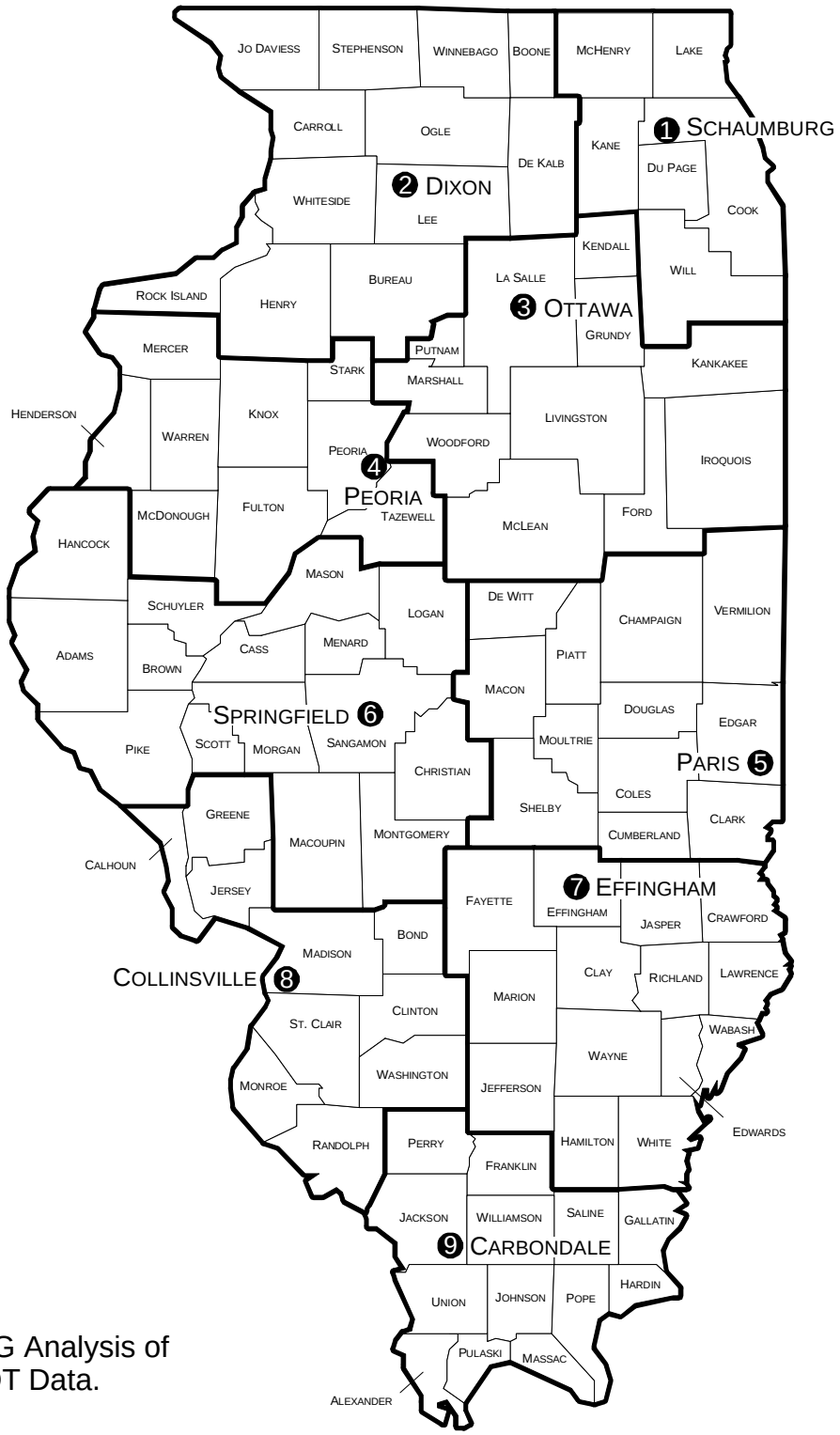
Calendar Year	Total Award Amount	Contracts Let	Contracts Awarded
1995	$776,898,452	970	907
1996	$896,288,995	948	889

Source: IDOT Division of Highways

IDOT uses outside contractors for most roadbuilding activities. IDOT employee road crews perform only small emergency projects and routine highway maintenance. IDOT has nine district offices that employ engineers who help plan and monitor road construction projects. Exhibit 1-4 shows the boundaries of IDOT's nine districts.

Exhibit 1-4

IDOT DISTRICTS MAP



Source: OAG Analysis of IDOT Data.

The number of road construction contracts awarded by IDOT at scheduled lettings decreased from calendar year 1995 through 1996, although the total dollar amount awarded increased some in 1996. IDOT lets most construction contracts on a scheduled basis. However, sometimes IDOT lets projects at special lettings. For instance, a special letting was held in 1997 to award one project to brace piers on the Stevenson Expressway. During the audit period, procurement of contractor services and roadbuilding materials was guided primarily by the Illinois Purchasing Act (30 ILCS 505) and IDOT policies and procedures.

Exhibit 1-5
CONTRACTS BY IDOT DISTRICT
Calendar Year 1996

District	Number of Contracts	% of Total Contracts	% of Total $	Total Award
1	201	22.61%	40.29%	$361,088,343
2	128	14.40%	10.25%	$91,871,619
3	92	10.35%	8.81%	$78,973,269
4	78	8.77%	6.60%	$59,146,039
5	68	7.65%	6.19%	$55,498,488
6	93	10.46%	10.16%	$91,091,115
7	74	8.32%	3.90%	$34,992,823
8	103	11.59%	8.89%	$79,671,829
9	47	5.29%	4.62%	$41,412,250
Statewide	5	.56%	.28%	$2,543,219
Total	889	100%	100%	$896,288,995

Note: Percentage totals may not add due to rounding
Source: OAG analysis of IDOT data

Exhibit 1-5 summarizes road construction contracts by IDOT district. During calendar year 1996, IDOT awarded 889 road construction contracts totaling $896 million. Just over 40 percent of all the contract dollars awarded were for projects located in IDOT District One (Cook & surrounding counties). The next closest was District Two, with 10.25 percent of total dollars awarded.

In addition to the 889 contracts awarded, IDOT chose not to award contracts for 59 projects put out for letting. The low bids on these projects totaled $53,761,375. Generally, the lowest bid received for these 59 contracts was significantly higher than IDOT's estimated cost for the project.

As directed by LAC Resolution Number 111, we selected other midwestern states to compare their roadbuilding costs with those of IDOT's. We selected the five states that border Illinois – Indiana, Wisconsin, Iowa, Missouri, and Kentucky, as well as Ohio, which shares similar characteristics with Illinois. Exhibit 1-6 summarizes the number and dollar amount of road construction contracts awarded by these states during calendar year 1996. The number of contracts awarded during this period varied widely, ranging from 889 in Illinois to 179 in Missouri. Total award amounts ranged from $896 million in Illinois to $381 million in Kentucky.

Exhibit 1-6
ROAD CONSTRUCTION CONTRACTS IN SELECTED MIDWESTERN STATES
Calendar Year 1996

State	Total Award Amount	Contracts Awarded
Illinois	**$ 896,288,995**	**889**
Ohio	$ 834,877,034	783
Indiana	$ 597,886,334	573
Missouri	$ 458,764,000	179
Wisconsin*	$ 442,000,000	423
Iowa	$ 399,764,590	636
Kentucky	$ 381,000,000	752

* Information for fiscal year
Source: OAG Survey of States

IDOT'S ROAD CONSTRUCTION CONTRACTING PROCESS

The key aspects of IDOT's contracting process are shown in Exhibit 1-7 and explained below:

- *Project Planning* begins with IDOT developing and prioritizing projects in their five-year and one-year planning books. For each bid letting, IDOT prepares a service bulletin that describes the specific work up for bid at that time.

- The purpose of *Cost Estimates* is to evaluate the reasonableness of contractors' bids. IDOT's Central Office compares its estimate for each project to estimates prepared at the district level. Central Office decides what the final estimate amount will be.

- The *Proposal* process involves *Prequalification of Contractors* and determining *Authorization to Bid*. Prequalification is designed to ensure that contractors have the resources necessary to complete a job. Primary contractors must be prequalified prior to bidding. However, prequalification may be waived to acquire specialized skills not covered by available work categories, to purchase manufactured products, or to achieve sufficient competition (44 Ill. Adm. Code 650.70). A contractor must also receive from IDOT an authorization to bid, which is a certification that a contractor does not have uncompleted work or another obligation or impediment that would prevent it from completing the job.

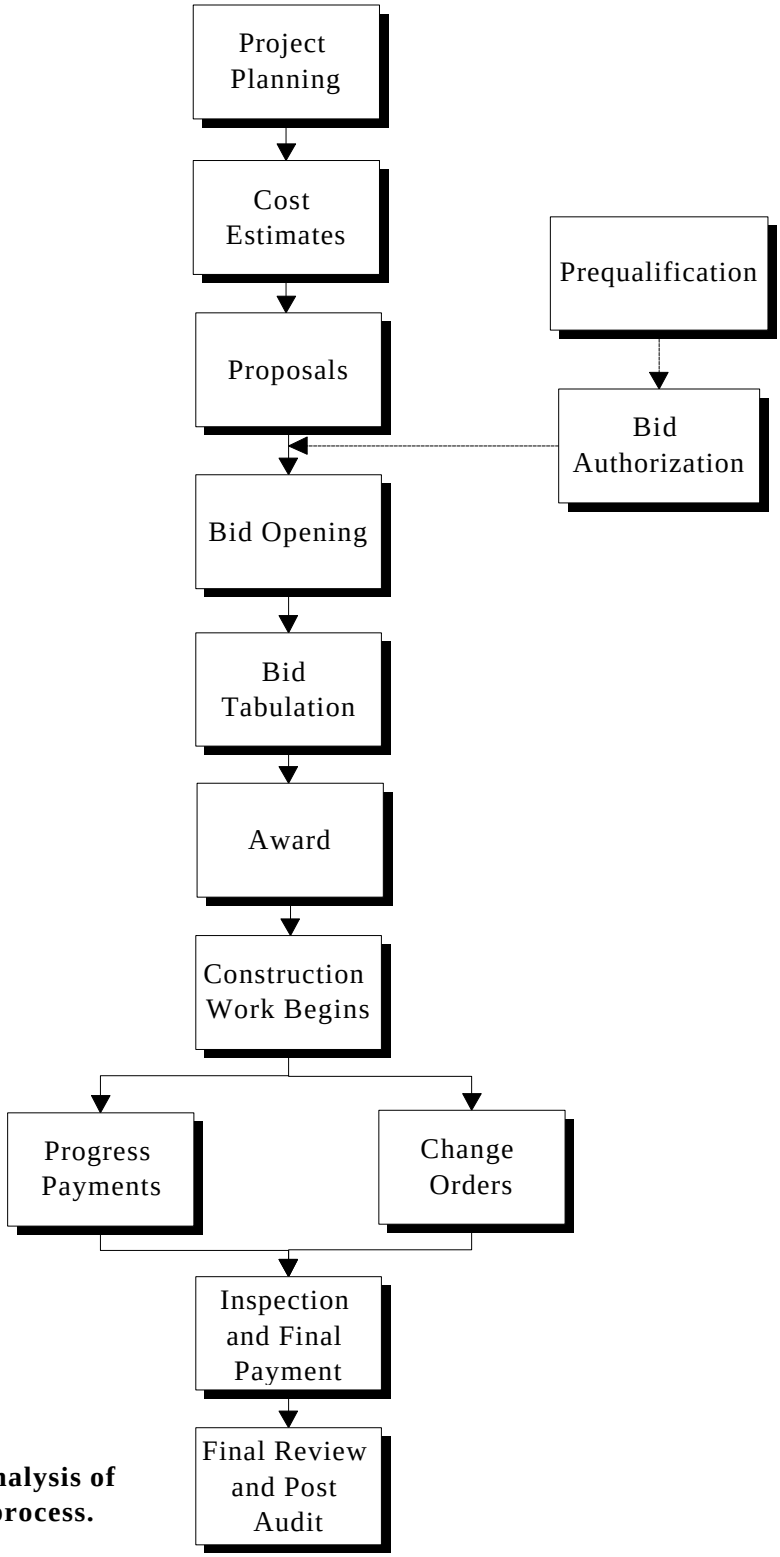
- Approximately seven or eight times each year IDOT has a scheduled *Bid Opening* to collect and read contractors' bids for road construction contracts. If the bidder is on the prequalified list, then the item number, contractor, and total dollar amount of the bid is read during the bid opening.

- *Bid Tabulation* involves reviewing bids and determining the lowest qualified bidder. Generally, the lowest qualified bidder is *Awarded* the contract. However, if a contractor is low bidder on multiple contracts, but executing all of those contracts would make it exceed its available financial or work rating, IDOT will award contracts in a manner that is most advantageous to the State.

- *Construction Work Begins* after the contract is executed. Contractors are typically paid once per month, based on work completed (e.g., *Progress Payments*). Many times original contract estimates on amounts of material, labor, equipment, and other factors do not match what is actually needed to do a construction project. When this occurs, IDOT must produce a written *Change Order*. Any adjustment, addition, or deduction from the original contract amount requires a change order, including incentive payments or liquidated damages.

- The resident engineer and the field engineer do a *Final Inspection* to make sure the construction has been satisfactorily completed. The *Final Payment* is made after assessing the amount of materials used, liquidated damages for completing the project late, or incentive payments for completing the project early.

Exhibit 1-7
IDOT CONTRACTING PROCESS



Source: OAG analysis of IDOT process.

- IDOT's audit division conducts *Final Construction Reviews* of selected projects. An auditor and an engineer go to an active construction job to review records and documents to make sure the contractor and the resident engineer are in compliance with applicable rules, laws, and regulations. IDOT's audit division also performs *Post Audits* of selected projects to verify the adequacy of project documentation.

OVERSIGHT AND ADVISORY ORGANIZATIONS

AASHTO is the acronym for the American Association of State Highway and Transportation Officials, an organization that provides technical services and advice on transportation issues to IDOT and other state highway departments, the U.S. Department of Transportation, and Congress. AASHTO publishes standards for roadbuilding under the title *A Policy on Geometric Design of Highways and Streets*, also known as the "Green Book." Many states use AASHTO's Green Book to develop their road design standards. AASHTO publishes other advisories, such as "Suggested Guidelines for Strengthening Bidding and Contract Procedures," which is the basis for some of our recommendations in this report.

The Federal Highway Administration (FHWA) is a unit of the U.S. Department of Transportation. The FHWA's function includes monitoring the use of federal-aid highway funds, promoting the use of new transportation technologies, and providing technical training and assistance to state and local transportation agencies. The FHWA publishes quarterly price trend reports that show unit prices for selected pay items for each state and issues periodic technical advisories on highway topics.

LIMITATIONS REGARDING FEDERAL HIGHWAY ADMINISTRATION DATA

Legislative Audit Commission Resolution Number 111 indicates that, in part, this audit was initiated because "published accounts have reported that in recent years, Illinois has paid more than other states for certain roadbuilding costs." The cost data referred to in the resolution came from the Federal Highway Administration's (FHWA) quarterly price trend analysis called "Price Trends for Federal-Aid Highway Construction." This report tracks the unit cost in all 50 states for six major construction materials: excavation, portland cement concrete, asphalt, reinforcing steel, structural steel, and structural concrete.

There are several reasons why cost comparisons between states using FHWA data are limited. First, the FHWA data include only federal-aid highway projects over $500,000, which involved only 49 (5.5%) of IDOT's 889 road construction contracts in calendar year 1996. These 49 contracts represented only $203 million (23%) of the $896 million in IDOT's total road construction contract awards in that year.

Also, according to the FHWA, individual state indices may not be truly representative of long-term price trends because of comparatively low volumes of work for the period reported, or

because of unusual projects awarded during the reporting period. Also, differences in bid item specifications among the states might account for some of the differences in unit prices in the various states.

Another reason why cost comparisons between states using FHWA data are limited is because the FHWA's cost data contained some errors that occurred because the FHWA omitted some data and inaccurately converted some metric measures to English units. For example, we found conversion errors from kilograms to pounds and an instance where kilograms were never converted to pounds.

The FHWA issued revised Price Trend Data for 1995 and 1996 to correct errors in their original reports. Exhibit 1-8 shows the original and revised FHWA figures for 1995. The revised FHWA reports include a disclaimer stating that the FHWA indices are not to be used for state comparisons.

Exhibit 1-8
FEDERAL HIGHWAY ADMINISTRATION'S ORIGINAL AND REVISED UNIT COST DATA FOR ILLINOIS FOR 1995
(For Federal-aid Projects over $500,000 Awarded on the National Highway System)

Construction Material	Unit	Original	Revised
Common Excavation	Cubic Yard	$3.68	$3.93
Portland Cement Concrete	Square Yard	$28.49	$22.67
Asphalt	Ton	$31.66	$31.80
Reinforcing Steel	Pound	$0.91	$0.65
Structural Steel	Pound	$1.01	$1.16
Structural Concrete	Cubic Yard	$447.11	$447.98

Source: OAG analysis of FHWA Statistics

Legislative Audit Commission Resolution Number 111 required us to compare IDOT's roadbuilding material costs with those of other midwestern states. To help ensure the validity of our statewide average cost comparisons, we compared selected specific pay items between the states (for example, medium traffic volume, surface course asphalt), rather than just general pay item classifications. We obtained and reviewed general specifications to ensure comparability.

We inquired of IDOT officials to identify factors that cause cost differences. To identify these factors, we accompanied IDOT officials at their request to visits with contractors. We also visited with department of transportation officials in three other midwestern states and reviewed and obtained additional cost information. Our analysis included all projects undertaken by the states and, unlike the FHWA reports, was not limited to those federal projects over $500,000.

Our analysis also included a project to project analysis in which we controlled for certain types of road projects (such as rural/urban, interstate/non-interstate, resurfacing/new construction). These individual project comparisons generally supported the same conclusions we found in the statewide cost comparisons.

When we identified factors which caused cost differences between similar pay items, such as IDOT's inclusion of mobilization and QC/QA in its pay items, such factors are disclosed in the audit report. In any analysis such as this, there are factors which cannot be controlled for, such as

availability of aggregate and labor cost differentials. When we identified such differences, they too are disclosed in the report.

SCOPE AND METHODOLOGY

The audit was conducted in accordance with generally accepted government auditing standards and the audit standards promulgated by the Office of the Auditor General at 74 Ill. Adm. Code 420.310.

We obtained and reviewed road construction cost information from IDOT and other midwestern states primarily for calendar year 1996. This time period represented the most recently completed full construction season at the time we were conducting fieldwork.

We examined 889 contracts let by IDOT in 1996 which were subsequently awarded. In the report, these contracts are referred to as contracts awarded by IDOT. We also reviewed information on specific projects and pay items. Whenever this report refers to the costs or prices paid for roadbuilding materials, we are referring to awarded unit bid prices.

We surveyed and obtained data from other midwestern states' transportation departments. In the report the term "Illinois" generally refers to the Illinois Department of Transportation or IDOT, and other state names refer to that state's transportation department. We selected states that border Illinois (Indiana, Iowa, Kentucky, Missouri, Wisconsin) or that have similar climate, terrain, and traffic volume (Ohio). We relied on the validity and accuracy of cost data and procedural information provided by each state's transportation department. We conducted site visits to Indiana, Missouri, and Wisconsin to collect additional detailed project descriptions and cost information. Appendices B and C contain a detailed description of our other states' survey methodology and a summary of the survey results.

We contacted and obtained information from the United States Department of Transportation's Office of the Inspector General, the U. S. Department of Labor's Bureau of Labor Statistics, the Illinois Department of Labor, the Illinois State Toll Highway Authority, and the American Association of State Highway and Transportation Officials (AASHTO). We also reviewed pertinent reports from other states and obtained information from Internet sites maintained by transportation departments in other states.

We also met with representatives of the Federal Highway Administration's Region 5 - Illinois Division to discuss variables and issues related to road costs. The FHWA provided us with price trend data for calendar years 1995 and 1996.

We contracted with a consulting firm, Booz·Allen & Hamilton Inc. of McLean, Virginia, to provide technical support to assist the audit team. The consultant reviewed the OAG's audit plans, data analyses, and conclusions, as well as attended selected meetings with IDOT officials. We interviewed officials at IDOT responsible for aspects of the road construction contracting process, such as project planning, contractor prequalification, contract letting, and payments to

contractors, including change orders. We observed IDOT's process of obtaining bids and letting contracts. We reviewed additional information provided by IDOT, including policy and procedure manuals, service bulletins, standard contract provisions, lists of prequalified contractors and consultants, internal audit reports, and other management reports and memoranda. We also contacted some contractors in Illinois and other states to determine reasons for cost differences among states.

While we identified many factors which likely cause differences in road costs between Illinois and other midwestern states, we were unable to quantify the specific effects of various factors on states' cost differences. For example, we found differences in how states account for project mobilization and quality control/quality assurance. Also, some pay items, such as asphalt base course and excavation, were not consistently used for the same type of construction work.

We tested for compliance with applicable laws, rules, and policies governing road construction by IDOT. We reviewed management controls relating to the audit objectives identified in Legislative Audit Commission Resolution Number 111 (see Appendix A). We reviewed the two previous financial and compliance audits of IDOT released by the Office of the Auditor General to identify any management control issues related to road construction costs, the road construction contracting process, or IDOT's information systems. We also reviewed relevant audits conducted by the Office of the Auditor General of IDOT's information systems. This report contains agency recommendations that address areas where controls could be strengthened.

REPORT ORGANIZATION

The remainder of the report is organized as follows:

CHAPTER TWO - ROADBUILDING MATERIAL COSTS

CHAPTER THREE - REASONS FOR VARIANCES IN ROADBUILDING MATERIAL COSTS

CHAPTER FOUR - COMPETITION FOR ROAD CONTRACTS

CHAPTER FIVE - OTHER ISSUES RELATED TO PROCUREMENT

ROADBUILDING MATERIAL COSTS

Chapter Two

CHAPTER CONCLUSIONS

We found considerable variations in roadbuilding pay item unit costs within Illinois and between Illinois and other midwestern states. The cost differences between IDOT's districts were caused by various factors, including the size and type of project and the extent of competition among contractors vying for the project. These same factors can also account for variations in unit costs between states. Differences in project requirements, bid item reporting, and specifications among the states also account for some of the differences in unit prices.

Illinois' unit costs, on average, were generally higher than those reported by other midwestern states. When comparing calendar year 1996 statewide average prices for the most used road construction materials, Illinois' unit costs were higher than the average of the other midwestern states in 9 of 10 categories compared, including excavation, asphalt products, reinforcing steel, and concrete products. However, Illinois' unit cost for structural steel was below the average for other midwestern states. A comparison of individual projects found that Illinois' unit cost per pay item was generally higher than the unit costs paid by other states for similar projects.

INTRODUCTION

This chapter presents unit cost information for Illinois and other midwestern states. Unit costs are based on the average of all low bidders' costs and include not only material costs but also job-specific costs, such as labor and equipment. Because each road construction job is unique, the unit costs for individual projects may vary considerably. For example, an asphalt job in an urban area of the State might have a higher unit cost than a project of similar size in a rural area because of the costs associated with moving equipment and rerouting traffic in the urban area.

Exhibit 2-1
IDOT AWARDS FOR MAJOR MATERIALS
Calendar Year 1996

Material	Awards
Asphalt	$ 143,922,228
Concrete*	95,680,661
Structural Steel	29,077,597
Reinforcing Steel	16,286,009
Earth Excavation	54,056,920
Total	$ 339,023,415
Total Contract $ in CY96	$ 896,288,995
% of Total Contract $	38%

*Includes structural concrete and portland cement
Source: OAG analysis of IDOT's price trend index

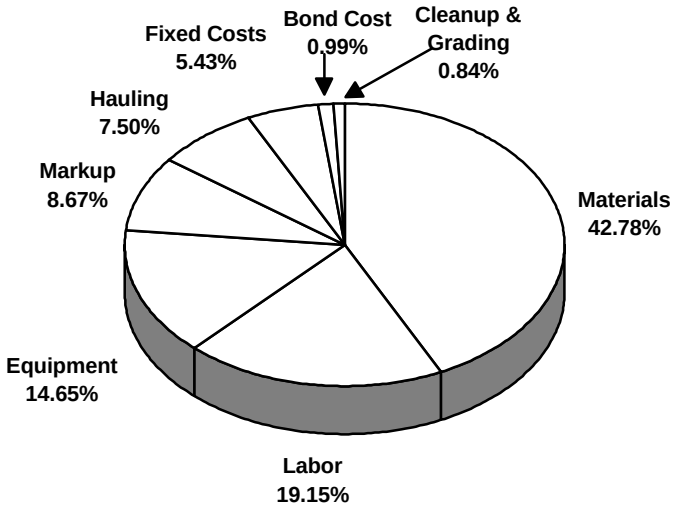
We analyzed cost information for the following major categories: asphalt (base course, binder course, and surface course), concrete (portland cement and structural concrete), structural steel, reinforcing steel (plain and epoxy coated), and earth excavation. According to the FHWA, the indicators they track in their price trend reports represent more than 30% of the dollar value of all federal-aid highway contracts. Exhibit 2-1 shows that the major categories of materials we analyzed accounted for 38 percent of IDOT's total road contract awards for calendar year 1996.

PAY ITEM COMPONENTS

Contract proposals and bids for road construction projects are broken into a series of individual pay items that are needed to complete the project. These pay items include materials and services ranging from different types of pavement to flagging and traffic control. When contractors bid a unit price for an individual pay item, the bid may include the cost of materials, labor, transportation & hauling, equipment, clean up, profit, overhead and bond, mobilization, and fixed costs. Fixed costs include the costs of complying with IDOT's Quality Control/ Quality Assurance (QC/QA) program and plant costs.

The composition of a pay item can affect the unit cost. Exhibit 2-2 shows an example of a cost **estimate** provided by IDOT of the relative cost components in a ton of surface course asphalt in a typical IDOT contract. In the example shown in Exhibit 2-2, materials comprised an estimated 43 percent of the cost of a ton of asphalt surface course. Other factors such as labor, equipment, hauling, markup, and fixed costs comprised an estimated 57 percent of the unit cost in this particular example. The information presented in Exhibit 2-2 is meant to illustrate the estimated costs for one project only. The type and percentage of costs associated with a pay item will vary from contract to contract.

Exhibit 2-2
EXAMPLE OF PAY ITEM COMPONENTS-ASPHALT SURFACE COURSE
(IDOT Cost Estimate)



Note: This is an example of IDOT's estimated costs for one project; actual costs may vary. Also, the percentage of costs associated with a given pay item will vary from contract to contract.

Source: OAG analysis of IDOT data

COST COMPARISONS WITHIN ILLINOIS

The cost of common roadbuilding materials varied considerably among different regions of Illinois. Cost variables may include whether the project is in a predominantly urban or rural area, the amount of competition in the area, the quantity of each material used in the project, and the availability and quality of materials. Exhibit 2-3 shows the average unit price for 1996 in the nine IDOT districts for three common road construction pay items: earth excavation, asphalt surface course, and reinforcing steel.

Exhibit 2-3 shows that IDOT's 1996 unit cost for earth excavation varied 273 percent from $6.60 per cubic yard in IDOT District One (Chicago Metro Area) to $1.77 per cubic yard in District Six. IDOT officials said that excavation costs in District One were higher due to the characteristics of urban excavation. The lower price paid in District Six for earth excavation shows how the amount purchased affects unit costs. The District Six low price was driven by one contract for a large quantity of excavation. On this contract, the unit price was $0.76 per cubic yard (for 1,016,582 cubic yards of excavation), whereas some other smaller projects in the District had unit prices for excavation of $4.70 and $6.60 per cubic yard.

Also, the effect of this one large contract on the statewide average price is notable. The excavation in this one contract accounted for roughly 15 percent of all excavation done in the

State in 1996. If this one contract were excluded, the average price of excavation for 1996 would have increased from $4.24 statewide to $4.85 statewide. Conversely, if there had been two more contracts of this size and price, the statewide average for excavation would have dropped to $3.45. Consistently throughout our analysis, the quantity of the pay item purchased had a significant effect on the unit pay item price.

The unit cost for surface course asphalt varied by up to 40 percent between different areas of the State. The average cost per ton ranged from $28.59 per ton in IDOT District Two (northwestern Illinois) to $39.91 in District Five (east central Illinois). In District Two, a large number of contracts were awarded to one contractor who owned both the source of aggregate and the asphalt company in the area. IDOT officials stated that this contractor could significantly underbid other contractors, which may have driven the average price down. Conversely, District Five had a large number of single bid contracts. The lack of competition in the District may have contributed to higher prices.

The cost of epoxy coated reinforcing steel varied up to 32 percent among districts: District Eight (East St. Louis Metro Area) had the highest cost at $.79 per pound, whereas District Nine (southern Illinois) had the lowest cost at $.60 per pound.

As shown on Exhibit 2-3, the cost of road construction materials varies in Illinois. Many factors cause these cost variations and likely come into play when Illinois' roadbuilding material costs are compared with those of other midwestern states.

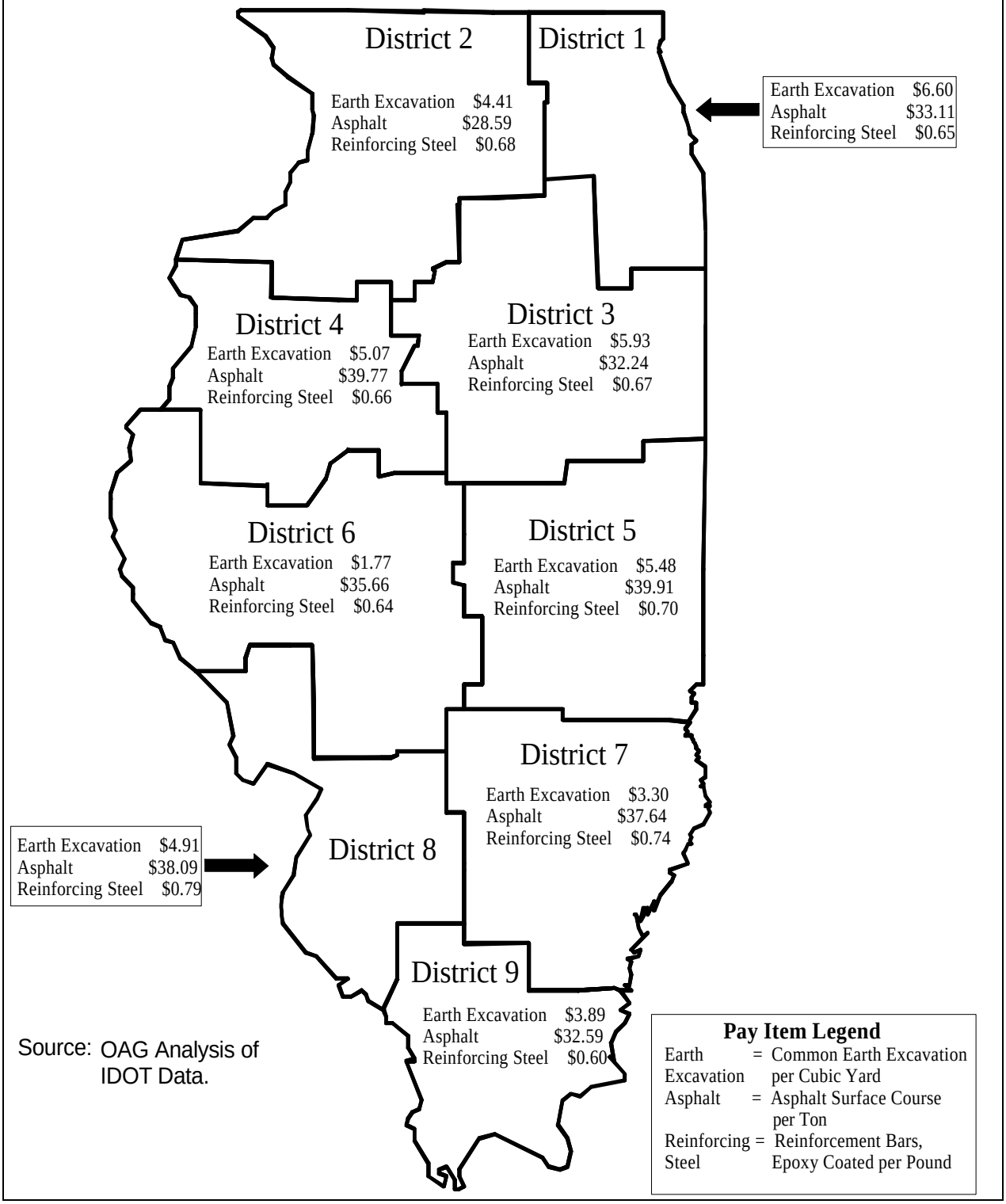
COST COMPARISON WITH OTHER MIDWESTERN STATES

To compare the cost of roadbuilding materials between Illinois and other midwestern states, we collected data for frequently purchased pay item categories: (1) Common Excavation; (2) Portland Cement Concrete; (3) Asphalt; (4) Reinforcing Steel; (5) Structural Steel; and (6) Structural Concrete. We collected data for three types of asphalt (base, binder, and surface course), two types of reinforcing steel (plain and epoxy coated), and two types of structural concrete (superstructure and other structural concrete) for a total of ten pay items.

For these ten items, we collected data from other midwestern states adjacent to Illinois or in the same general climatic zone. These states included Indiana, Iowa, Kentucky, Missouri, Ohio, and Wisconsin. We collected information for awarded highway construction contracts let by each state's transportation agency in calendar year 1996. We also collected individual project cost data from these states to compare to similar projects in Illinois.

Exhibit 2-3

COST OF SELECTED MATERIALS FOR CALENDAR YEAR 1996
BY IDOT DISTRICT



Source: OAG Analysis of IDOT Data.

Based on this information, we found that Illinois' average costs for roadbuilding materials are generally higher than other midwestern states in most categories. Illinois' costs for excavation, concrete, and asphalt pavements are considerably higher in most cases than other midwestern states, but Illinois' costs for steel products compare more favorably. Asphalt base course and structural concrete show the largest difference between Illinois and other midwestern states.

The remaining pages of this chapter discuss how Illinois' unit costs for roadbuilding materials compare to other midwestern states on a statewide and project-specific basis.

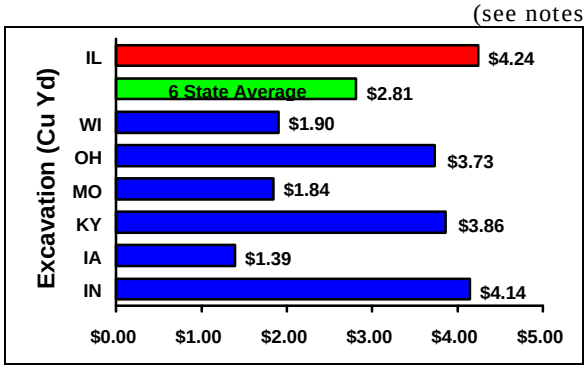
Statewide Average Cost Comparisons

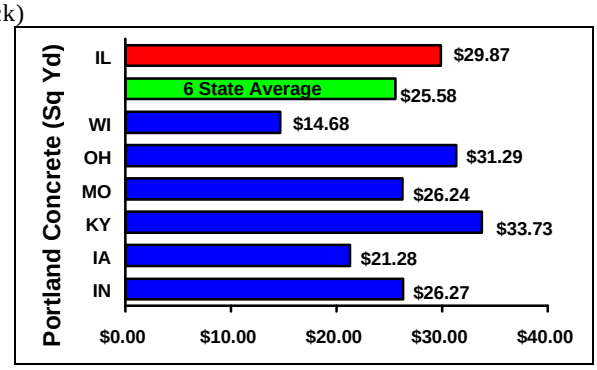
We compiled the average statewide unit cost for ten individual roadbuilding pay items for each of the midwestern states surveyed. Exhibit 2-4 shows cost comparisons for each material. The front side of Exhibit 2-4 shows unit cost comparisons and the back side discusses factors affecting costs and cost reporting differences among states. Exhibits 2-5 through 2-13 are graphs that show the average unit pay item cost for Illinois in each category with the highest dollar amount purchased, the average for all six states, the range of unit costs for all states, and a ratio of the unit cost between Illinois and the average for other states' unit costs.

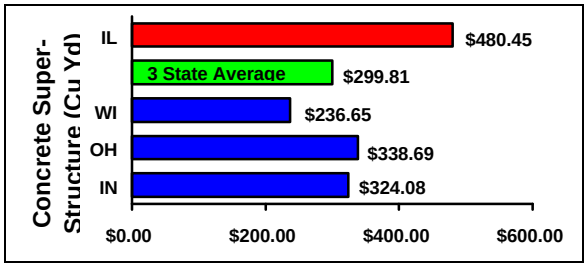
Digest Exhibit 2

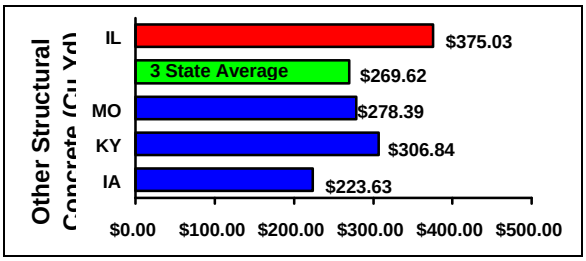
COSTS OF SELECTED CONSTRUCTION MATERIALS ILLINOIS AND OTHER MIDWESTERN STATES

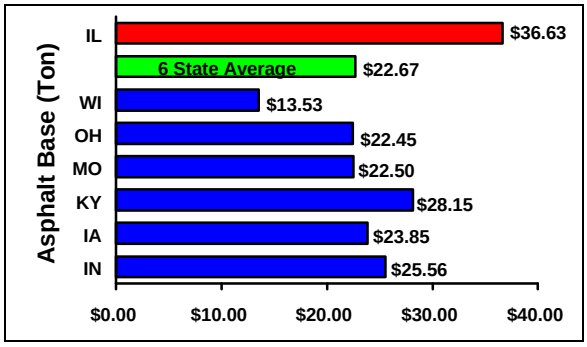
(see notes on back)

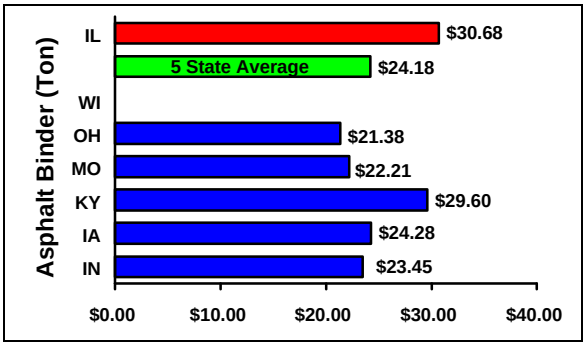


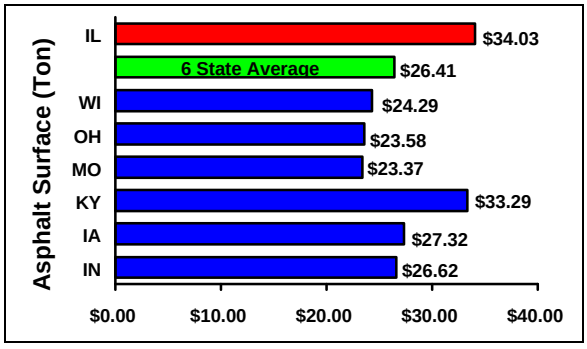


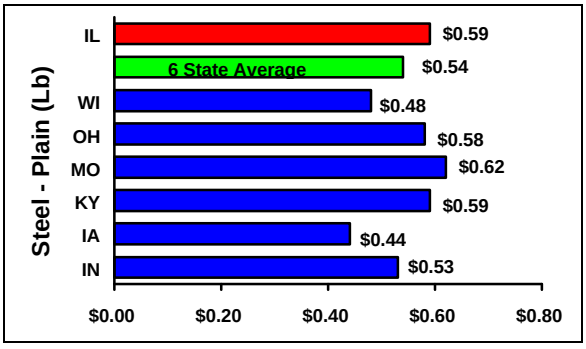


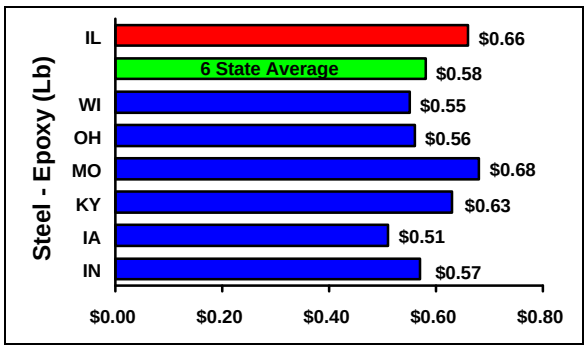


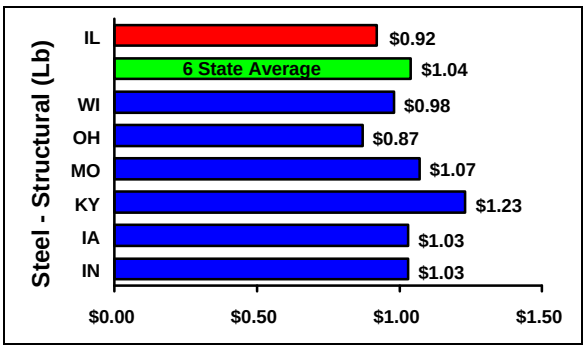












FACTORS AFFECTING PAY ITEM AVERAGE UNIT COSTS SHOWN ON EXHIBIT 2-4

The differences in average unit costs by specific pay item shown in Exhibit 2-4 can be attributable to a number of factors. A pay item is comprised of several types of costs, including labor, materials, equipment, and contractors' overhead. There are many factors which impact pay item costs reported by the various states. For example, Illinois generally has higher labor costs than the other states. Consequently, the higher cost of labor in Illinois can increase IDOT's pay item unit costs versus those in other states. Other factors which impact costs include:

- Higher workers compensation rates in Illinois
- Work rules and local preference requirements regarding the staffing of road projects
- More strict project requirements and specifications
- Inability to obtain high quality aggregate from local supplies, thereby requiring more costly transport of this material
- Quantity of a pay item used on a project

The amount of cost differences attributable to these factors is difficult to project because of the varying nature and composition of pay items, size and type of projects, and ways in which contractors structure their bids.

There were also differences in pay item reporting between Illinois and the other states reviewed. For example, Illinois does not separate mobilization costs from its pay items, which other states report separately. Consequently, the cost for some IDOT pay items may be higher because of the inclusion of mobilization costs. Other differences identified based on our review and a recent survey conducted by IDOT included:

Surface Course and Binder Course Asphalt: Unit costs for Missouri and Wisconsin exclude aggregate certification costs (about $1.00 per ton in Illinois). Also, Wisconsin unit costs for surface course asphalt exclude QC/QA (estimated at $1 - $2 per ton). Conversely, Illinois unit costs do not include anti-strip costs whereas Kentucky and Missouri unit costs do (estimated by IDOT at about $0.65 per ton).

Base Course Asphalt: Illinois uses base course asphalt primarily for temporary roads, side streets, or detour roads which can be a more costly use than new construction, according to IDOT.

Portland Cement Concrete: Unit costs for Indiana exclude the cost of sealing contraction joints. Indiana, Iowa, Kentucky and Missouri unit costs exclude subgrade preparation. Conversely, Illinois unit cost does not include QC/QA costs whereas Kentucky unit costs do. In addition, the thickness of the portland cement pavement varied among the states, with Illinois' 9 ½ inch pavement being the thinnest of the states reviewed.

Structural Concrete: Unit costs for Indiana, Iowa, Missouri, and Wisconsin exclude parapet costs; Missouri also excludes sidewalk costs. Kentucky and Wisconsin unit costs exclude the cost of protective shields. Conversely, Illinois unit cost does not include admixtures whereas the Iowa unit cost does. Also, Illinois unit cost does not include QC/QA whereas Kentucky and Ohio unit costs do.

Earth Excavation: Illinois unit costs for excavation include the costs of clearing, undercutting, compaction, dust control, overhaul, borrow material, settlement platforms, and disposal of unsuitable materials. Many of these items are paid for separately in other states, and may, therefore, lower their unit costs for excavation.

For a more detailed discussion of the pay items reviewed and the various factors affecting pay item unit costs, see chapters two through five of the audit report.

Excavation

Excavation involves moving earth and related materials. Exhibit 2-5 shows that Iowa, Missouri, and Wisconsin paid considerably less for excavation than Illinois, while the costs in Indiana, Kentucky, and Ohio were more comparable to the cost in Illinois. Illinois paid 51 percent more for excavation ($4.24) than the average of $2.81 paid by the other midwestern states. In 1996, Illinois paid a total of $29 million for 6.8 million cubic yards of roadway excavation.

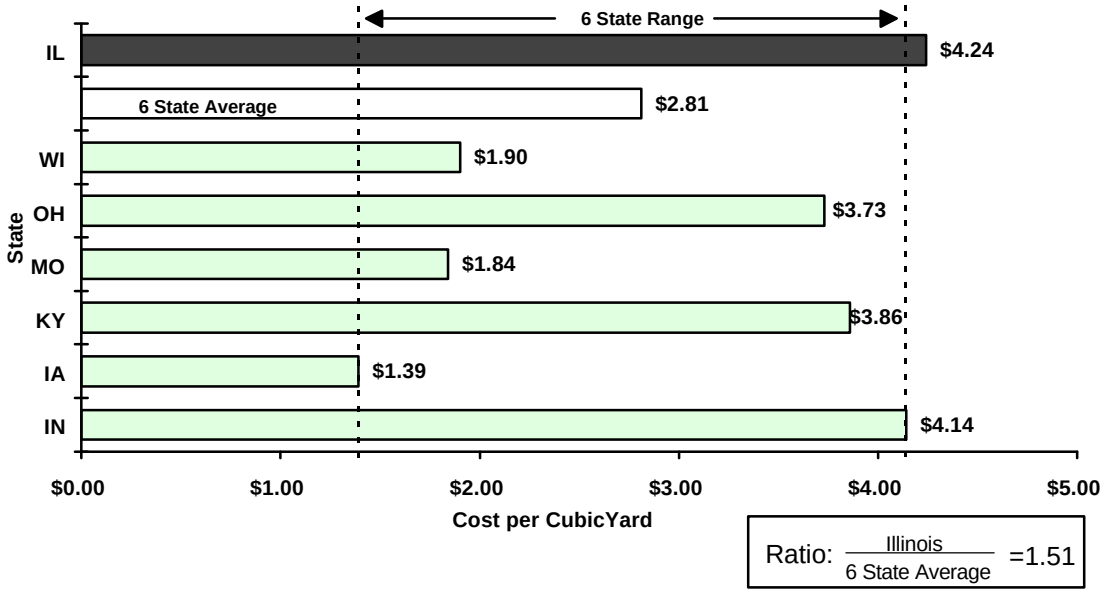
Indiana and Illinois had similar average unit costs for excavation. However, Indiana's excavation costs included embankment costs. Embankment involves hauling material to the job site for filler and grading. According to IDOT officials, flat states such as Illinois tend to use more embankment. In Illinois and other midwestern states, except Indiana, embankment was a separate pay item. In Illinois, embankment cost less per unit ($3.53) than excavation ($4.24). If excavation and embankment were grouped in Illinois, Illinois would have had a lower unit cost than Indiana.

The quantity of excavation also affected excavation unit costs. Iowa reported almost 25 million cubic yards of excavation in 1996. According to Iowa officials, Iowa constructed several new roads in 1996. In 1996, IDOT reported 6.8 million cubic yards of roadway excavation, much of which was attributable to one project (1.1 million cubic yards) that, according to IDOT officials, had a high price because the contractor needed to pump water out of a strip mine before excavation could begin. However, the price per cubic yard for this project was $3.86, which was lower than the overall average price of $4.24 per cubic yard in 1996.

Other factors noted by IDOT that can affect excavation costs between states included differing moisture content of soils (for example, in some areas dry materials must be hauled in for fill), disposal of excavated materials (for example, in the Chicago area excess material must be hauled away because it cannot be disposed of on site), and differences in tracking excavation costs among states. Iowa's and Missouri's departments of transportation provide borrow materials included in the cost of excavation. In Illinois, however, contractors must provide borrow materials.

Exhibit 2-5

ROADWAY EXCAVATION



Note: Illinois unit costs for excavation include the costs of clearing, undercutting, compaction, dust control, overhaul, borrow material, settlement platforms, and disposal of unsuitable materials. Many of these items are paid for separately in other states, and may, therefore, lower their unit costs for excavation.

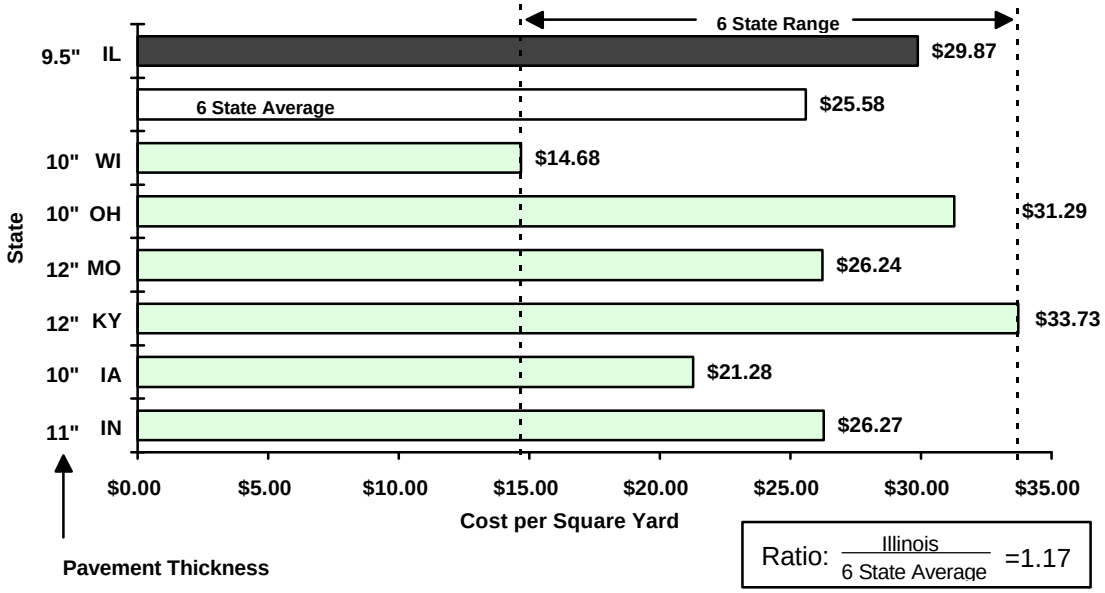
Source: OAG analysis of IDOT and other states data

Portland Cement Concrete Pavement

The thickness of portland cement concrete pavement can affect the average price per unit. Even though Illinois reported costs for a thinner pavement (9½ inch) than other midwestern states (10 to 12 inch), Illinois was still more expensive per square yard than four of the six other midwestern states we surveyed. The two states with higher unit costs were Kentucky for 12-inch pavement and Ohio for 10-inch pavement.

As with excavation, quantity appeared to play a key role in the unit costs paid by some of the states. The three states with the lowest unit costs paid for the highest quantity of portland cement pavement: Wisconsin had 1,523,204 square yards at an average price of $14.68 per square yard; Iowa had 844,195 square yards at $21.28 per square yard; and Missouri had 769,872 square yards at $26.24 per square yard. In 1996, IDOT purchased 390,782 square yards of 9½-inch portland cement concrete at $29.87 per square yard for a total of $11.7 million.

Exhibit 2-6
PORTLAND CEMENT CONCRETE PAVEMENT



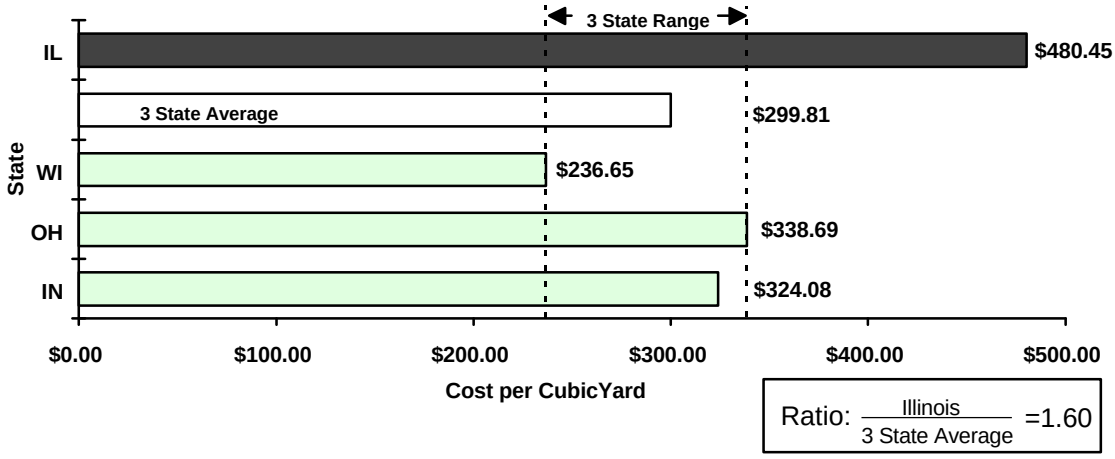
Note: Unit costs for Indiana exclude the cost of sealing contraction joints. Indiana, Iowa, Kentucky and Missouri unit costs exclude subgrade preparation. Conversely, Illinois unit cost does not include QC/QA costs whereas Kentucky unit costs do. In addition, the thickness of the portland cement pavement varied among the states, with Illinois' 9 ½ inch pavement being the thinnest of the states reviewed.

Source: OAG analysis of IDOT and other states data

Structural Concrete

Exhibit 2-7A shows that Illinois' cost per cubic yard of concrete superstructure ($480.45) was 60 percent higher than the average of the three other midwestern states ($299.81) that provided comparable information. Indiana's information is for bridge deck superstructure, Ohio's information is for superstructure, and Wisconsin's information is for concrete masonry for bridges. Concrete superstructure is generally used in bridge decks. In 1996, Illinois paid a total of $27.6 million for 57,463 cubic yards of concrete superstructure.

Exhibit 2-7A
CONCRETE SUPERSTRUCTURE



Note: Unit costs for Indiana and Wisconsin exclude parapet costs; Wisconsin also excludes the cost of protective shields. Conversely, Illinois unit cost does not include QC/QA whereas Ohio unit cost does.

Source: OAG analysis of IDOT and other states data

Exhibit 2-7B presents average prices for other types of structural concrete, including substructure, which is generally a lower grade of structural concrete used in bridges and box culverts. Exhibit 2-7B shows that Illinois' cost per cubic yard of concrete substructure ($375.03) was 39 percent higher than the average of the three other comparable midwestern states ($269.62). The information from Iowa and Kentucky included both bridges and box culverts.

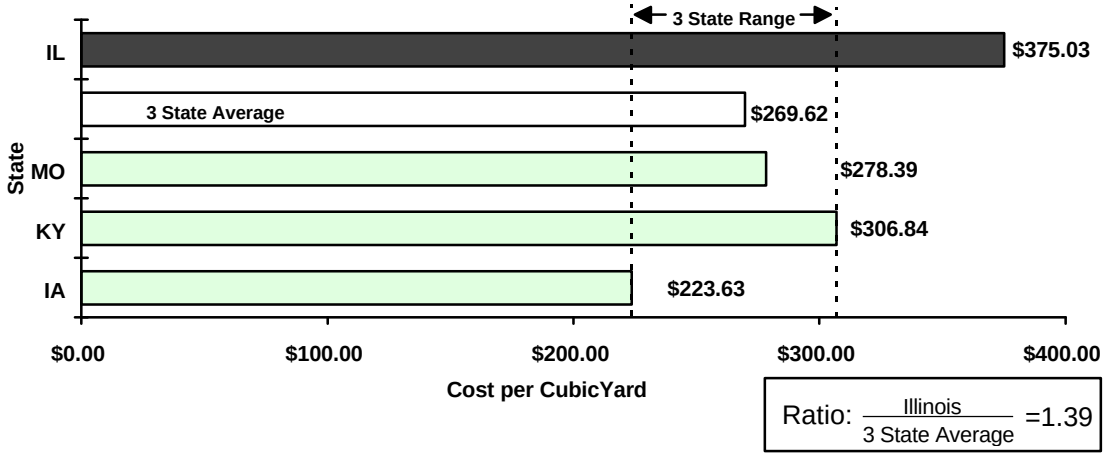
Contractors interviewed provided some explanations as to why Illinois' structural concrete costs were higher than other states. Some contractors noted that some other states use precast metal forms for bridge decks, but Illinois uses wood forms that require more time and resources to build. Contractors also noted that Illinois includes the cost of parapets (low, protective walls or railings on bridges) in the cost of superstructure concrete, whereas other states do not.

One contractor noted that Illinois' structural concrete costs are higher because Illinois requires contractors to tie bridge beams together on new bridge construction, requires the use of plasticizers in the concrete, and does not use a standardized highway bridge design. However, another contractor

said many states tie bridge beams, the cost of plasticizers is minimal and is not a requirement, and no midwestern state uses a standardized bridge design.

IDOT data also showed that the average cost of all types of structural concrete, including items such as box culverts and foundations, was $422 per cubic yard. Even at $422 per cubic yard, Illinois' structural concrete costs were 41 percent higher than the three-state average for concrete superstructure ($299.81).

Exhibit 2-7B
OTHER TYPES OF STRUCTURAL CONCRETE
(including substructure)



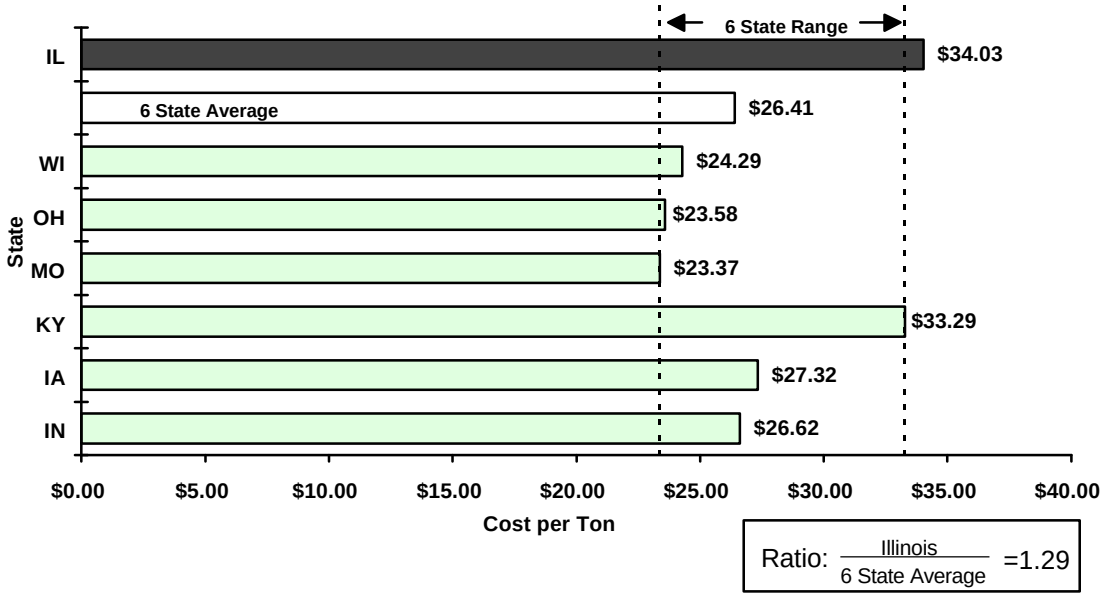
Note: Unit costs for Iowa and Missouri exclude parapet costs; Missouri also excludes sidewalk costs. Kentucky excludes the cost of protective shields. Conversely, Illinois unit cost does not include admixtures whereas the Iowa unit cost does. Also, Illinois unit cost does not include QC/QA whereas Kentucky unit cost does.

Source: OAG analysis of IDOT and other states data

Asphalt Surface Course

Exhibit 2-8 shows that Illinois paid almost 30 percent more on average for a ton of asphalt surface course than the other six states surveyed. Surface course is the top layer of pavement. States use different qualities of surface course depending on factors such as traffic volumes and friction requirements. The type of surface course reported for Illinois with the highest dollar amount purchased in calendar year 1996 was for medium volume traffic. The average cost of surface course for all six midwestern states surveyed was $26.41. A comparable grade of asphalt surface course was substituted for Missouri and Kentucky to help ensure comparability with Illinois and the other states. In 1996, Illinois paid a total of $32.1 million for 941,807 tons of this type of asphalt surface course. Even when Illinois' lesser quality mixes are compared to the medium or high volume mixes shown in Exhibit 2-8, Illinois' asphalt is still considerably more expensive.

Exhibit 2-8
ASPHALT SURFACE COURSE



Note: Unit costs for Missouri and Wisconsin exclude asphalt certification costs (about $1.00 per ton in Illinois). Also, Wisconsin unit costs for surface course asphalt exclude QC/QA (estimated at $1 - $2 per ton). Conversely, Illinois unit costs do not include anti-strip costs whereas Kentucky and Missouri unit costs do (estimated by IDOT at about $0.65 per ton).

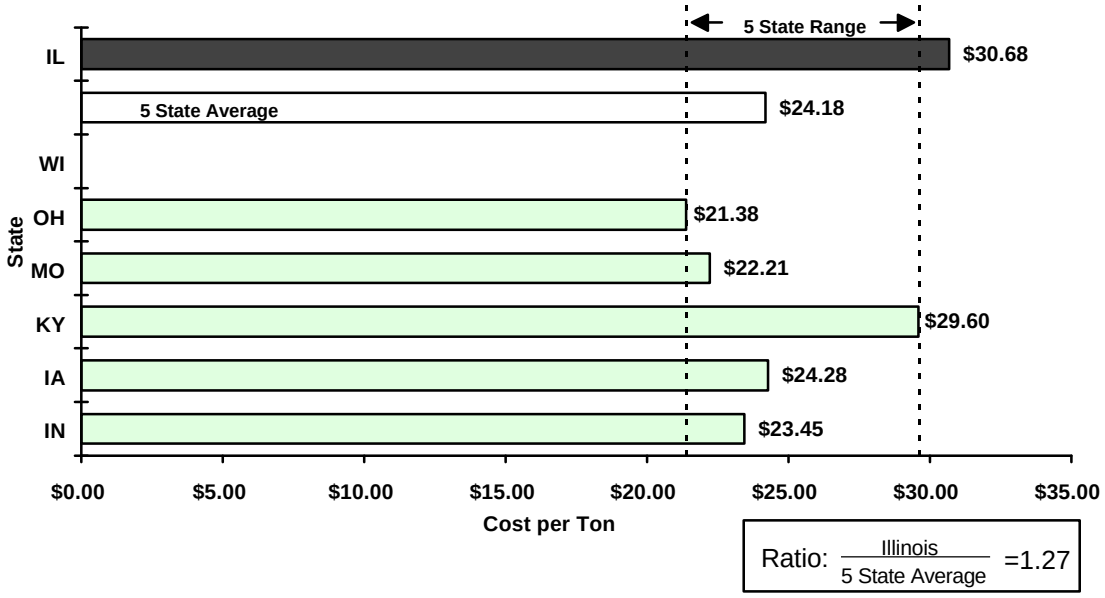
Source: OAG analysis of IDOT and other states data

Asphalt Binder Course

Binder course is a type of asphalt used below the surface course layer of asphalt and does not come into contact with tires. Some states such as Wisconsin do not have a separate pay item for binder course, but they include it within their base or surface course pay items.

As with surface course, Illinois' average unit cost for binder course ($30.68) was 27 percent higher than the average unit cost paid in other midwestern states ($24.18). In 1996, Illinois paid a total of $7.6 million for 247,610 tons of this type of asphalt binder course. Illinois' cost for binder course was $1.08 per ton higher than the next lowest priced state in our review (Kentucky: $29.60) and over $9.00 per ton higher than the lowest priced state (Ohio: $21.38).

Exhibit 2-9
ASPHALT BINDER COURSE



Note: Unit costs for Missouri exclude asphalt certification costs (about $1.00 per ton in Illinois). Conversely, Illinois' unit costs do not include anti-strip costs whereas Kentucky and Missouri unit costs do (estimated by IDOT at about $0.65 per ton).

Source: OAG analysis of IDOT and other states data

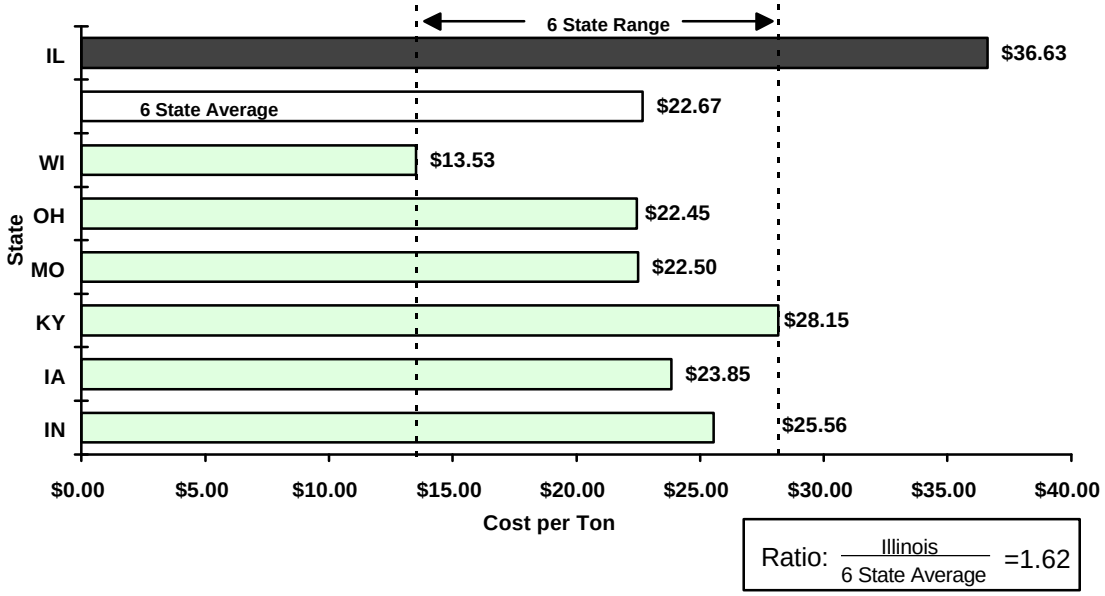
Asphalt Base Course

Exhibit 2-10 shows that Illinois' $36.63 per ton cost for asphalt base course is 62 percent higher than the $22.67 average cost per ton for other midwestern states. In 1996, Illinois paid a total of $2.6 million for 72,193 tons of this type of asphalt base course. Illinois' cost was over $8.00 per ton higher than the next lowest priced state in our review (Kentucky: $28.15) and over $23.00 per ton higher than the lowest priced state (Wisconsin: $13.53). In Illinois, base course was the most expensive of the three asphalt mixes reviewed. In none of the other six states examined was base course the most expensive mix.

IDOT tracks base course by depth in square yards. The most used pay item for base course is presented in Exhibit 2-10 and has been converted to tons. According to IDOT officials, IDOT uses the base course pay item presented in Exhibit 2-10 to classify the construction and removal of temporary roads used to reroute traffic during road construction. Thus, IDOT's unit price for this type of base course includes the cost of both building and removing temporary roads. However, IDOT has pay item categories for temporary roads and temporary pavement which it could use in these instances instead of the base course category.

IDOT also provided us with an analysis of their top 15 base course jobs for 1996. These jobs were for varying depths of base course. Three of the 15 jobs indicated the base course was used for some type of temporary road. Other examples of how base course was used included paving side streets and constructing a median.

Exhibit 2-10
ASPHALT BASE COURSE



Note: Illinois uses base course asphalt primarily for temporary roads, side streets, or detour roads which can be a more costly use than new construction, according to IDOT.

Source: OAG analysis of IDOT and other states data

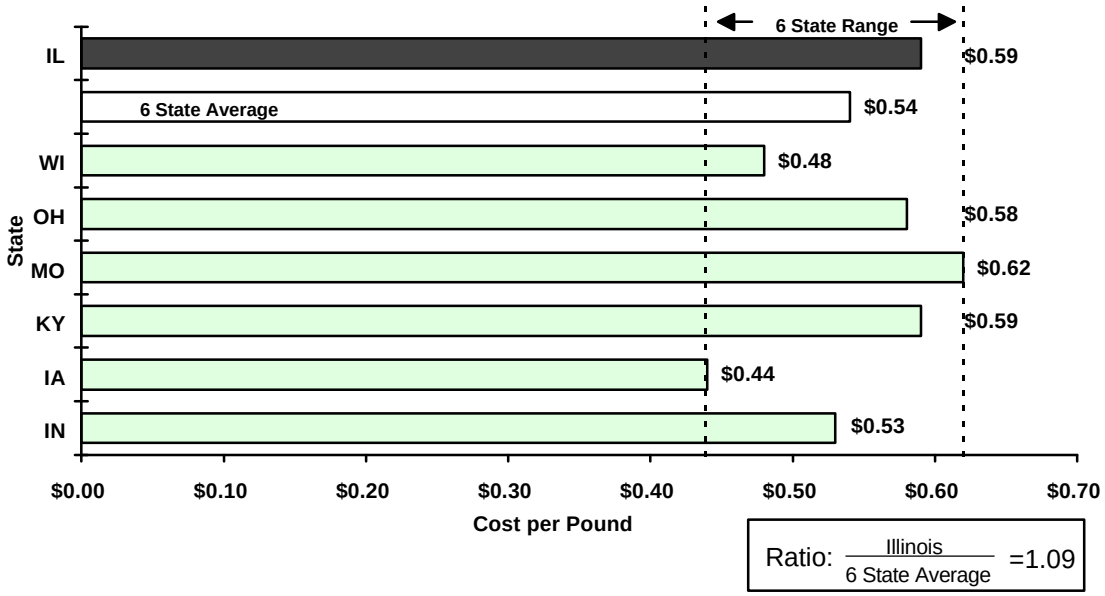
Reinforcing Steel (Plain and Epoxy Coated)

IDOT paid higher average prices for reinforcing steel compared to the average for other midwestern states, although for both types of reinforcing steel IDOT's average unit cost was within the range of costs in other midwestern states. Exhibit 2-11 shows that the average cost for plain reinforcing steel in other midwestern states was $.54 per pound, and $.59 per pound in Illinois. Exhibit 2-12 shows that the cost of epoxy coated reinforcing steel in Illinois was $.66 per pound while the average for other midwestern states was $.58. IDOT paid as much or more for both types of reinforcing steel than all other midwestern states except Missouri. In 1996, Illinois paid a total of $2.5 million for 4.3 million pounds of plain reinforcing steel and $14 million for 21.1 million pounds of epoxy coated reinforcing steel.

Reinforcing steel is generally used to reinforce concrete structures or pavements. Although there are different grades for this material, the grade of steel does not significantly affect the unit cost. IDOT

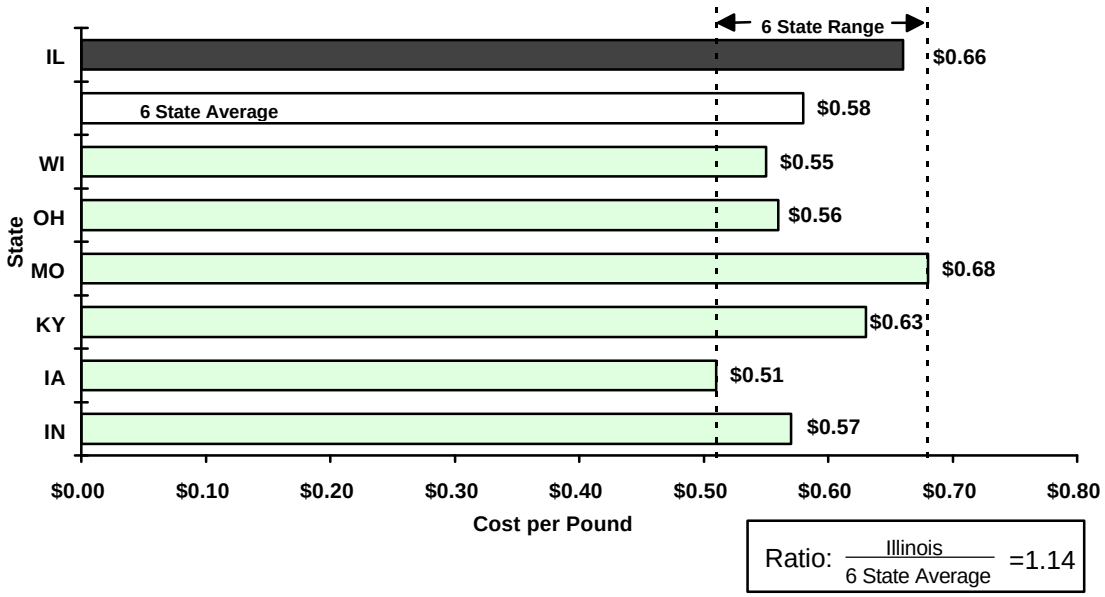
officials stated that different grades of steel affect the price of reinforcing steel by only a penny or two per pound.

Exhibit 2-11
REINFORCING STEEL - PLAIN



Source: OAG analysis of IDOT and other states data

Exhibit 2-12
REINFORCING STEEL - EPOXY

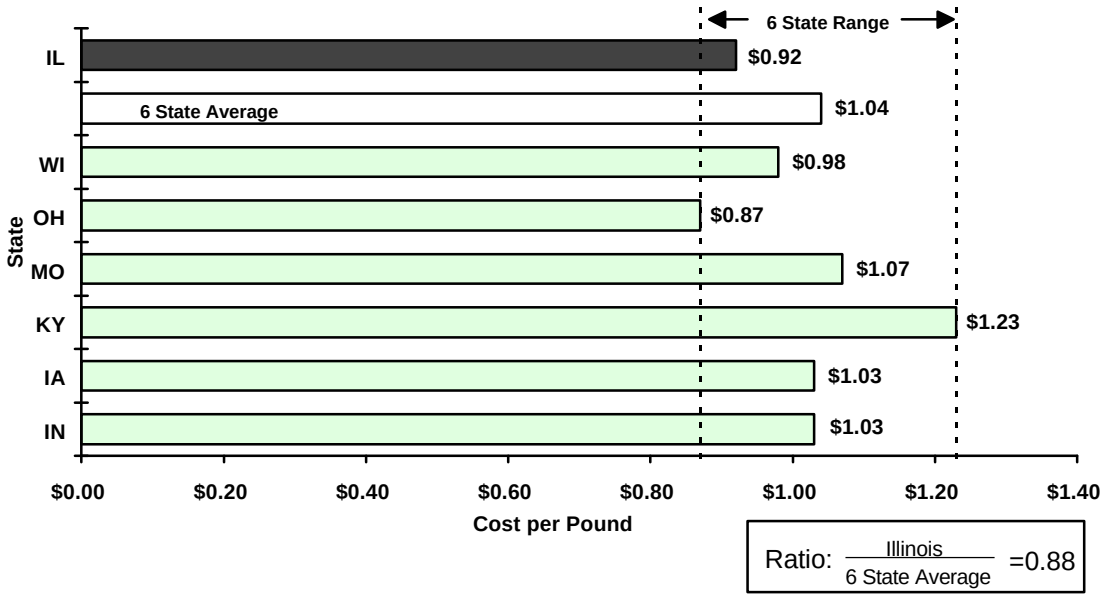


Source: OAG analysis of IDOT and other states data

Structural Steel

Structural steel is used to build bridges and, as with reinforcing steel, may vary somewhat in grade. All states include the cost of furnishing and erecting the steel in their unit costs. Exhibit 2-13 shows that Illinois paid less for structural steel than five of the six other midwestern states we reviewed. For 1996 contracts, IDOT's average price for structural steel ($0.92) was 12 percent less than the average price of $1.04 paid in other midwestern states. The price per pound of structural steel in other midwestern states ranged from $1.23 to $0.87. In 1996, Illinois paid a total of $28.7 million for 31 million pounds of structural steel.

Exhibit 2-13
STRUCTURAL STEEL



Source: OAG analysis of IDOT and other states data

Grouped Project Cost Comparisons

In addition to comparing statewide averages for roadbuilding materials, projects that were generally awarded in calendar year 1996 were chosen from other midwestern states to compare to projects awarded in Illinois. Projects were selected based on the size, type of road, and location. When conducting the comparisons, other factors were included such as the quantity of each material used on the project and the specific type of construction.

The project comparisons between Illinois and other midwestern states concentrate on three roadbuilding materials: excavation, asphalt surface course, and epoxy coated reinforcing steel. For these materials, we found that the project comparisons generally supported the same cost trends that were identified in the comparisons among states presented previously in this chapter.

Asphalt Resurfacing Projects

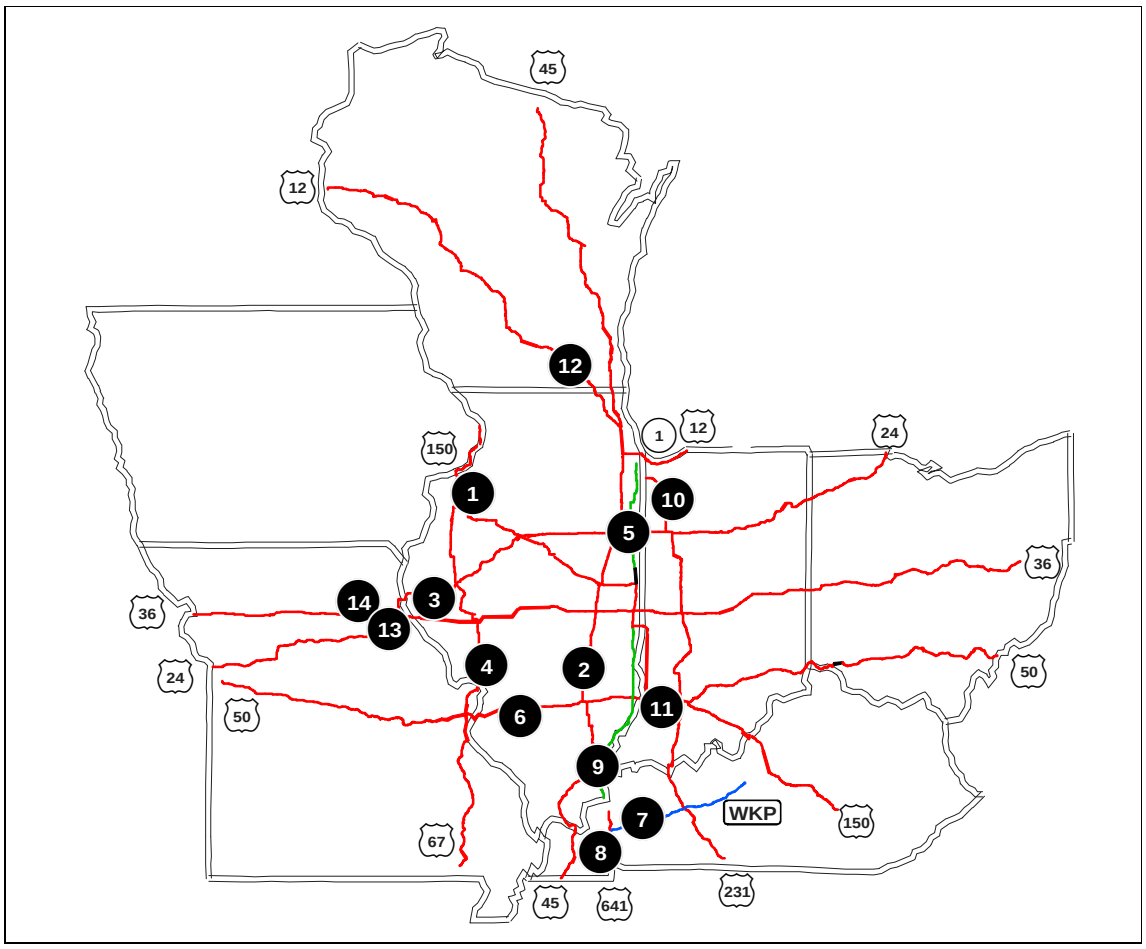
Many of the projects we sampled from other states involved asphalt resurfacing on interstate or non-interstate highways. Exhibit 2-14 shows that even when controlling for such factors as type of road (interstate or non-interstate), type of project (resurfacing, rehabilitation, widening, new construction, or bridge), area of project (urban or rural), and size of project, IDOT paid more per ton for asphalt surface course than other midwestern states. All of the projects shown in Exhibit 2-14 were for asphalt resurfacing projects on rural, non-interstate roads.

The costs in Exhibit 2-14 range from $21.80 for a large quantity purchase by Missouri to $40.19 for a smaller quantity purchase by IDOT. However, IDOT paid significantly more than other midwestern states for asphalt surface course even when the size of project is controlled for. Seven of the 14 various-sized projects shown in Exhibit 2-14 are IDOT projects, and six of the seven IDOT projects had a higher unit cost than the other seven projects from other states.

Exhibit 2-14

COST OF ASPHALT SURFACE COURSE

(for rural non-interstate resurfacing projects)



#	State	Highway	County	Tons	Cost per Ton
1	**IL**	**US 150**	**Knox/Henry**	**8,155**	**$40.19**
2	**IL**	**US 45**	**Effingham**	**5,534**	**$38.36**
3	**IL**	**US 24**	**Adams**	**7,127**	**$37.95**
4	**IL**	**US 67/IL 111**	**Macoupin**	**12,566**	**$36.81**
5	**IL**	**US 24**	**Iroquois**	**9,351**	**$36.75**
6	**IL**	**US 50**	**Clinton**	**6,951**	**$35.10**
7	KY	WKP*	Hopkins	5,168	$32.44
8	KY	US 641	Calloway	7,141	$32.00
9	**IL**	**IL 1**	**Gallatin**	**15,489**	**$29.21**
10	IN	US 231	Porter/Jasper	3,803	$29.03
11	IN	US 50	Daviees	2,720	$28.75
12	WI	US 12	Walworth	41,856	$25.06
13	MO	US 24	Marion	3,646	$24.80
14	MO	US 36	Shelby	34,276	$21.80

* Western Kentucky Parkway

Source: OAG analysis of IDOT and other state data

Epoxy Coated Reinforcing Steel Projects

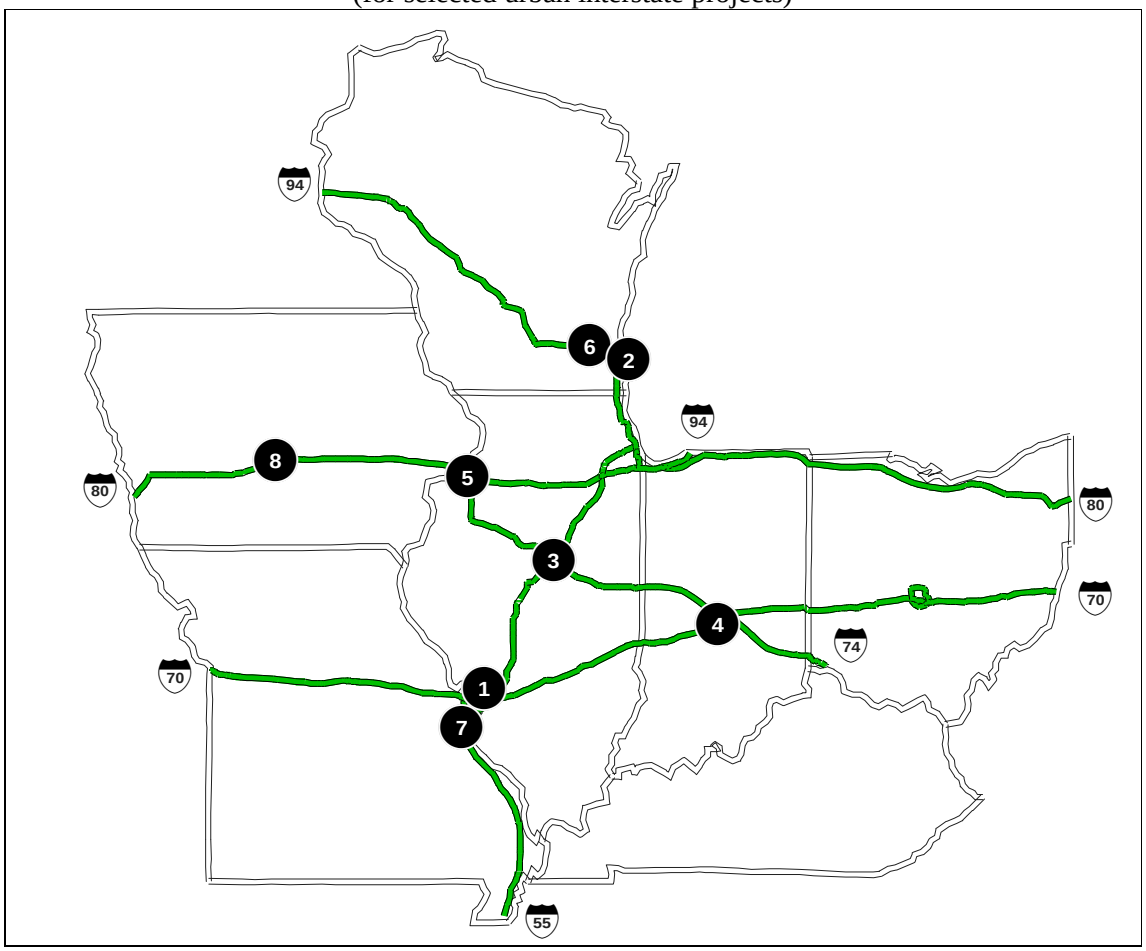
Although fewer projects selected for comparison in Illinois and other midwestern states used epoxy coated reinforcing steel than asphalt surface course, we were able to compare rehabilitation/reconstruction projects and bridge projects for Illinois and some other midwestern states. Exhibit 2-15 shows that for these selected projects, Illinois paid a higher unit price for epoxy coated reinforcing steel than projects in three other states (Wisconsin, Missouri, and Indiana) with comparable urban interstate rehabilitation/reconstruction projects and bridge projects.

Although unit prices generally decrease as the quantity purchased increases, the data in Exhibit 2-15 suggest that Illinois pays more for epoxy coated reinforcing steel regardless of quantity. For example, Wisconsin paid less ($0.47) per pound for 640,182 pounds than Illinois paid ($0.79) for a smaller quantity (263,880 pounds). In addition, Wisconsin paid less ($0.60) per pound for 21,180 pounds than Illinois paid for a larger quantity (263,880 pounds).

Exhibit 2-15

COST OF EPOXY COATED REINFORCING STEEL

(for selected urban interstate projects)



#	State	Highway	County	Pounds	Cost per Pound
1	**IL**	**I-270**	**Madison**	**1,177,640**	**$0.79**
2	WI	I-94	Milwaukee	640,182	$0.47
3	**IL**	**I-55/74**	**McLean**	**263,880**	**$0.79**
4	IN	I-70	Marion	156,370	$0.56
5	**IL**	**I-74/80/280**	**Henry**	**63,760**	**$1.00**
6	WI	I-94	Milwaukee	21,180	$0.60
7	MO	I-55	St. Louis	7,080	$0.77
8	IA	I-80	Polk	6,304	$1.00

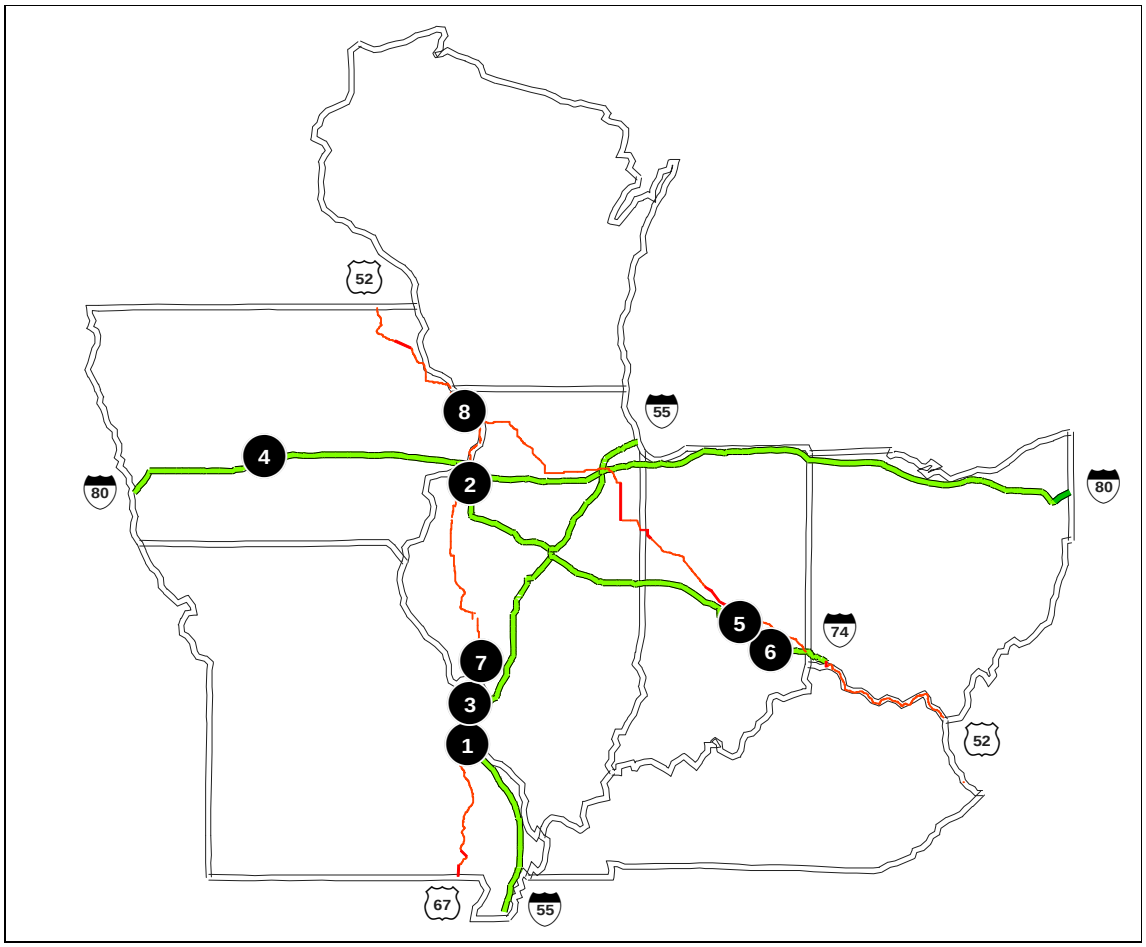
Source: OAG analysis of IDOT and other state data

Excavation Projects

The cost for excavation varies widely among Illinois and other states. Exhibit 2-16 shows 8 projects sampled that had large quantities of excavation for Illinois and other midwestern states. The exhibit shows that of projects selected Illinois had the project with the single largest amount of excavation. The exhibit also shows that Indiana paid the same or more for the unit cost of excavation, while others like Iowa and Missouri paid less.

Exhibit 2-16

COMPARISON OF LARGE QUANTITY EXCAVATION PROJECTS IN MIDWESTERN STATES REVIEWED



#	State	Highway	Project Type	County	Urban/ Rural	Cubic Yards	Cost per Cubic Yard
1	MO	I-55	Rehabilitation	Jefferson	U	52,648	$3.82
2	**IL**	**I-280/80/74**	**Reconstruction**	**Henry**	**U**	**158,193**	**$3.80**
3	MO	I-55	Reconstruction	St. Louis	U	85,457	$3.20
4	IA	I-80	Rehabilitation	Polk	U	45,991	$2.10
5	IN	I-74	Rehabilitation	Shelby	R	130,057	$6.12
6	IN	I-74	Reconstruction	Decatur	R	60,695	$4.50
7	**IL**	**US 67**	**Resurfacing**	Macoupin	**R**	**69,686**	**$6.69**
8	IA	US 52	Widen/Resurface	Jackson	R	87,681	$2.70

Source: OAG analysis of IDOT and other state data

Individual Project Cost Comparisons

The final type of comparison conducted to assess the cost of roadbuilding materials in Illinois in relation to those of other midwestern states was an individual project comparison. For this comparison, projects in other states and Illinois were selected based on their comparability in terms of size and road type. Projects in other states were also selected based on their proximity to Illinois. For Ohio, project proximity to Illinois could not be used. The two materials compared were asphalt surface course and epoxy coated reinforcing steel. These comparisons generally show the same pattern of higher unit costs for IDOT projects.

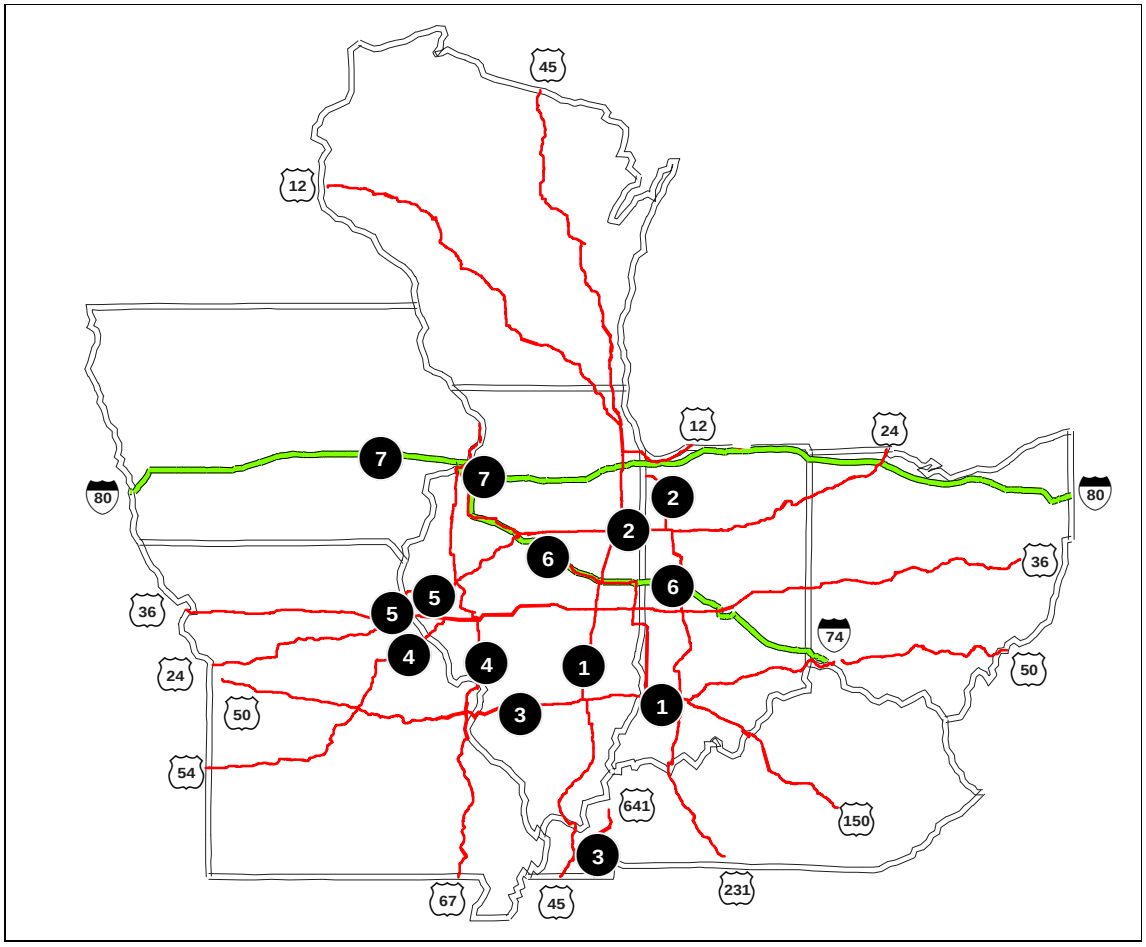
The Illinois projects in Exhibit 2-17 were matched with other states' projects controlling for project type, road type, rural or urban location, and quantity of material used. We also compared the class of asphalt used on these projects. In four of seven comparisons, a similar class of asphalt was used by Illinois and the comparison state. In all of the four comparisons, Illinois' costs were higher (numbers 2, 3, 4, 5). In one of the seven comparisons (number 1), the comparison state used a lower class of asphalt than did Illinois. In the remaining comparisons (numbers 6 and 7), the comparison state used a higher class of asphalt than Illinois. In comparison number 6, Illinois' cost was less than the other state's cost, but in comparison number 7, Illinois paid $0.40 more per ton for a lower class of asphalt.

Exhibit 2-17 shows that Illinois generally paid more for asphalt surface course when compared to projects in other states. In comparisons 1 and 2 the quantity in the Illinois project is at least double the quantity in the other state project, but Illinois still paid at least $7.72 more per ton. In comparison 5, Illinois' quantity is almost double Missouri's quantity, but Illinois paid over $13.00 more per ton. These two projects were both on U.S. Route 24 in bordering counties.

Exhibit 2-18 shows project comparisons between Illinois and other states for epoxy coated reinforcing bars. The comparisons within the exhibit are ordered first by type of project, then by type of road, and finally by whether the projects occurred in rural or urban areas. This exhibit shows that in all four comparisons, Illinois paid more for reinforcing bars.

Exhibit 2-17

PROJECT COMPARISONS BETWEEN ILLINOIS AND OTHER STATES FOR ASPHALT SURFACE COURSE

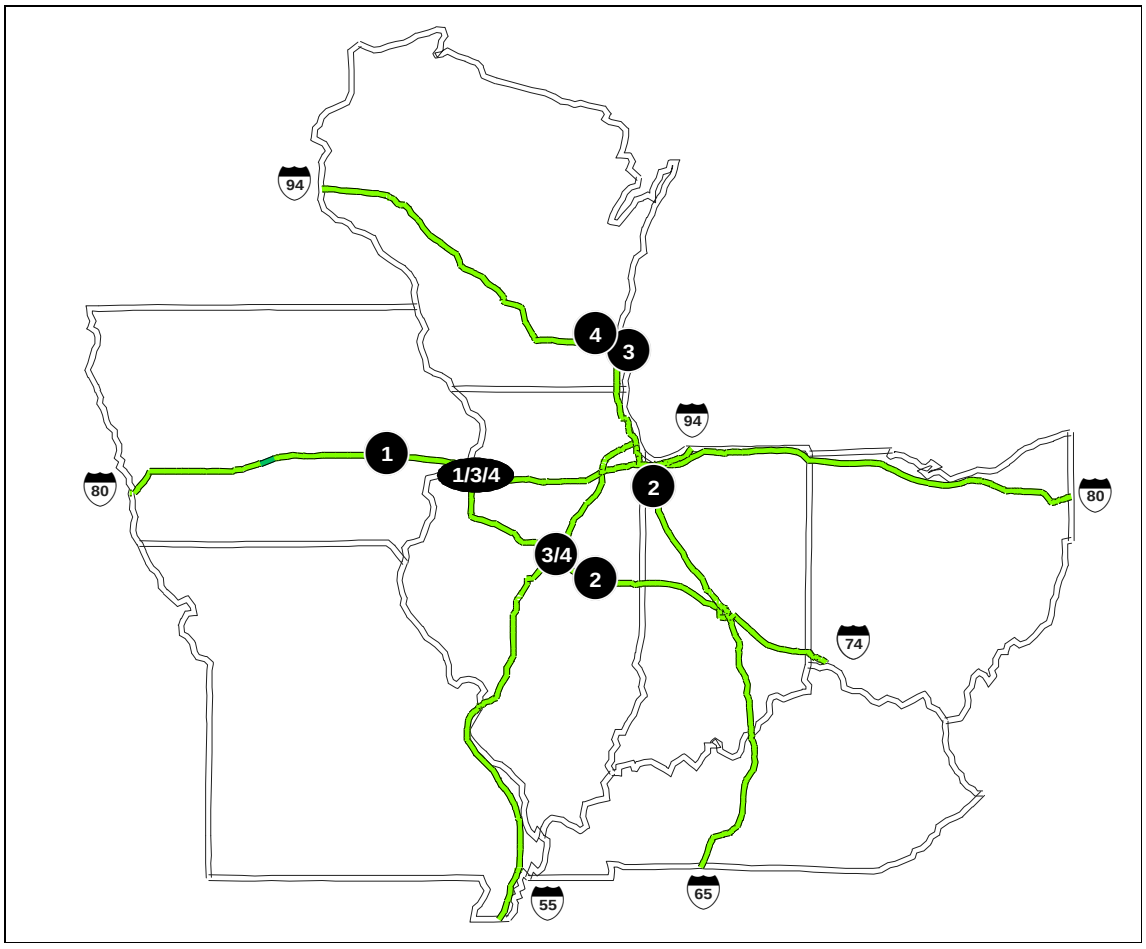


#	State	Highway	County	Tons	Cost per Ton
1	IL	US 45	Effingham	5,534	$38.36
	IN	US 50	Daviees	2,720	$28.75
2	IL	US 24	Iroquois	9,351	$36.75
	IN	US 231	Porter/Jasper	3,803	$29.03
3	IL	US 50	Clinton	6,951	$35.10
	KY	US 641	Calloway	7,141	$32.00
4	IL	US 67/IL 111	Macoupin	12,566	$36.81
	MO	US 54	Pike	13,530	$20.05
5	IL	US 24	Adams	7,127	$37.95
	MO	US 24	Marion	3,646	$24.80
6	IL	I-74	McLean	15,617	$26.54
	IN	I-74	Montgomery	22,610	$32.48
7	IL	I-74/80/280	Henry	3,966	$36.90
	IA	I-80	Johnson	2,124	$36.50

Source: OAG analysis of Illinois and other state projects

Exhibit 2-18

PROJECT COMPARISON BETWEEN ILLINOIS AND OTHER STATES FOR EPOXY COATED REINFORCING STEEL



#	State	Project Type	Highway	County	Rural/ Urban	Pounds	Cost per Pound
1	IL	reconstruction	I-74/80/280	Henry	U	63,760	$1.00
	IA	reconstruction	I-80	Johnson	R	3,114	$0.70
2	IL	bridge replacement	I-74	Champaign	R	388,030	$0.67
	IN	bridge rehabilitation	I-65	Lake	R	114,936	$0.59
3	IL	reconstruction	I-74/80/280	Henry	U	63,760	$1.00
	IL	reconstruction	I-55/74	McLean	U	263,880	$0.79
	WI	rehabilitation	I-94	Milwaukee	U	21,180	$0.60
4	IL	reconstruction	I-74/80/280	Henry	U	63,760	$1.00
	IL	reconstruction	I-55/74	McLean	U	263,880	$0.79
	WI	rehabilitation	I-94	Milwaukee	U	640,182	$0.47

Source: OAG analysis of IDOT and other state data

REASONS FOR VARIANCES IN ROADBUILDING MATERIAL COSTS

Chapter Three

CHAPTER CONCLUSIONS

Many factors can contribute to differences between the cost of road construction pay items in Illinois and other midwestern states. IDOT has limited control over some factors, and these are examined in this chapter. Chapter Four addresses the issue of competition for road contracts and the effect of single bids on costs. Chapter Five addresses other issues related to procurement over which IDOT has control.

IDOT generally paid more for road construction items than other midwestern states reviewed. We asked IDOT officials to identify factors that could account for significant differences in costs paid by Illinois for construction pay items as compared to the other states. IDOT provided some general information on the causes of cost differences between road construction pay items in Illinois and other midwestern states. However, to determine more specifically why IDOT's costs were higher, IDOT officials met during the audit with several road construction contractors that do business in Illinois and other states. The contractors offered various, and sometimes inconsistent, reasons for higher pay item costs in Illinois.

Factors affecting pay item unit costs include labor, the quantity and quality of material purchased, and the cost elements included within the pay item. Labor rates in Illinois for road construction were in most cases higher than in other midwestern states reviewed, based on data from the U.S. Department of Labor. In a comparison of prevailing wage rates between Illinois counties and adjacent counties in neighboring states, Illinois' labor rates for selected job classifications were as high or higher. In addition, workers compensation rates and unemployment insurance costs were generally higher in Illinois than in the other midwestern states reviewed. Further, labor laws and practices among states varied.

The quantity of the material purchased also impacted the unit cost paid for a pay item. Generally, the more material purchased, the lower the pay item's unit cost. Other factors, such as the availability of roadbuilding materials, caused cost differences between states.

Some Illinois pay items are more costly because IDOT includes costs in those items that other states do not. For example, the other states reviewed had a separate pay item for costs incurred by contractors to mobilize at the beginning of a project. Prior to 1993 Illinois had a separate pay item for mobilization; in 1993 IDOT began including mobilization in the cost of other pay items. These and other factors identified in this Chapter can have varying effects on pay item costs, depending upon the nature and composition of the pay item, the size and type of the project, and

the ways in which contractors structure their bids. The extent to which factors such as labor, materials and cost reporting practices affect cost differences between states cannot be determined because contract bids are not consistently structured to include this information.

INTRODUCTION

Road construction costs can vary due to a number of factors. According to the FHWA, specific cost factors include materials (high-quality sand and gravel, steel, cement, asphalt), environmental factors (freeze/thaw, moisture, natural drainage of underlying soils), labor market, traffic demands, and type of construction (new construction, reconstruction, rehabilitation). All of these factors can vary between states and within the same state, which cause differences in cost. However, not all of these factors affect the cost of individual pay items. Rather, they may just affect the overall cost of the project.

Some cost factors are endemic to Illinois and may be beyond IDOT's control. This Chapter discusses those cost variables. There are, however, other factors that affect road construction costs which IDOT can address. Those factors, and related recommendations, are addressed in Chapters Four and Five.

ROADBUILDING LABOR COSTS

In most cases, Illinois had higher labor rates for road construction than other midwestern states we reviewed. As discussed earlier, the unit cost paid by IDOT for a particular pay item is comprised of many components, one of which is labor. In the asphalt pay item cited, IDOT estimated that labor accounted for at least 19 percent of the total unit cost for a ton of asphalt.

The proportion of total unit costs comprised by labor varies from pay item to pay item. While IDOT estimates how much labor is associated with a particular pay item as part of its project cost estimation process, IDOT officials stated they did not know what the actual labor component was for the various pay items. According to one IDOT contractor, the labor component for the various pay items ranged from 10 to 70 percent of the total pay item cost. IDOT's project cost estimation process is examined in Chapter Five.

Statewide Wage Data

The U. S. Department of Labor's Bureau of Labor Statistics (BLS) wage information for state highway and street construction showed that Illinois' labor costs related to roadbuilding were generally higher than the other states examined. The BLS information is derived from employment reports employers file with the state agency responsible for administering the state's unemployment program. Exhibit 3-1 summarizes the average weekly wage rates for highway and street construction for Illinois and the six comparison states.

Exhibit 3-1
AVERAGE WEEKLY WAGE HIGHWAY AND STREET CONSTRUCTION
1996

State	Average Weekly Wage
Kentucky	$ 642
Iowa	$ 661
Missouri	$ 747
Ohio	$ 783
Indiana	$ 809
Wisconsin	$ 945
Average	**$ 765**
Illinois	**$ 907**

Source: U.S. Bureau of Labor Statistics

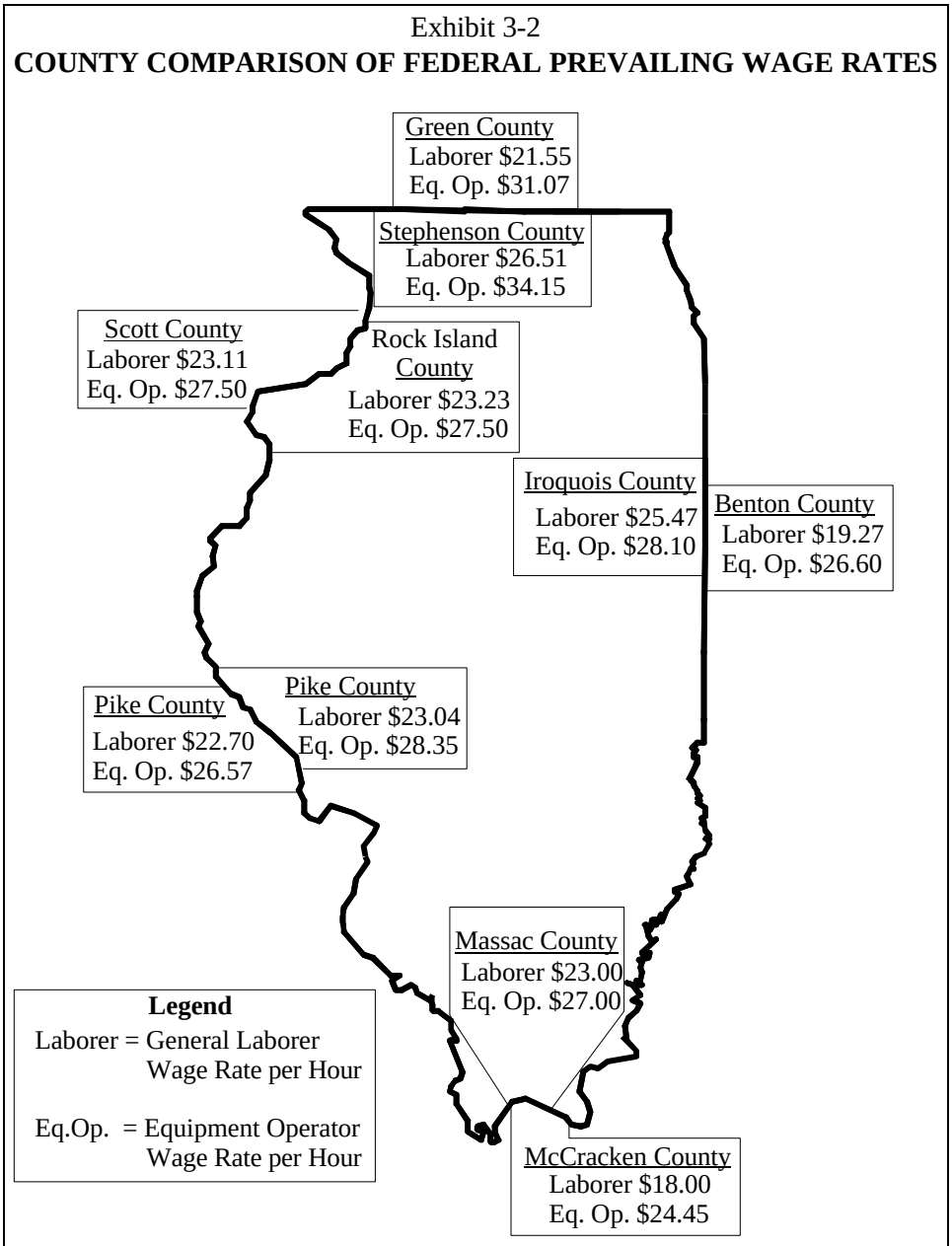
As Exhibit 3-1 shows, Illinois' average weekly wage for highway and street construction workers was $907, as compared with the average rate of $765 for the other six states, or 19 percent higher. Only Wisconsin had an average weekly wage higher than Illinois. One possible explanation for Wisconsin's higher wage rate is that due to a shorter construction season, road construction workers may work more overtime for which they receive a higher level of compensation.

Occupational Wage Data

The U.S. Department of Labor compiles prevailing wage information for many different occupations. The federal prevailing wage information is generally reported by county. On federally-funded construction projects, states must pay federal prevailing wages.

We identified two highway construction classifications for which we obtained the latest comparable data in Illinois and the six comparison states. These classifications were highway laborer and asphalt equipment operator. We selected five counties in Illinois, one which bordered each of the five neighboring states. We then selected the adjacent county in the bordering state and compared the wage costs.

Exhibit 3-2
COUNTY COMPARISON OF FEDERAL PREVAILING WAGE RATES



Source: OAG analysis of Bureau of Labor Statistics Data

As Exhibit 3-2 shows, in all county comparisons, Illinois' labor costs (labor rates and fringes) were as high or higher than those in the adjacent county in the other state. The comparison between Rock Island County in Illinois and Scott County in Iowa yielded the closest labor costs: Illinois was 1 percent higher for the laborer classification; the equipment operator costs were the same. Large differences were found in the laborer rates between Iroquois County (32 percent higher), Massac

County (28 percent higher), Stephenson County (23 percent higher) and their respective other states' comparison counties. Less pronounced differences were found in the equipment operator comparisons.

We also compared the federal prevailing wage rates in Cook County with those of other states' counties which have large metropolitan populations. In all instances, Cook County had higher labor rates than the other states' counties. As Exhibit 3-3 shows, Cook County's rates were higher than the average for the other six states' counties: 33 percent higher for laborer ($27.80 for Cook County v. $20.96 for the other states' metropolitan areas) and 26 percent higher for equipment operator ($34.70 for Cook County v. $27.48 for the other states' metropolitan areas). The variances ranged from a 10 percent difference for the laborer costs between Cook County and St. Louis/St. Louis County in Missouri to a 73 percent difference for the laborer costs between Cook County and Polk County, Iowa.

Exhibit 3-3
FEDERAL PREVAILING WAGES FOR HIGHWAY CONSTRUCTION
Midwest Metropolitan Counties for 1996

County	Laborer Rate	Equipment Operator Rate
St. Louis, MO (St. Louis)	$25.21	$30.08
Cuyahoga, OH (Cleveland)	$23.61	$29.23
Milwaukee, WI (Milwaukee)	$23.57	$31.07
Marion, IN (Indianapolis)	$19.27	$26.60
Jefferson, KY (Louisville)	$18.00	$24.45
Polk, IA (Des Moines)	$16.09	$23.42
Six State Average	**$20.96**	**$27.48**
Cook, IL (Chicago)	**$27.80**	**$34.70**

Source: OAG Analysis of Bureau of Labor Statistics data

Several Illinois laws may impact labor costs associated with road construction projects. In addition to federal law, Illinois' Prevailing Wage Act (820 ILCS 130) establishes the policy that prevailing wages be paid to all laborers and workers employed on behalf of public bodies engaged in public works. Compliance with the State Prevailing Wage Act is a requirement of IDOT contracts. While all states must follow federal prevailing wages on federally-funded contracts, states may have differing wage requirements for state projects. Some contractors noted that Illinois has more stringent time requirements for completing road construction projects, which can increase the amount of overtime wages paid to employees.

Another State law, the Employment of Illinois Workers on Public Works Act (30 ILCS 570), requires that during periods of excessive unemployment in Illinois persons charged with constructing a public works project use only Illinois laborers on such projects "Provided, that other laborers may be used when Illinois laborers . . . are not available, or are incapable of performing the particular type of work involved. . . ." The Act defines a period of excessive unemployment as any month immediately following two consecutive months during which the State's unemployment level exceeded 5 percent. IDOT contracts contain this requirement. While this provision may help limit unemployment in Illinois, it may also reduce the number of out-of-state firms bidding on Illinois projects, thereby reducing competition and increasing construction costs.

Other labor-related costs, such as workers' compensation and unemployment insurance costs, were generally higher in Illinois than in the other midwestern states we examined. For example, in two categories specifically related to road construction, Illinois' workers' compensation insurance rates were higher than the average of the other six midwestern states. For excavation, Illinois' workers' compensation rates were 14 percent higher than the average for the six other states. For steel erection, Illinois was 100 percent higher than the other states. According to IDOT estimates we reviewed, workers' compensation accounts for 11 percent of the hourly rate for workers on road projects. In addition, Illinois' average tax rate for unemployment insurance was higher than other midwestern states.

Several contractors interviewed confirmed that Illinois' workers' compensation rates resulted in higher labor-related costs than those in other states. One construction company provided an example which showed that its bid price for a project in Illinois would be 3.78 percent higher than what it would bid in Missouri for the same project, due to Illinois' higher workers' compensation rates.

Labor practices, which vary among states, and even within states, can increase construction costs. The FHWA's 1992 examination of single bid contract occurrences at IDOT concluded that Illinois was a very strong union state. Contractors were generally not permitted by union jurisdiction to move crews from one county to another.

Crew size was cited by contractors as a factor which can have a large impact on the cost of similar construction jobs. One contractor noted that union rules in Illinois have manning requirements, such as oilers on projects, which can increase labor costs. Another contractor said that because of varying union rules he may be required to have a crew size of 15 in one region and 5 in another region for the same type of job.

The percentage of the total cost of a pay item comprised by labor varies. In the unit cost example for surface course asphalt cited at the beginning of Chapter 2, labor comprised an estimated 19 percent of the total pay item cost. The average cost for a ton of surface course asphalt in Illinois was $34.03. If labor makes up 19 percent of the total cost of a ton of surface course, this would represent $6.47 of the cost. If Illinois labor costs were 20 percent higher than the other states, adjusting Illinois' labor costs to be consistent with other states would result in a reduction of $1.08, or a reduction in the unit cost for a ton of surface course asphalt from $34.03 to $32.95, which is still a 25 percent difference from the average for the six other states ($26.41).

ROADBUILDING MATERIAL COSTS

Material costs comprise the other major component of a road construction pay item. Materials include such items as crushed rock or sand (aggregate), liquid asphalt, metal reinforcing materials, and paint. As with labor, the percentage of total cost that materials comprise varies from pay item to pay item.

There are a number of factors that can affect the cost paid by a state for a particular roadbuilding material. These factors can cause variations within a state and among states.

Availability of Aggregate Materials

Aggregates such as sand, gravel, and rock are major components of road construction. Occasionally, the type of aggregate needed for a particular road is not readily available and must be transported to the job site. These transportation costs can increase the overall unit costs. For example, dolomite is considered to be a better grade of aggregate than limestone. Dolomite is predominate north of Interstate 80 in Illinois, whereas limestone is predominate south of Interstate 80. Thus, when dolomite is needed for a road in southern Illinois, it must be shipped, which may increase the cost of the project.

According to IDOT officials, most of the aggregate used in District Seven must be shipped by railroad from either Kankakee, East St. Louis, Kentucky, or Indiana. In addition, contractors who are able to provide their own supply of aggregates can typically offer lower unit costs for certain pay items.

Mix Design

IDOT has three general mixes it uses for surface course, mixtures C, D, and E. Mixture C surface course is used on low traffic roads, mixture D is used for moderate traffic roads, and mixture E is used for heavy traffic roads. Each mixture of surface course is broken down into three types. Type 1 represents the highest tier of design stability, type 2 is the second highest, and type 3 is the lowest. Exhibit 3-4 shows the average price per ton for all C, D, and E mixtures.

Exhibit 3-4
AVERAGE PRICE PER TON FOR ALL C, D, AND E ASPHALT SURFACE COURSE MIXTURES

Mixture	Tons	Dollar Amount	Average Price
C mixtures	284,041.64	$9,848,808.15	$34.67
D mixtures	1,185,111.63	$40,421,335.28	$34.11
E mixtures	288,860.30	$10,131,615.90	$35.07
Total	1,758,013.57	$60,401,759.33	$34.36

Source: OAG analysis of IDOT data.

Within these three general mixes there are hundreds of different mix designs for asphalt, and each mix design can produce some variation in cost. The specific mix design used for a project can vary depending upon where the construction is, traffic volume, and the type of road.

While states may use different mix designs for their roads, they need to comply with certain basic quality standards. Within the scope of this audit, it was not feasible to examine the hundreds of different mixes and their related performance characteristics.

Exhibit 3-4 shows that in Illinois, the type of mixture used for asphalt surface course did not appear to significantly affect the unit price for surface course. Also, our comparison of specific

IDOT projects with similar projects in other states, controlling for type and location of road (two factors that affect the mix design required), found that in most instances Illinois' costs were higher than those of other states. If, however, significant cost differences do exist because the mix designs used by IDOT are more expensive than those used by other states, then IDOT should examine whether these higher costs are justified.

EFFECT OF VOLUME ON UNIT PRICES

Material costs can vary significantly based on project size. On a large project, contractors can purchase materials at a lower unit cost than on smaller projects where less material is needed. Also, contractors can more widely distribute fixed costs over a large project than over a small project which reduces the amount of fixed cost per pay item unit. Exhibit 3-5 shows the fluctuations in unit prices and quantity of materials used for selected IDOT pay items.

Exhibit 3-5
EFFECT OF VOLUME PURCHASES ON IDOT'S AVERAGE UNIT PRICE
Calendar Year 1996

Pay Item	Unit Measure	Minimum Unit Price	Volume	Maximum Unit Price	Volume	Average Price
Earth Excavation	Cubic Yard	$0.76	1,016,582	$100.00	2	$4.24
Super-Structure Concrete	Cubic Yard	$325.00	955	$6,665.00	1	$480.45
Asphalt Surface Course	Ton	$21.04	19,050	$421.00	60	$34.03
Structural Steel	Pound	$0.64	59,701	$2.84	3,801	$0.93
Embankment	Cubic Yard	$0.30	1,019,315	$57.34	31	$3.53
Structural Concrete	Cubic Yard	$178.91	3,491	$3,650.00	2	$375.03
Portland Cement	Square Yard	$23.00	48,285	$48.78	2,097	$29.87
Reinforcing Bars, Epoxy	Pound	$0.50	177,267	$8.00	12	$0.66

Source: OAG analysis of IDOT contracts let in calendar year 1996

In Illinois and elsewhere, the quantity of a pay item purchased affects the per unit cost. Generally, for a specific pay item, the higher the quantity purchased, the lower the per unit cost. Conversely, the lower the quantity purchased, the higher the per unit cost.

Exhibit 3-6 shows how the cost of a Class D asphalt surface course pay item fluctuates at different quantity intervals. As the number of tons used increases, the average price per ton decreases. For example, when between 0 and 100 tons of asphalt surface course were used, the average cost was $111.92; but when over 10,000 tons of asphalt surface course were used, the average cost dropped to $29.93. This shows the tendency of higher quantity driving the unit cost down.

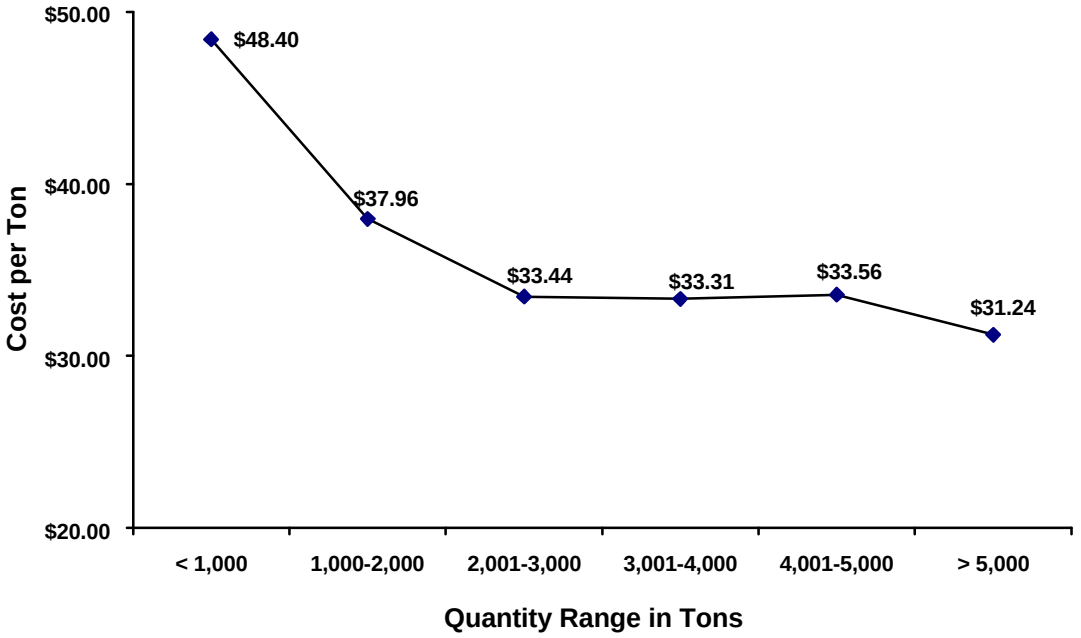
Exhibit 3-6
ASPHALT SURFACE COURSE BID PRICES FOR VARIOUS QUANTITIES
(Mix D, Type 2)

Quantity Range (Tons)	# of Contracts	Quantity (Tons)	Total Cost	Average Price/Ton
0 - 100	25	1,371.80	$153,531.75	$111.92
101 - 500	37	8,396.60	$472,749.25	$56.30
501 - 1,000	32	23,393.00	$971,407.71	$41.53
1,001 - 2,000	33	49,042.00	$1,858,837.73	$37.90
2,001 - 5,000	35	108,215.70	$3,617,514.68	$33.43
5,001 - 10,000	18	139,217.00	$4,595,807.27	$33.01
>10,000	13	186,969.20	$5,595,201.01	$29.93
Total	193	516,605.30	$17,265,049.40	$33.42

Source: OAG analysis of IDOT data

According to IDOT officials, the larger a project, the lower the marginal cost of materials used in the project, which lowers unit costs of pay items. This was generally observed to be true for pay items reviewed by the OAG for Illinois and in other states. Exhibit 3-7, which plots the information presented in Exhibit 3-6 on a line graph in quantity groups of 1,000 tons, shows how cost decreases as quantity increases.

Exhibit 3-7
AVERAGE ASPHALT PRICE BY CONTRACT QUANTITY
(Mix D, Type 2)



Source: OAG analysis of IDOT data

Illinois' median award amount for road contracts let in calendar year 1996 was about the same as the average median amount in other midwestern states. Exhibit 3-8 shows that average median award amount was $276,555 for all midwestern states and $276,473 for Illinois. Three midwestern states (Wisconsin, Ohio, Indiana) had higher median award amounts than Illinois and three had lower amounts (Missouri, Iowa, Kentucky).

Given that larger volume purchases can result in lower unit costs for road construction pay items, IDOT should examine ways when feasible to use volume purchases to increase cost savings.

Exhibit 3-8
MEDIAN AWARD AMOUNT FOR ROAD CONTRACTS
Calendar Year 1996

State	Median Award Amount
Wisconsin	$ 416,541
Ohio	$ 363,975
Indiana	$ 328,369
Missouri	$ 219,810
Iowa	$ 194,307
Kentucky	$ 136,326
6 State Average	**$ 276,555**
Illinois	**$ 276,473**

Source: OAG analysis of state data

COMPARABILITY OF PAY ITEM COSTS

States generally include the same types of costs in their pay items. There are, however, a few cost factors that can explain some of the difference between IDOT's costs and those reported by other states.

Mobilization Cost

States generally pay contractors for costs incurred in mobilizing equipment, materials, etc. for the road construction project. Other states we surveyed have a separate pay item for mobilization costs (i.e., they report mobilization as a separate cost of constructing a road). IDOT, however, does not have a separate pay item for mobilization. Rather, contractors in Illinois include mobilization costs as part of the cost of the individual pay items. Consequently, Illinois' unit prices likely include mobilization costs whereas the unit prices from the other states do not.

IDOT officials stated that they do not know in which pay items contractors include their mobilization costs. Generally, IDOT officials said contractors likely put mobilization costs in pay items for which they will be paid early in the construction project, such as excavation.

Quality Control/Quality Assurance Costs

States have established Quality Control/Quality Assurance (QC/QA) programs to help ensure that materials used in road projects meet specified quality standards. Some state transportation departments do not have QC/QA programs and, thus, no costs are passed to the contractor. Other states assign the responsibility for quality control of the contractors' production (QC) to the contractors. The assurance testing (QA) is the responsibility of the owner (state).

Some of the other states' unit costs for asphalt do not include QC/QA costs. Wisconsin reported having a separate pay item for QC/QA. Wisconsin's cost for the QC/QA pay item for asphalt mixtures in the contracts we examined ranged from $0.12 per ton for base course to $2.15 for certain surface courses.

Until the early 1990s, IDOT did not have a QC/QA program which transferred QC responsibilities to the contractor. However, according to IDOT officials, implementation of QC/QA began in the early 1990s and will be fully implemented on all asphalt projects in 1999. According to IDOT officials, because Illinois now requires contractors to bear the cost of material testing and plant certification, the cost charged by contractors for items such as asphalt has increased. The pay item component estimate for asphalt surface course provided by IDOT and shown in Chapter Two lists the cost of QC/QA as $1.23 per ton. IDOT officials estimated requiring the contractors to conduct the QC/QA program has increased by $.75 to $1.00 the cost paid by IDOT for a ton of asphalt, or about three percent**.** However, QC/QA is not currently required on all asphalt projects; therefore, it is difficult to project the actual effect of QC/QA costs on Illinois' pay items.

LEGAL REQUIREMENTS

Differences in legal requirements in the states can affect road construction costs. Environmental requirements can vary among states and even within a state. The 1992 single bid study noted that some contractors were concerned about the timeliness and expense of the permitting process. The contractors we interviewed did not identify significant differences in environmental requirements between Illinois and the other midwestern states. Two contractors we interviewed said the environmental requirements were similar; one contractor said Illinois may be slightly more strict, while another said Illinois' may be less strict than another state.

Other legal requirements which may impact roadbuilding costs which were cited by contractors included Illinois' truck weight restrictions and Disadvantaged Business Enterprise (DBE) requirements. Two contractors stated that differing DBE requirements can affect construction costs. One contractor noted that Illinois' stricter weight limits on certain roads results in the need to make more trips to haul materials, as compared to Indiana, thereby increasing the cost of Illinois' projects.

OTHER FACTORS AFFECTING PAY ITEM COSTS

There are other cost factors that IDOT has little, if any, control over. These uncontrollable factors, which can affect the cost of roadbuilding materials and a state-to-state comparison of such costs, include:

- **Environmental Factors** - IDOT officials stated that Illinois, Iowa, and Indiana have more severe freeze/thaw damage because of multiple freeze/thaw conditions each year. Northern states such as Minnesota or Michigan experience long winters that may require a different grade of materials or additives to make the pavement more resilient to the conditions. Northern states have a shorter construction season. In these states labor may cost more because of the limited amount of time the contractors have to complete the job.

- **Amount of Traffic** - The cost of road building materials may be higher in urbanized areas such as Chicago because of the logistics involved in getting the material to the job site and traffic control. In addition, routes frequently traveled by heavy trucks may require a higher quality of construction materials.

TRACKING OF PAY ITEM COSTS

The precise effect of the various factors discussed in this chapter on the cost differences between Illinois and the other states is difficult to quantify. Cost components such as labor and materials vary among pay items. Also, while IDOT estimates labor costs, material costs, and other factors when preparing a cost estimate for a project, IDOT officials did not know what the actual component costs were on specific pay items. Without this information, the extent to which factors such as labor, materials, and cost reporting practices affect cost differences between states cannot be determined.

IDOT does not have a separate pay item for mobilization. Consequently, IDOT cannot determine the cost of mobilization on a given project or the amount of cost that mobilization comprises of a particular pay item. According to IDOT officials, IDOT had a separate pay item for mobilization prior to 1993, at which time it began including mobilization in the costs of other pay items.

IDOT also has difficulties determining the cost of QC/QA because it is not required for all projects and IDOT does not track the associated costs. Obtaining more detailed information on construction costs, rather than lumping all costs into one pay item, would allow IDOT management to know what factors cause higher costs and what steps could be taken to reduce or control costs.

Inconsistent classification of road construction materials by IDOT makes the comparability of certain materials difficult. For example, IDOT officials stated that asphalt base course in Illinois is used for temporary roads and includes the cost of removing the pavement, even though IDOT has a separate pay item called “temporary pavement.” In another example, IDOT officials stated that excavation may be higher in Illinois because a large excavation project over a strip mine was contained in the average cost of common roadway excavation. It may have been more appropriate to classify such a project in an uncommon roadway excavation category. This inconsistent classification of certain materials, combined with the fact that some cost factors are not tracked, reduces the quality of information IDOT management has to track, manage, and control road construction costs.

Recommendation Number One

IDOT should develop procedures to more accurately track the associated costs for materials, such as establishing separate pay items for mobilization and QC/QA, and should consistently classify materials into the appropriate pay items category.

.....

Illinois Department of Transportation Response:

IDOT will incorporate separate pay items for mobilization and project engineering (QC/QA, contractor staking, etc.). It is anticipated this change will be incorporated into IDOT contracts let in the summer of '98.

Although we agree to implement this recommendation, IDOT does not believe this will reduce the total project cost. IDOT now advances three percent of the contract amount for mobilization to the contractor upon execution of a contract. Although IDOT does not have a separate pay item for QC/QA, contractors include this cost in various asphalt pay items. In both instances, the bottom line costs will virtually be the same with or without separating costs by creating more pay items.

CONCLUSION

This chapter has identified a number of factors that can affect the unit costs of major pay items associated with road construction projects. These factors are summarized below:

higher labor costs in Illinois - associated with prevailing wages, union contract provisions, workers compensation rates, and unemployment insurance rates;

inclusion of project mobilization costs in selected IDOT project pay items - such as excavation;

inclusion of quality assurance/quality control costs in selected IDOT materials-related pay items - such as asphalt;

selected higher IDOT materials costs - due to the need to obtain the required quality of material from a more distant source - such as aggregate; and

varying legal requirements - such as prevailing wage rules, and truck size and weight limits.

Each of these factors can have a varying effect on pay item unit costs, depending on the nature and composition of the pay item, the size of the project, and the ways in which contractors structure their bids. These factors account for some of the unit cost differences shown in Chapter 2 between Illinois and the other midwestern states surveyed. The next two chapters discuss ways IDOT may be able to reduce construction costs through its contracting process.

COMPETITION FOR ROAD CONTRACTS

Chapter Four

CHAPTER CONCLUSIONS

The amount of competition for road contracts affects construction costs. IDOT awarded about 12 percent of its road contracts to single bidders in 1996. These single bid contracts had significantly higher award amounts relative to IDOT's project cost estimates than did multiple bid contracts.

IDOT needs to increase its efforts to encourage and develop competition on road construction projects in the State. Further, IDOT needs to establish formal guidelines governing when to award or rebid roadbuilding contracts based on the number of bids received and the amount of the lowest bid relative to the estimate.

EFFECT OF COMPETITION ON ROAD CONSTRUCTION COSTS

Limited competition resulted in higher roadbuilding costs for the State. The Federal Highway Administration's (FHWA) Technical Advisory T5080.6 states that competition for projects by bidders is an integral part of a successful construction program. Competition was limited for some IDOT contracts, especially in certain IDOT districts.

Statewide Effect of Single Bid Awards

The clearest cases of limited competition was when there was only one bidder on a road construction project. In these single bid contracts, IDOT paid significantly more than in projects where there were multiple bidders.

On average, the award amount for the 889 contracts in 1996 was 9.99 percent under IDOT's estimate. However, there was a marked difference between projects receiving multiple bids and those receiving a single bid. Exhibit 4-1 shows that the 106 single bid contracts averaged .64 percent *above* IDOT's estimate and the 783 multiple bid contracts averaged 10.88 percent *below* IDOT's estimate. If single bid contracts had come in at 10.88 percent below the estimate, the total amount awarded would have been reduced by approximately $8.9 million.

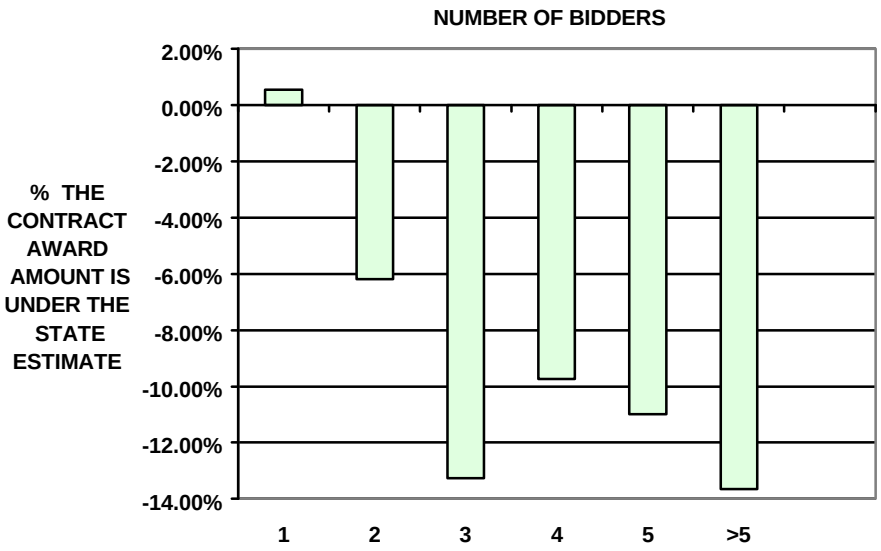
Exhibit 4-1
VARIANCE OF AWARD AMOUNT FROM ESTIMATE FOR SINGLE BID AND MULTIPLE BID CONTRACTS
Calendar Year 1996

	Contracts Awarded	Estimate Amount	Award Amount	Variance from Estimate
Single Bids	106	$ 77,194,790	$ 77, 692,326	0.64% above
Multiple Bids	783	$918,558,994	$818,596,669	10.88% below

Source: OAG analysis of IDOT data

Exhibit 4-2 illustrates that when there were three or more bidders on a road contract, the contract award amount was further under IDOT's estimate than when there was a single bidder, or even only two bidders. The median dollar amount for single bid awards was $286,611 and $275,299 for multiple bids, which shows that the median size contract for both types was comparable.

Exhibit 4-2
EFFECT OF MULTIPLE BIDDERS ON PROJECT COSTS



Source: OAG analysis of IDOT data

District Effect of Single Bid Awards

Single bid awards were concentrated regionally in Districts 3, 5, and 7, as shown on Exhibit 4-3. These Districts are located in eastern Illinois along the Indiana border. Districts 3 and 7 accounted for almost half (49 of 106) of IDOT's single bids. Single bids accounted for 24 percent

(22 of 92) of all contracts awarded in District 3, 22 percent (15 of 68) of all contracts awarded in District 5, and 36 percent (27 of 74) of all contracts awarded in District 7.

Exhibit 4-3
SINGLE BID CONTRACTS AWARDED BY IDOT
Calendar Year 1996

District	# of Single Bids	% of Total Single Bids	Total Contracts	% of Total Contracts that are Single Bids	IDOT's Total Estimated Cost	Total Amount Awarded	Variance From IDOT's Estimated Cost
1	9	8.49%	201	4.48%	$3,845,060	$3,809,997	-0.91%
2	12	11.32%	128	9.38%	$5,669,334	$5,492,685	-3.12%
3	**22**	**20.75%**	**92**	**23.91%**	**$18,897,460**	**$19,328,234**	**2.28%**
4	9	8.49%	78	11.54%	$3,299,875	$3,327,545	0.84%
5	**15**	**14.15%**	**68**	**22.06%**	**$27,415,142**	**$27,681,170**	**0.97%**
6	4	3.77%	93	4.30%	$3,795,836	$3,798,151	0.06%
7	**27**	**25.47%**	**74**	**36.49%**	**$11,804,040**	**$11,771,565**	**-0.28%**
8	6	5.66%	103	5.83%	$1,383,087	$1,406,040	1.66%
9	1	0.94%	47	2.13%	$268,036	$287,118	7.12%
Statewide	1	0.94%	5	20.00%	$816,919	$789,820	-3.32%
Totals	106	100.00%	889	11.92%	$77,194,790	$77,692,326	0.64%

Note: Totals may not add due to rounding.
Source: OAG analysis of IDOT data

Of the 106 single bid contracts, 72 (68%) involved some kind of asphalt work according to their work descriptions. Exhibit 4-4 shows how many single bid contracts in each district involved asphalt work. Districts 3, 5, and 7 accounted for 53 of the 72 single bid asphalt projects. Exhibit 4-5 is a map that shows the location of IDOT's single bid contracts for calendar year 1996. Appendix E shows the contractor name, contract number, IDOT estimate, low bidder amount, and percentage away from the estimate for each of the 106 single bid contracts.

An IDOT official stated that asphalt plant location is a major factor that drives single bids. Single bids often occur when there is only one asphalt plant in the area of a contract involving asphalt work. The official stated that there is limited competition because of the considerable cost of setting up an asphalt plant and the limited

Exhibit 4-4
IDOT'S SINGLE BID CONTRACTS INVOLVING ASPHALT
Calendar Year 1996

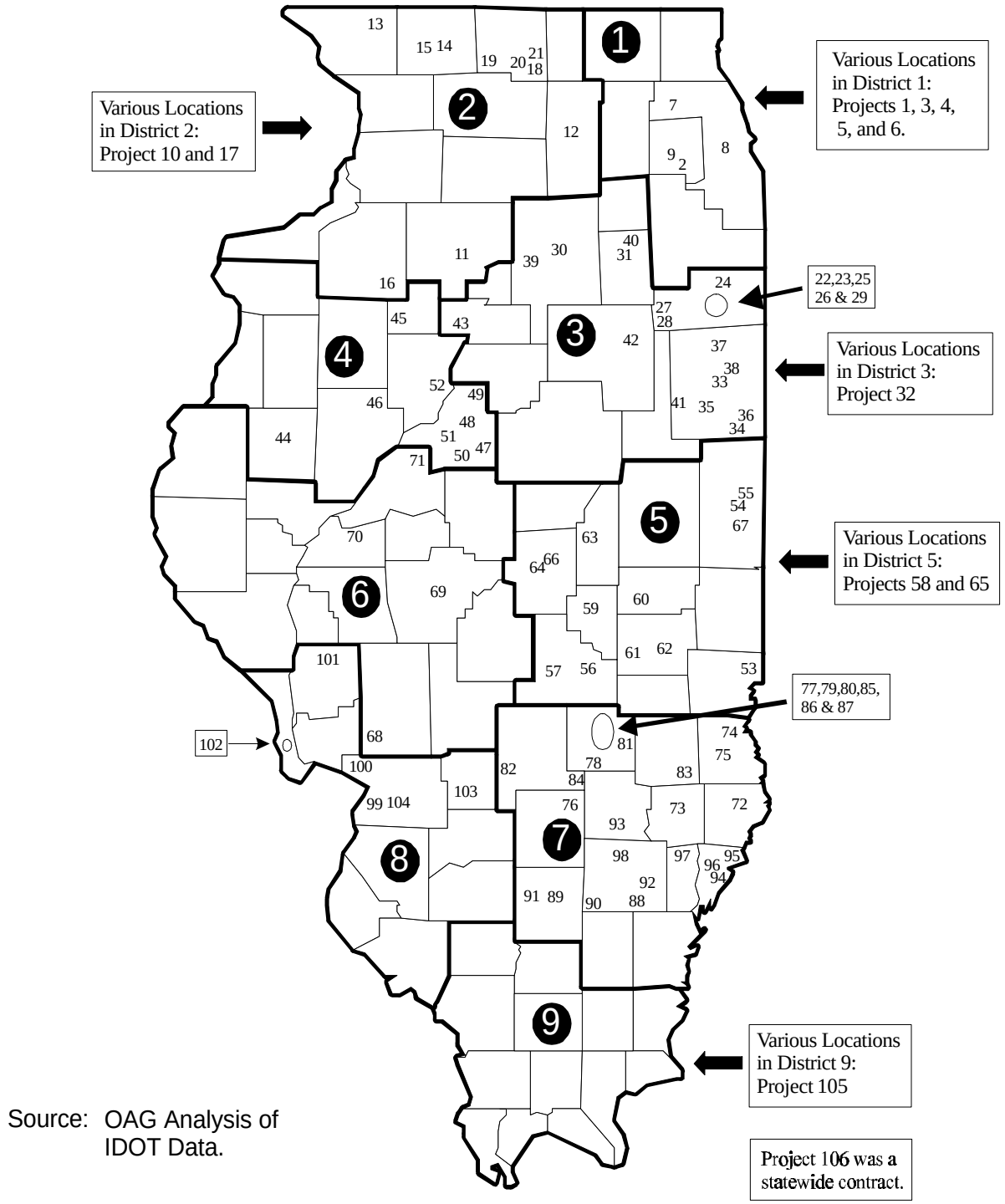
District	Single Bid Contracts	Asphalt Projects
1	9	1
2	12	9
3	**22**	**15**
4	9	3
5	**15**	**13**
6	4	3
7	**27**	**25**
8	6	3
9	1	0
Statewide	1	0
Total	**106**	**72**

Source: OAG analysis of IDOT contracts

Exhibit 4-5

MAP OF 106 SINGLE BID CONTRACT LOCATIONS

Calendar Year 1996



Source: OAG Analysis of IDOT Data.

Note: For a full listing of these 106 single bid contracts see Appendix E.

amount of work in some areas of the State. However, in some cases more than one contractor owned an asphalt plant in the area of a project, but only one contractor submitted a bid. Two examples from IDOT District Three follow:

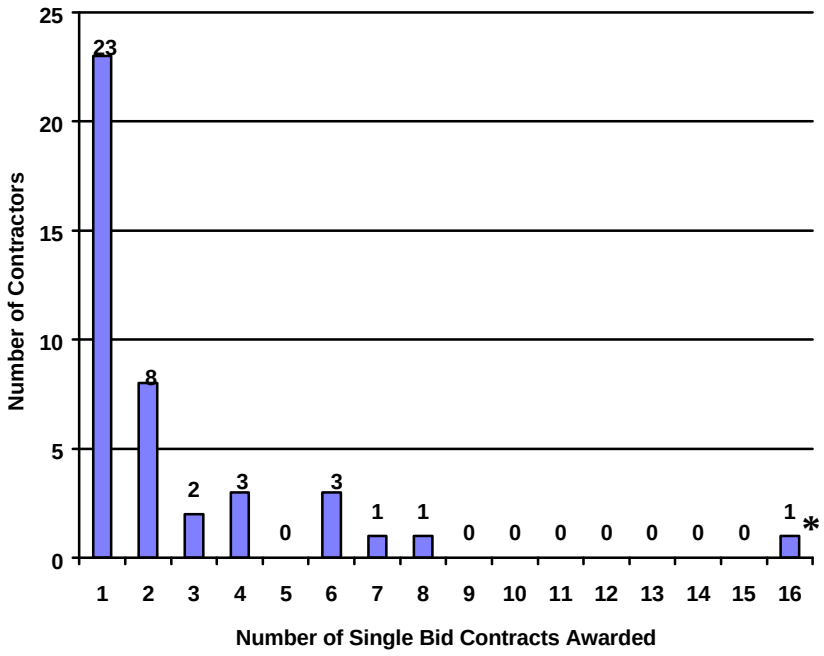
- Asphalt Project A: Two companies received authorization to bid, but only one submitted a bid. Both contractors owned asphalt plants within one mile of the project. A third contractor owned an asphalt plant approximately ten miles from the project, but did not request authorization to bid. Thus, it appears that at least three contractors could have bid on the project. The contract was awarded to the single bidder for an amount 2.8 percent ($8,538) above IDOT's estimate.

- Asphalt Project B: Again, two companies received authorization to bid, but only one made a bid. The bidding contractor owned an asphalt plant within ten miles of the project, but the non-bidding contractor did not own an asphalt plant near the project. A third contractor who was prequalified by IDOT owned an asphalt plant about one mile from the project but did not request authorization to bid on this or any other project in calendar year 1996. The contract was awarded to the single bidder for an amount 4.5 percent ($40,585) above IDOT's estimate.

Exhibit 4-6

NUMBER OF SINGLE BID CONTRACTS AWARDED TO CONTRACTORS BY IDOT

Calendar Year 1996



*An asphalt company and a paving company with generally the same corporate officers were awarded these 16 contracts; 4 went to the paving company, 1 went to the asphalt company and 11 went to joint ventures between the two firms.

Source: OAG analysis of IDOT data

Certain contractors received the majority of single bid contracts. As shown on Exhibit 4-6, 42 contractors were awarded single bid contracts in calendar year 1996. Twenty-three contractors received only one single bid contract. Ten received two or three single bid contracts. However, 9 of the 42 contractors received 4 or more single bid contracts and accounted for 61 (58%) of the 106 single bid contracts awarded. An asphalt company and a paving company with generally the

same corporate officers received 16 single bids (15 percent of all single bids awarded); 5 of these 16 single bid contracts were in District 5, and 11 were in District 7. Another contractor was awarded 8 single bid contracts, all in District 3.

Illinois' Single Bids Compared To Other States

Illinois had a lower percentage of single bid contracts than the average for all midwestern states during calendar year 1996. However, 11.9 percent of Illinois' contracts were awarded to single bidders, which was a higher percentage than four of the six other states we reviewed. The percentage of single bids ranged from over 37 percent in Kentucky to 3.9 percent in Missouri (see Exhibit 4-7).

Exhibit 4-7
SINGLE BID CONTRACTS AWARDED IN OTHER MIDWESTERN STATES
Calendar Year 1996

State	Number of Projects*	Number of Single Bids	Percentage of Single Bids
Kentucky	752	282	37.5%
Wisconsin	423	55	13.0%
Illinois	**889**	**106**	**11.9%**
Iowa	636	60	9.4%
Indiana	573	51	8.9%
Ohio	783	57	7.3%
Missouri	179	7	3.9%

*Notes: Illinois' number is for projects let and awarded; other states' numbers are for projects awarded. Wisconsin provided data for fiscal year 1996.
Source: OAG analysis of other states' data.

1992 SINGLE BID STUDY

In 1992, Illinois' Division of the Federal Highway Administration and IDOT personnel reviewed the single bid issue at IDOT. From 1987 through 1991, 18 percent of all IDOT projects were awarded to single bidders, and 70 percent of all single bid contracts involved asphalt. The study was conducted to determine the reasons why IDOT had such a large number of single bid contract occurrences and to determine what improvements, if any, could be made to increase competitiveness. The review concluded that the following factors resulted in the high occurrence of single bids:

- Difficulties facing a contractor trying to become established in an area where a strong contractor already exists. Factors restricting a contractor's work base include union practices, availability of high quality aggregate, asphalt plant mobility, environmental regulations, local zoning requirements, and statutory requirements;

- Joint ventures that reduce the competitive atmosphere;

- Requirements that contractors be prequalified in major work item categories; and

- Lack of special bidding procedures in Illinois that would increase the number of bidders.

In response to the report, IDOT agreed to implement a variety of recommendations, including not publishing the estimated cost of the job until after the bid letting, limiting joint ventures to three parties, and eliminating the requirement that a contractor be prequalified in the major work item category in order to obtain a bidding proposal. IDOT also rejected some recommendations from the report; for example, IDOT did not increase the frequency of lettings to at least once a month or liberalize certain prequalification requirements for asphalt contractors as recommended.

Since the study was completed in 1992, the percentage of projects awarded to single bidders by IDOT has decreased from the 18 percent rate cited in the 1992 report to 12 percent in 1996. Although the single bid rate has declined, there remains room for improvement.

RECOMMENDATIONS FOR STRENGTHENING COMPETITION

There are several areas where IDOT can strengthen competition on roadbuilding contracts in the State. These include developing a more proactive effort to increase the number of proposers on road projects, developing formal contract award guidelines which limit instances in which single bid contracts are awarded, and rebidding those contracts where single bids were received.

IDOT's Current Efforts to Increase Competition Are Limited

IDOT has not established a proactive program to enhance or promote competition in areas of the State where competition is limited. When IDOT officials were asked how they encourage competition, they responded that IDOT is not in the business of promoting competition and that the market place dictates competition. However, IDOT officials said they contacted a large Indiana construction firm about bidding on road projects in eastern Illinois, where competition is limited. They have also tried to solicit contractors for a few large jobs requiring special skills (for example, for the Kennedy Expressway lane reversal project, IDOT recruited a computer company that specialized in that type of work.)

The FHWA recommends that if a significant number of firms take a bidding proposal, but only a small percentage (less than 30 percent) actually submit a bid, an effort should be made to determine the reasons for the lack of interest. In 72 of the 889 contracts awarded in 1996 (8 percent), less than 30 percent of the firms who received a bid authorization actually submitted a bid. On one project, 11 contractors received a bid authorization, but only one bid was received. There were 28 other projects where four or more contractors received bid authorization but only one firm actually bid.

IDOT does not routinely contact companies that received bid authorization but did not bid. Similarly, they do not routinely contact known contractors in an area to determine why they do not bid. AASHTO notes that personal contacts after taking the bids could prove helpful in determining why certain contractors did not bid, and could help contracting agencies decide whether future jobs could be divided or combined differently to attract additional bidders.

IDOT officials many times know why a single bid was received. For example, when a project is in the immediate proximity of one contractor's asphalt plant, other contractors may choose not to bid. However, in other instances there was no clear explanation why only one bid was received.

Recommendation Number Two

The Illinois Department of Transportation should increase its efforts to encourage and develop competition on road construction projects in the State. IDOT should follow up with contractors who requested and received bid authorization, but then did not subsequently bid, to determine why they did not bid. IDOT could also routinely follow up with firms not requesting bid authorization to determine actions the State could take to get them to participate in the bidding process.

.....

Illinois Department of Transportation Response:

IDOT will follow up with contractors who requested and received bid authorization, but then did not subsequently bid beginning with the April 24, 1998 Letting. This information will be forwarded to the Director of Highways. IDOT will develop a survey form for prequalified firms that only infrequently request bid authorization to determine the reason(s) for their non-participation in the bidding process. These forms will be sent on a regular basis beginning this fall. This information will be evaluated to determine if there are actions IDOT can take to encourage them to participate. An annual summary report of the results of these surveys will be sent to the Director of Highways.

Although we agree to implement these recommendations, IDOT does not believe they will be substantive in increasing competition and lowering costs. None of the six surveyed states demonstrated efforts to increase competition beyond IDOT's efforts.

IDOT Lacks A Formal Policy To Control The Award Of Contracts

While IDOT has general guidelines which govern contract award decisions, it has not developed formal policies or procedures in this area. Generally, IDOT will award a contract if the lowest bid falls within an "awardable range" of the engineer's estimate. This guideline applies to both single and multiple bid projects. In certain instances, such as small dollar value projects, IDOT may award a contract when the lowest bid exceeds the awardable range.

The Federal Highway Administration's Technical Advisory T5080.4 provides guidance for determining the adequacy of competition for road contracts. The FHWA Advisory states that competition is considered excellent when there are six or more bids within 20 percent of the low bid. In 1996, only 15 percent (130 of 889) of the projects awarded by IDOT had 6 or more bids.

The FHWA Technical Advisory also states there is inadequate competition for single bid contracts when the single bid exceeds the engineer's estimate (see Exhibit 4-8). Of the 106 single bid contracts awarded by IDOT in 1996, 57 (54 percent) *exceeded* the IDOT estimate for the project: 35 exceeded the estimate by less than 5 percent of the estimate, 12 were between 5 and 10 percent above the estimate, and 10 were more than 10 percent above the estimate.

Exhibit 4-8
FEDERAL HIGHWAY ADMINISTRATION GUIDELINES FOR ADEQUATE COMPETITION

Number of Bids	Adequate Competition When Low Bid Does Not Exceed Estimate By:
5	20%
4	15%
3	10%
2	5%
1	0%

Note: The FWHA notes that these guidelines may not apply for projects where competition has been historically low.

Many of the single bids occurred in areas of the State where competition has been historically low, which, according to the FHWA, may exclude them from the FHWA guidelines. However, awarding contracts under any circumstances to single bidders whose bids exceed the estimate may encourage single bidders to continue to submit inflated proposals.

The FHWA suggests that most projects with inadequate bidding competition should be re-advertised with certain exceptions, such as projects to correct extremely hazardous conditions and emergency repairs. In 1996, IDOT rejected 59 of the 114 projects where the lowest bid amount exceeded the engineer's estimate by more than 5 percent; however, 55 of the 114 projects were awarded. Also in 1996, IDOT rejected 55 of the 74 where the lowest bid amount exceeded the engineer's estimate by more than 10 percent; however, 19 of the 74 projects were awarded.

IDOT realized significant savings when it rebid projects because the lowest bid exceeded the awardable range. We reviewed 43 contracts rebid in 1996, with initial low bids totaling $23.1 million. When these 43 projects were rebid, the low bids totaled $21.2 million, or a reduction of 8 percent from the original low bid. In 31 instances, the original low bidder submitted an even lower bid when the project was rebid.

All six midwestern states we surveyed issued single bid road construction contracts. However, only Iowa has adopted the FHWA guidelines and has a policy that limits single bid awards to certain circumstances.

Recommendation Number Three

IDOT should establish formal guidelines governing the award of roadbuilding contracts. Specifically, the guidelines should delineate the factors and criteria the Department will use in deciding whether to award or rebid a contract, such as the number of bidders, the size and nature of the project, and the amount that the lowest bid may exceed the engineer's estimate. Consideration should be given to formally adopting the guidelines for competition established by the FHWA, which suggest not awarding contracts to single bidders whose bid exceeds the engineer's estimate.

.....

Illinois Department of Transportation Response:

IDOT has guidelines to govern its awards committee in making decisions on awards. However, no written policies or procedures have been produced. IDOT will establish written guidelines governing the award of roadbuilding contracts that reflect the current award process and have them in effect for the June 12, 1998 Letting.

The report mentions that 43 projects were rebid by IDOT in 1996. One of the factors IDOT's award committee uses in making an awards decision is whether a rebid is likely to result in a lower or higher bid. The 43 projects looked at in this review are those which the awards committee felt would produce a lower bid if they were rebid. When these projects were rebid, the low bid averaged eight percent lower than the original low bid, yielding a savings of $1.9 million. In 31 of the 43 projects, the original low bidder submitted an even lower bid when the project was rebid. The lower bids verify the awards committee's judgment.

IDOT follows the guidelines for competition established by Federal Highway Administration in Technical Advisories T5080.4 and T5080.6 and is considered by FHWA to be in compliance with those advisories.

FHWA guidelines recognize that projects in areas of historically poor competition specifically should be reviewed independently of FHWA or any alternative guideline. IDOT will continue to try to balance the need for roadwork in an area of poor competition against the cost of awarding to a single bidder such that the best interests of the taxpayers are served.

Although we agree to implement this recommendation, IDOT does not believe it will result in lower costs.

IDOT'S POST-AWARD REVIEW PROGRAM TO IDENTIFY BIDDING IRREGULARITIES

Limited competition may occur not only due to normal market forces; it may also be the result of collusive activity among contractors. Both the FHWA and AASHTO recommend that state

transportation departments make a conscientious effort to detect patterns of bidding irregularities among contractors.

IDOT produces some management reports that monitor pay item use, show contractor activity and some which may detect irregular bidding among contractors. IDOT produces reports such as item rank analysis, item price history, and line item profile reports that show which pay items are most used, the average price, and historical bid data for individual districts.

IDOT monitors contractor activity by producing vendor market share reports that show which firms are awarded the most contracts and the highest total dollars in contracts statewide and by county.

IDOT also produces reports that may help identify irregular bidding. IDOT uses a line item profile and bid evaluation reports to identify contractors with the same unit bid prices or contractors that may be unbalancing a bid. IDOT produces low bid competition summary reports that show vendor competition in areas of the State. IDOT also produces bidder analysis reports that show by letting the number of proposals issued, bids received, and low bid amount. Although these reports are tools for identifying irregular bidding patterns, reports reviewed did not show geographical bidding patterns which are useful to detect bid rigging and rotating among contractors.

AASHTO, the United States Department of Transportation (USDOT), and the United States Department of Justice provide guidance on how bidding results may indicate collusive activity. One indicator that contractors may be colluding or rigging bids is when a particular contractor regularly wins in a certain geographic area. Our review of single bids showed that asphalt companies that received four or more single bids tended to be in certain areas of the State. Exhibit 4-9 shows the locations of single bids for asphalt companies that received four or more single bid contracts in 1996. It is possible that single bids were concentrated in certain areas due to normal market forces or because of labor practices which, according to the FHWA single bid report, require contractors use construction workers from within the county where the road is being constructed.

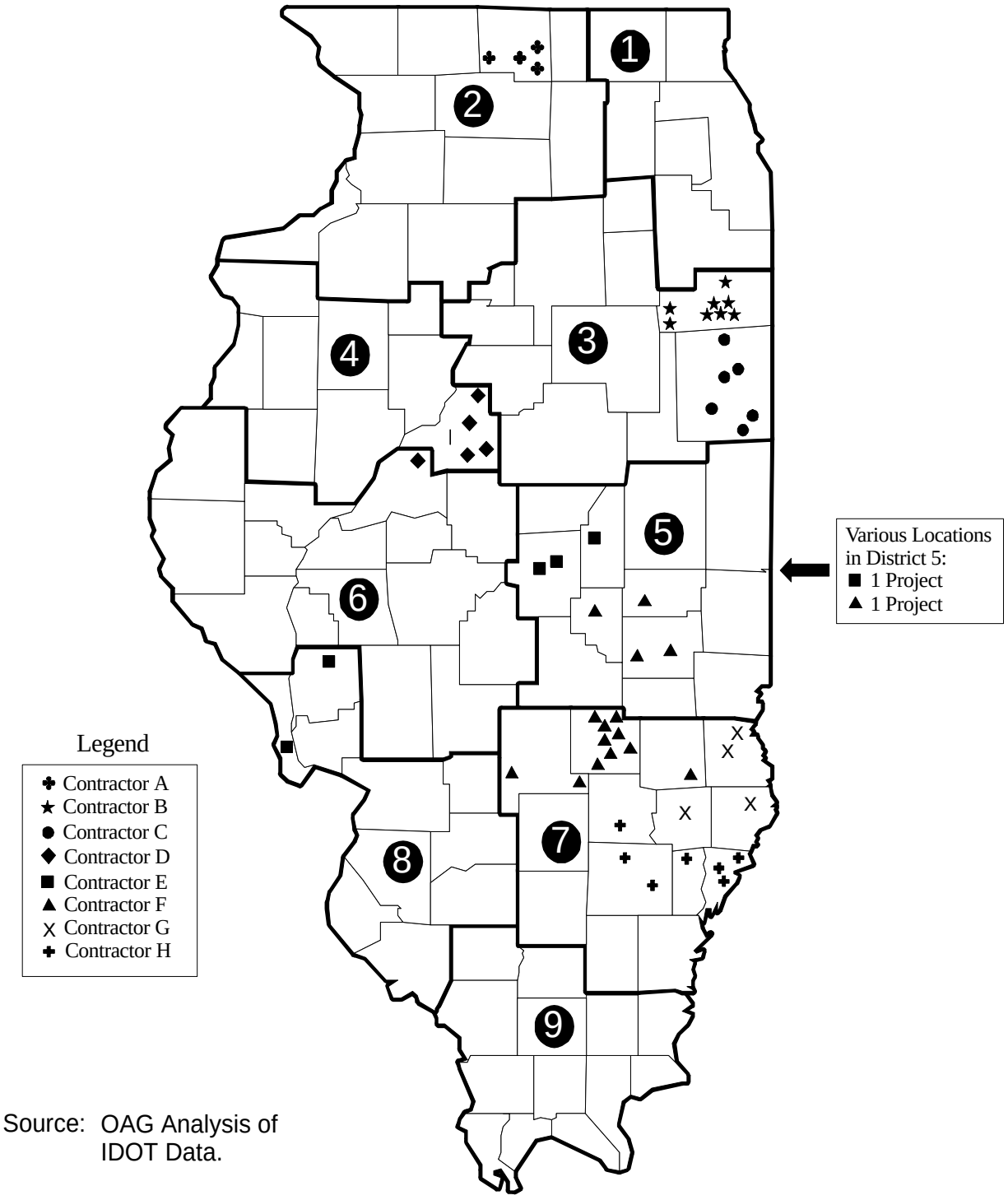
USDOT and the U.S. Department of Justice note that another indicator of possible bidding irregularities is the tendency of qualified bidders to not bid. As stated earlier, in eight percent of the awarded contracts let in calendar year 1996, less than 30 percent of the firms who received a bid authorization actually submitted a bid.

IDOT received only one bid on 106 contracts in 1996. Given the large number of contracts with only one bidder, one would expect that a reasonable number of contracts would have received no bids. However, there were only 2 projects in 1996 that received no bids.

Exhibit 4-9

ASPHALT CONTRACTORS WITH FOUR OR MORE SINGLE BID CONTRACTS

Calendar Year 1996



Source: OAG Analysis of IDOT Data.

Note: For a complete map of single bids see Exhibit 4-5

Questionable bidding practices should be referred to the Attorney General's Office for investigation. As of February 1998 the Illinois Procurement Code (Public Act 90-572) allows State agencies to suspend any contractor for violating the Code or for failure to conform to specifications or terms of delivery for a period up to five years. Prior to passage of the Procurement Code, IDOT was allowed to suspend contractors for up to 12 months (44 Ill. Adm. Code 675.240). The Code also allows State agencies to permanently debar a bidder or prospective bidder from doing business with the State.

IDOT has been providing reports to the Attorney General's Office which show contractors that have similar unit bid prices. According to IDOT officials, IDOT also suspended one contractor and its affiliated companies in 1993. In 1996, this contractor and its affiliated companies were indicted by the federal government and suspended by the FHWA.

Recommendation Number Four

IDOT should review the capability of its current computer systems to identify bidding irregularities such as bid rigging/rotating and update them as necessary.

.....

Illinois Department of Transportation Response:

As detailed in the report, IDOT produces many reports aimed at detecting bidding irregularities and provides reports to the Attorney General's Office when circumstances warrant.

IDOT will continue to review the capability of our current computer systems to identify bidding irregularities.

OTHER ISSUES RELATED TO PROCUREMENT

Chapter Five

CHAPTER CONCLUSIONS

In addition to trying to strengthen competition, there are several other changes IDOT can make to its procurement process to help more aggressively control road construction costs. These changes include improving the accuracy of cost estimates to help ensure IDOT does not accept inflated bids or reject valid ones, discontinuing the practice of releasing cost estimates to the public, contacting contractors whose prequalification lapses to determine the causes or reasons, improving controls over the letting process, taking steps to avoid unnecessary change orders, and continuing to explore the uses of value engineering and other innovative contracting procedures.

PROJECT COST ESTIMATES

Project cost estimates prepared by IDOT prior to bid lettings play a critical role in ensuring the State's road construction costs are reasonable and competitive. These estimates are the benchmark used to determine whether a project will be awarded. If the lowest bidder is within an "awardable range" of the estimate, the bidder is awarded the contract.

IDOT prepares or reviews a cost estimate for each road project. Each district has at least one individual who is responsible for preparing estimates for the district's projects. The estimates include the costs involved in a road construction project, including material and production rates, equipment, labor, overhead, profit, and bond costs.

The estimator uses primarily two types of cost data: current and historical. For major pay items, the estimator prepares a worksheet based on current costs. Estimators call suppliers (such as quarries for aggregate and oil companies for liquid asphalt) to get current prices for road construction materials. For labor costs, the estimator obtains labor rates from IDOT's Day Labor section which maintains wage information from union contracts. The FHWA notes that using current cost information to assess costs is more accurate than using historical data.

For minor pay items, the estimator uses historical cost information. These are the costs that IDOT has historically paid for a particular pay item. While using historical cost information is also accepted practice, the FHWA notes that historical data can be less accurate, especially if a high level of competition does not exist. If competition is poor, then historical costs may be inflated.

IDOT officials stated that Central Office staff prepare their own estimate, which they then compare with the district's estimate. Central Office decides what the final estimate amount will be.

Accuracy of IDOT's Project Cost Estimates

For the 889 contracts awarded by IDOT in calendar year 1996, the winning bid averaged 10 percent under the IDOT cost estimate for the project. For the road construction projects reported to the FHWA, IDOT's awarded contract amount was on average 8.74 percent under the IDOT cost estimate. As shown in Exhibit 5-1, of the midwestern states we reviewed, only Indiana had a higher percent than Illinois for awarded contract amounts lower than their estimates. The national average was 6.42 percent.

Exhibit 5-1
PERCENTAGE DIFFERENCE BETWEEN CONTRACT AWARD AMOUNTS AND THE ESTIMATE FOR FEDERAL PROJECTS REPORTED TO FHWA
Calendar Year 1996

State	% Winning Bid is Under Estimate
Indiana	9.29
Illinois	**8.74**
Ohio	7.72
Kentucky	6.76
Missouri	6.32
Iowa	3.66
Wisconsin	2.14
National Average	**6.42%**

Source: OAG from FHWA data

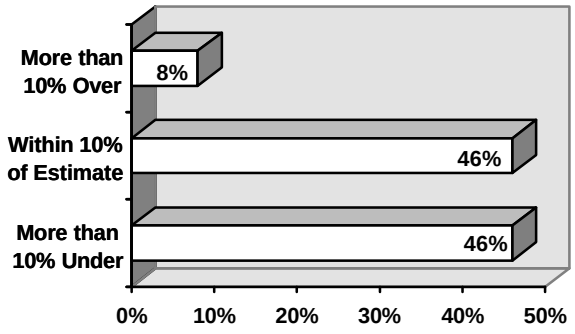
When the winning bid amount is consistently lower than the State's project cost estimate, it may be an indication that competitive forces are at work and the State is experiencing reduced construction costs due to competition. However, that interpretation is based on the assumption that the State's estimate of project cost is accurate.

The accuracy of estimates is important for several reasons. First, if an estimate is inaccurate, reasonable bids may be rejected (if the estimate is too low) or inflated proposals may be accepted (if the estimates are too high). Second, as noted by the FHWA, an estimate must have credibility if the process is to be effective. If the estimates run consistently above the low bid, then over time contractors may inflate their bids knowing the bids will still come in under the State's estimate.

The FHWA's contracting guidelines state that estimates should produce a reasonable degree of accuracy as measured against actual bids received. At least 50 percent of the project cost estimates should be within 10 percent (plus or minus) of the actual low bids. However, Exhibit 5-2 shows that 46 percent of the low bids on the 948 contracts let by IDOT in 1996 were within 10 percent of estimate.

If IDOT's estimates reflect actual costs, one would generally expect that IDOT would receive about as many bids above the estimate as below. However, 8 percent of low bids (74 of 948) exceeded the estimate by more than 10 percent, whereas 46 percent (434 of 948) were more than 10 percent under the estimate. This leads to the conclusion that IDOT's estimates are generally higher than actual construction costs.

Exhibit 5-2
COMPARISON OF LOW BIDS TO DEPARTMENT ESTIMATE
948 Contracts Let in 1996



Source: OAG analysis of IDOT data

We also found wide variations among Districts in the frequency that low bids fell within 10 percent of the estimate. In four of the nine IDOT Districts, the low bids fell within 10 percent of the State's estimate more than 50 percent of the time. The percentage of bids within 10 percent of the State's estimate ranged from 66 percent for District 5 to 27 percent for District 6.

There are a number of reasons why IDOT's estimates may be consistently higher than the lowest bid. The Districts where IDOT's estimates were frequently higher than the bid price, such as Districts 2 and 6, were Districts where there was generally a good level of competition and relatively few single bids. Thus contractors may be submitting leaner proposals in order to have a better chance of being awarded the contract. In such an environment, IDOT estimates should take such competition into account.

We also found that final project estimates prepared by the Central Office were frequently higher than the original District estimates. In our review of 29 IDOT contracts, the final project cost estimate issued by Central Office was greater than the District estimate in 21 of the projects, less in 6 projects, and the same for 2 projects. In the 21 projects where the higher Central Office estimate was used, the original District estimate was closer to the low bid amount in 17 of the 21 projects (81 percent). In both 1996 and 1997, the District total estimated cost of all projects awarded in a District was closer to the total contract amount for these projects than the final estimates prepared by Central Office.

IDOT's use of current cost data is another factor which may be contributing to estimates that significantly exceed the lowest bidder. IDOT contacts suppliers, such as quarries and petroleum companies, to get current prices on the major material components going into a road project. These quoted costs then go into the estimator's worksheet to calculate the individual pay item cost. FHWA guidelines note that it is generally not the practice for material suppliers to quote the same prices to State estimators as they quote to contractors. IDOT officials stated that this same practice is likely occurring in Illinois. The FHWA notes that because of this practice, the actual costs quoted the State by a supplier may need to be adjusted.

IDOT officials also stated that the estimators know the single bid areas in the State and increase their estimates accordingly because they know the bids will be higher. Because of this practice, the State's estimate may become inflated, which lessens its effectiveness in serving as a control over construction costs.

Given the critical role that estimates play in the awarding of contracts and in controlling costs, it is essential that estimates be reliable. IDOT officials stated that they track an estimator's estimates to determine if for the year the estimates are, on average, more than 10 percent different from the actual contract cost. IDOT certifies District estimators after one year if their estimates fall within 10 percent of the lowest bid amounts.

Recommendation Number Five

The Illinois Department of Transportation should improve the accuracy of its project cost estimation process. The Department should identify cost areas where its estimates deviate from the lowest bid amount and promptly update the unit costs used in future estimates. The Department should continue to routinely check assumptions and allowances used in developing cost estimates and regularly review and update unit cost information to ensure it reflects current competitive construction unit costs.

.....

Illinois Department of Transportation Response:

IDOT believes its project cost estimation process is accurate and reliable. We note from FHWA data on accuracy of the engineer's estimate that Illinois is the only state among the six surveyed states that has met the 50% criteria every year of the past eight years on federally-funded projects. We also note that Illinois' percent of winning bids under the estimate is in a range of, or of a like magnitude of, four of the six surveyed states. See the attached chart entitled "Accuracy of Engineer's Estimate" (see Appendix G).

We believe Illinois is the only state among the six surveyed states that employs the method found in Technical Advisory T5080.6 of using both actual cost and historical data in preparing the estimate. IDOT uses detailed unit cost worksheets on the major work items that together usually total a substantial portion of the contract amount. These detailed unit cost sheets are project specific and reflect those costs dictated by current market conditions. IDOT uses historical data to estimate the costs related to those items of a lesser impact whose costs are slower to react to changes in the construction industry.

In 1992-1993, IDOT's estimating procedures were reviewed and updated by a task force of construction, design, bridge and estimating personnel. In conjunction, construction production rates were reviewed and updated by a task force of construction, design and estimating personnel.

In 1992, IDOT revised the computer programs used in developing cost estimates in order to facilitate the review and updating of unit cost information. Also in 1992, IDOT implemented an

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estimator certification program to increase the uniformity and accuracy of cost estimates.

IDOT believes it is appropriate to use an estimate that reflects the market in all situations. To use an estimate that is not representative of the market is to ignore reality.

IDOT agrees that it is essential that estimates be accurate and reliable. IDOT will continually strive to improve construction cost estimating by constantly monitoring, reviewing and updating our unit cost information.

Confidentiality of Project Cost Estimates

As noted by the FHWA, policies and procedures concerning the confidentiality of cost estimates range from providing contractors with the estimated cost of the project in the bidding documents to keeping the estimate confidential, even after the project has been completed. Until the early 1990s, IDOT published the estimated cost of the project prior to the letting. Since that time, however, IDOT only releases the estimate once the bids have been read. IDOT reads the estimate when:

- IDOT receives multiple bids and the low bid is within an awardable range; or
- There is a single bid and it is under the estimate.

IDOT does not read the engineer's estimate when:

- There are multiple bids and the apparent low bidder is not in an awardable range;
- There is a single bid that is over the estimate; or
- The low bidder is 35 percent or more below the estimate and the next low bidder.

IDOT officials stated that they release the estimate after the bids are opened to give newer contractors a historical perspective of pricing in Illinois. However, releasing the estimate, even after the bids are opened, allows contractors to determine the highest reasonable price that the State was willing to accept. Contractors could use this information to increase future bids accordingly.

Recommendation Number Six

The Department of Transportation should not release the engineer's estimate to the public, even after the bids are opened.

Illinois Department of Transportation Response:

IDOT currently keeps the engineer's estimate confidential until a project is considered awardable.

IDOT will implement not revealing the engineer's estimate beginning with the June 12, 1998 Letting.

However, since the estimate that is released is a single total project cost figure, IDOT does not believe keeping the estimate confidential will reduce costs.

DIFFERENCES IN PROJECT REQUIREMENTS AMONG STATES

Differences exist in certain project requirements between Illinois and the other midwestern states which may be increasing IDOT's construction costs. IDOT contractors interviewed identified differences in road building requirements used by Illinois, compared to other states, which may be contributing to Illinois higher pay item costs. As noted in Chapter Two, one contractor said that IDOT's use of wooden forms, as opposed to metal slip forms, in bridge construction projects added to the cost of superstructure concrete. Another contractor noted that Illinois has shorter completion time requirements on its projects, which may increase the amount of overtime, and therefore, labor cost, associated with a construction project.

IDOT officials said they routinely monitor construction practices and requirements in other states to identify those which could result in cost savings for the Department. Reviewing other states' project specifications can be an effective way to identify areas where requirements can be changed and cost savings realized.

IDOT recently surveyed the six midwestern states covered in the audit and identified project requirements which may account for some of the higher unit costs in Illinois. Such factors included restrictions on paver speeds, methods used to seal portland cement pavement joints, methods for installing tie bars in portland concrete pavements, and texturing differences on bridge decks.

Recommendation Number Seven

The Department of Transportation should continue its efforts to identify and evaluate differences in project requirements between Illinois and other states to identify areas where cost savings can be realized while maintaining the integrity of the project.

.....

Illinois Department of Transportation Response:

IDOT will continue its efforts to identify areas where cost savings can be realized while maintaining the integrity of the project. This includes identifying and evaluating differences in project requirements between Illinois and other states.

As their primary duties, IDOT has engineers assigned to the ongoing review of standards and specifications to keep them current with state-of-the-art practices and to identify areas where cost savings can be realized by developing or revising standards and specifications. This includes ongoing communication with other states, both directly and through AASHTO, and regular discussions with material suppliers, manufacturers and other experts within the transportation field. The department's specification committee reviews and approves all proposed, new or revised specifications.

In evaluating the differences in project requirements between states, however, there are factors that must be considered in addition to costs. These include safety, quality/durability and service to the motorist by minimizing road closure times. For instance, certain aggregates may be required for their friction and durability characteristics which are not locally available and thus incur transportation costs. However, they provide anti-skid properties to the pavement which increase safety for the motorist.

IDOT allows fewer number of working days for many contracts than other states in order to complete construction sooner and open lanes to traffic. Reduction of delays to motorists can result in substantial user cost savings far beyond the additional cost required to expedite a contract.

Examples of conscious decisions IDOT has made to increase quality/durability include the use of removable forms for bridge decks so that the underside can be regularly inspected. Two other states use removable forms, while four states allow stay in place forms. IDOT specifications also regulate the speed of paving machines to 50 feet per minute to produce smoother pavements. Indiana regulates paver speed to 45 feet per minute. These types of decisions on project requirements may result in increased cost but produce a higher quality, more durable product which will result in lower costs over the life of the highway.

PREQUALIFICATION AND COMPETITION

Prequalification is the process IDOT uses to ensure that contractors have the financial and work ratings necessary to complete construction contracts. All contractors seeking authorization to bid on road contracts must be prequalified with IDOT. Although prequalification standards should be stringent enough to meet the demands of the job, they should not be set so high as to restrict smaller yet competent contractors from entering the market. Generally, we found less competition in certain parts of the State where there are fewer prequalified contractors.

Turnover in Prequalified Contractors in Illinois

A contractor's ability to become prequalified is an important factor for strengthening competition. If it is difficult to become prequalified, fewer new competitors will be submitting bids on contracts. To test this factor, a list of prequalified contractors from 1992 was compared to a list of prequalified contractors from 1997.

There were 980 prequalified contractors on the 1992 list and 903 prequalified contractors on the 1997 list. This represents a decrease of about eight percent from 1992 to 1997; however, the number of prequalified contractors fluctuates regularly. The two lists had 613 contractors in common. The 1997 list had 290 new contractors not on the 1992 list and the 1992 list had 367 contractors not on the 1997 list. Although this indicates that significant turnover has occurred among prequalified contractors, IDOT does not have a process for contacting contractors whose prequalification lapses to determine why the contractor chose not to renew its prequalification status. Overall, however, the number of new prequalified contractors since 1992 suggests that the prequalification process probably does not preclude contractors from becoming qualified to bid.

Prequalified Contractors by District

Certain parts of the State have fewer prequalified contractors. For example in District 1, which includes Chicago, there are 177 contractors prequalified in earthwork, whereas in District 7 in southeastern Illinois there are only 15 contractors prequalified in earthwork.

IDOT prequalifies contractors in 42 different work categories. Some of these categories include earthwork, portland cement concrete (PCC) paving, asphalt plant mix, and landscaping. IDOT's administrative rules define what types of work are included in each of these 42 categories, describe equipment requirements, and give formulas for work rating calculation. Exhibit 5-3 shows how many contractors were prequalified in each of IDOT's nine districts and out-of-state for three work categories.

Exhibit 5-3
PREQUALIFIED CONTRACTORS BY DISTRICT
as of August 1997

	District Number									Out of	
Work Category	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**State**	**Total**
Earthwork	177	55	48	23	33	53	15	50	24	60	538
PCC Paving	17	4	4	3	9	4	3	6	3	9	62
Asphalt Plant Mix	22	12	12	5	13	12	4	4	2	9	95

Source: OAG analysis of IDOT data

Of the 106 single bid contracts awarded which were let in calendar year 1996, 72 (68%) involved some kind of asphalt work according to their work descriptions. According to Exhibit 5-3, Districts 3 and 6 both have 12 contractors prequalified in asphalt plant mix, the major work category for asphalt binder, surface, and base course placement. However, for asphalt contracts in calendar year 1996, District 3 had 15 single bid contract awards out of 92 total awards (16.3%) compared to District 6 which had just 3 single bid contract awards out of 93 total awards (3.2%).

We asked IDOT officials to explain why two districts with the same number of prequalified contractors in asphalt plant mix would have such a difference in the number of single bids awarded. An IDOT official stated that availability of aggregate and who owns the aggregate are factors which affect bidding. For example, in District 3 a small group of companies control the aggregate, which reduces the number of bids on asphalt contracts.

Number of Prequalified Contractors in Midwestern States

When we surveyed midwestern states, we asked them for the total number of prequalified contractors and the number currently prequalified in excavation, asphalt, and portland cement. Wisconsin only provided us with the total contractors prequalified.

Exhibit 5-4 shows the number of contractors prequalified in Illinois and other states. Illinois has the second highest number of prequalified contractors following Ohio. Illinois ranks first in excavation, second in asphalt paving, and fourth in portland cement.

Exhibit 5-4
CONTRACTOR PREQUALIFICATION

State	Prequalification Process	Work Categories			
		Excavation	Asphalt	Portland Cement	Total Contractors Prequalified
Illinois	yes	573	105	61	918
Indiana	yes	309	69	122	534
Iowa	yes	39	48	122	434
Kentucky	yes	250	127	66	507
Missouri	no*	na	na	na	na
Ohio	yes	230	77	44	956#
Wisconsin	yes	np	np	np	400

na - not applicable, np - not provided, # - includes 301 prequalified general contractors, * - Missouri requires an annual questionnaire to be filed.
Source: OAG survey of other states

In 1992, FHWA compared IDOT's prequalification process with those of seven other states. In general, the FHWA concluded that IDOT's prequalification process did not hinder competition. However, the FHWA recommended that IDOT revise some aspects of the prequalification system, such as eliminating dollar values for work categories, eliminating the requirement that contractors have an asphalt plant before they can become prequalified, and eliminating the requirement that contractors must be prequalified in the work item category on a particular job in order to obtain a bidding proposal. IDOT only implemented the last of these three recommendations.

Firms can provide valuable feedback regarding the prequalification and contracting process. Firms that do not renew their prequalified status may have dropped from the program due to burdensome or costly requirements. Similarly, firms presently not qualified with IDOT may also provide useful insight as to aspects of IDOT's prequalification or contracting process that may be burdensome or unnecessary. According to the FHWA, contractors generally believe that the prequalification requirements for Illinois are fair. However, one contractor said Illinois' more extensive prequalification process added about $5,500 to his costs each year.

Recommendation Number Eight

IDOT should contact contractors whose prequalifications lapse, as well as existing contractors who are not prequalified, to identify if there are aspects of the IDOT prequalification or contracting process that may be hindering or limiting contractor participation.

.....

Illinois Department of Transportation Response:

IDOT will contact contractors whose prequalifications lapse to identify if there are aspects of the prequalification or contracting process that may be hindering or limiting contractor participation beginning immediately.

Although we agree to implement this recommendation, IDOT does not believe it will lower costs.

CONTROLS OVER VARIOUS ASPECTS OF THE CONTRACTING PROCESS

IDOT's administrative rules (44 Ill. Adm. Code 675.10) require competitive bidding on all highway construction contracts over $5,000. The Illinois Procurement Code (Public Act 90-572) provides guidelines for competitive bidding practices. Contracts subject to the Procurement Code must be advertised by publication no less than 14 days before the bid opening, and bids must be publicly opened at the time and place specified in the solicitations. Emergency purchases are exempt from competitive bidding.

Improve Controls Over Bid Lettings

Although IDOT's process for receiving, opening, and recording bids is generally well controlled, changes in the following areas could make the process stronger:

- **Discontinue the Practice of Publishing Bidders Lists Prior to Bid Openings.** IDOT and all other midwestern states surveyed release the list of contractors who have picked up bid packages prior to accepting bids. This practice allows contractors to know the extent of competition for projects they wish to bid on. Releasing the bidders lists may help increase competition by facilitating joint ventures with smaller firms. Contractors seeking to use Disadvantaged Business Enterprises as subcontractors may also find the bidders lists useful. However, even though releasing the bidders list may have some advantages, the FHWA and AASHTO advise that a list of contractors who have picked up a bid package should not be made available to other contractors before the bid opening. The USDOT states that the pre-letting release of the names of contractors who picked up bid packages on a particular project offers no advantage to the state and can provide colluding bidders with useful information concerning the universe of competition. Only *one* bidder requested bid authorization in 34 of the 889 contracts awarded in 1996. Consequently, since the bidder's list is published prior to

the bid opening, the sole proposer could determine they were the sole proposer and adjust their bid accordingly. Of the 34 projects where there was only one bidder authorized, 19 of the bids exceeded the engineer's estimate; 15 were lower.

- **Supply Contractors With Mailing Envelopes and Date Stamp Envelopes.** IDOT does not supply contractors with envelopes for submitting bids, although this practice is recommended by AASHTO. Contractors use their own envelopes and are instructed to attach a form provided by IDOT to the envelope to identify it as a bid. However, IDOT officials stated that some mail-in bids are opened by mistake before the letting because they lack the proper identifying form on the outside. IDOT's policy is to reseal improperly opened bids until the scheduled bid letting. In order to help minimize the number of bids opened improperly, AASHTO recommends that the DOT agency furnish envelopes for contractors to submit their bids. Furnishing an approved envelope provides for the ready recognition of bids versus other mail, thus assisting in their prompt delivery to the contract office and assuring the bid will not be opened improperly. Also, IDOT does not follow the USDOT recommendation to stamp the receipt date on mailing envelopes used by contractors to submit bids, information, and non-collusion affidavits. This control allows states to document mail fraud violations under federal law.

- **Increase the Number of Bid Lettings.** IDOT typically holds seven or eight scheduled bid lettings each year. The USDOT recommends more than one letting per month during peak construction periods to help reduce the probability of collusion among contractors. More than one letting per month would make it less convenient for contractors to meet and arrange bids. The USDOT states that this inconvenience could make collusive behavior more overt and more easily detectable.

- **Centralize Bid Box Location at Central Office.** Bids for contracts are opened and read publicly. Contractors can submit sealed bids until 10:00 a.m. on the day of the letting either by mailing or hand carrying the bids to IDOT, or by depositing them in locked boxes at IDOT or in the lobby of the Department of Commerce and Community Affairs (DCCA) in Springfield. However, AASHTO recommends that proposals be received at only one location—the contract office. AASHTO specifically warns against having a bid deposit box at a location where bidders assemble. IDOT's bid box at DCCA is near a hotel where road contractors have met the night before bid lettings. Live audio broadcasts of bid openings are fed to hotels in Springfield.

Recommendation Number Nine

The Illinois Department of Transportation should improve its controls over the bid letting process by (a) discontinuing the practice of publishing the list of potential bidders prior to the bid opening date; (b) supplying contractors with envelopes to use in submitting bids, and stamping the receipt date on mailing envelopes and retaining the envelopes contractors use to submit bids, information, and non-collusion affidavits; (c) increasing the number of bid lettings to at least one per month, and to more than one per month during peak construction periods; and (d) eliminating the bid collection box at DCCA and centralizing the collection of bids at the IDOT Central Office.

.....

Illinois Department of Transportation Response:

(a) IDOT believes it is important to publish the list of potential bidders. FHWA guidelines acknowledge both advantages and possible disadvantages of publishing the bidders' list. Specifically, FHWA recognizes the advantage of informing potential material suppliers and subcontractors of firms to contact to supply quotes for upcoming projects. IDOT believes that providing a bidders' list actually increases competition by allowing more subcontractors and suppliers to quote prices to bidders. The Auditor General's report points out that Illinois and all six surveyed states publish the bidders list. IDOT believes the advantage of publishing the list outweighs the potential for collusion.

(b) IDOT will provide envelopes for bidders once the consequences of the disclosure provisions of the new Illinois Procurement Code are understood insofar as envelope size, etc. are concerned. It is anticipated we will provide envelopes beginning with the September 18, 1998 Letting. Until then, IDOT will continue use of the identification form already required and will include a reminder in the Bulletin for the June 12, 1998 Letting, and others as needed, for bidders to carefully affix the provided form on the outside of the envelope identifying the contents as a bid. Although we agree to implement this recommendation, IDOT does not believe it will lower costs.

(c) The department has seven scheduled lettings per year. Three letting dates are scheduled prior to the start of the construction season to maximize the available time for contractors during the normal construction season from May 1 to November 30. A fourth letting date in June allows the possible advancement of projects from the next fiscal year to be advertised prior to July 1 but not awarded until after July 1 and an appropriation bill is signed. The three remaining dates are set for mid-summer or fall. Projects typically let on these lettings are short duration maintenance projects or complex projects that require a full construction season or longer to build. This schedule allows contractors to arrange for the delivery of necessary materials (such as structural steel or traffic signal equipment) and utility relocations prior to starting work in earnest in the spring of the following construction (continued on next page)

(continued from previous page)

season. IDOT does not believe that increasing the number of lettings to one or more per month will increase competition or reduce bid prices. In fact, more frequent lettings might increase bid prices due to less time to prepare bids resulting in greater risk and higher costs.

IDOT allows a five-week advertisement to give contractors, subcontractors and suppliers adequate time to review the plans and specifications and prepare their bids. The current spacing of the lettings gives the department two weeks to review all bids before the next advertisement. If a bid is rejected, there is time to advertise the project again for the next letting.

(d) IDOT will eliminate the bid collection box at DCCA beginning with the June 12, 1998 Letting. For the April 24, 1998 Letting, 6 bids out of a total of 438 were received at the DCCA bid collection box.

ECONOMIC INTEREST STATEMENTS

The Governor's Executive Order Number 77-3 requires certain State agency employees to file an annual statement of economic interests with the Board of Ethics. Further, the Illinois Governmental Ethics Act (5 ILCS 420.4A/1-101) requires State agency employees who "have direct supervisory authority over, or direct responsibility for the formulation, negotiation, issuance or execution of contracts entered into by the State in the amount of $5,000 or more" to file verified written Statements of Economic Interests with the Secretary of State. Personal economic disclosure is required of State employees in critical governmental positions to demonstrate that public decision making is free from both actual conflict of interest and the appearance of possible conflict.

We found that some IDOT employees with key responsibilities in the contracting process had not filed Statements of Economic Interests. Specifically, we found that seven IDOT employees with responsibilities such as certifying contractors for prequalification, approving cost estimates, and approving contract change orders had not filed Statements of Economic Interests with the Board of Ethics. We also found that three IDOT employees responsible for areas such as contract administration and cost estimates had not filed Statements of Economic Interests with the Secretary of State.

Recommendation Number Ten

IDOT should review and update its list of employees required to file Statements of Economic Interests with the Board of Ethics and the Secretary of State to ensure compliance with the Governor's Executive Order 77-3 and the Illinois Governmental Ethics Act, and IDOT should ensure that required Statements of Economic Interests are completed and submitted to the appropriate authorities.

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Illinois Department of Transportation Response:

Currently 1,205 IDOT employees file statements of economic interest with the Board of Ethics and 1,639 IDOT employees file statements of economic interest with the Secretary of State. The department is reviewing the filing requirements for both types of disclosure statements with respect to all positions in the department to ensure that the department and its employees are in compliance with the filing requirements established by the Board of Ethics and the Secretary of State. This analysis will be completed within 60 days.

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Auditor Comment:

We selected 12 high level IDOT employees with key responsibilities in IDOT's contracting or review process, including contract administration, program management, cost estimates, contractor prequalification, and construction operations. We examined whether these key employees had filed economic interest statements. We found that 7 of the 12 employees did not file statements with the Board of Ethics. Three of the 12 also did not file statements with the Secretary of State.

CHANGE ORDERS

IDOT should continue to improve the change order process in order to reduce the large number of avoidable changes in projects. Illinois has considerably more change orders than any other midwestern state. However, the total change from the awarded amount to the final payment amount for projects closed in calendar year 1996 was only 5.5 percent (well within a reasonable range). IDOT has studied change orders recently and implemented several changes to the process in 1997.

Many times original contract estimates on amounts of material, labor, equipment, and other factors do not match what is actually needed to complete a construction project. When this occurs, IDOT must issue an "Authorization for Contract Changes" or change order. A change order is one of the most important aspects of contract administration. By definition, it alters the contract work form that was awarded under the competitive bidding process and therefore, requires a clear explanation and careful consideration. Any adjustment, addition, or deduction

from the original contract amount requires a change order, including incentive payments or liquidated damages.

The Department's construction operations engineer reviews approximately 8,000 change orders per year. Most change orders are for routine changes, such as to balance material quantities, or when unpredictable weather conditions or road conditions affect work schedules and progress. IDOT officials stated that almost every contract awarded has at least one change order.

Generally, the project's resident engineer initiates change orders. Once the change order is approved by the district in which the construction is occurring, it is sent to IDOT Central Office. The change order is then reviewed by the Central Office and either approved or rejected.

Exhibit 5-5 shows the number of change orders posted for calendar years 1994-1996. The exhibit shows that the number of change orders was consistently over 8,000 during these three years.

Exhibit 5-5
CHANGE AUTHORIZATIONS
Calendar Years 1994-1996

Calendar Year	Change Authorizations
1994	8,473
1995	8,690
1996	8,375

Source: OAG analysis of IDOT data

Contracts Closed in Calendar Year 1996

We reviewed contracts that were closed in calendar year 1996 to assess the difference between the original award amount and the final payment amount. IDOT reported closing 1,048 contracts in calendar year 1996. These contracts had a total original award amount of $952,372,476. The final payment amount for these contracts was $1,004,892,341, which is an increase of $52,519,865 (5.5%).

In 662 of the contracts the final payment amount was greater than the original award, and in 358 contracts the final payment amount was less than the original award. In 28 (2.6%) of the projects, the original award was the same as the final payment. Two of these had changes orders that had additions and deductions of the same amount.

Review of IDOT's Change Orders

We reviewed a total of 8,971 change orders for 1,022 of the contracts closed in calendar year 1996. These 8,971 change orders resulted in a total net change of $51,931,105; 6,558 resulted in a net addition, 2,326 in a net deduction, and 87 resulted in a "0" net change. Of the additions, 124 resulted in a change of $100,000 or more. Four of the approved change orders resulted in net additions of over $1,000,000 with the largest for $3,030,000. Contracts closed during this time averaged almost 9 change orders per project. In one case, a single contract contained 178 change orders that resulted in a net increase of $4,473,396.

As shown on Exhibit 5-6, over half (54%) of all change orders (4,828 of 8,971) were for normal adjustment to quantities in the contract which accounted for over 13 percent of the dollar amount of change orders. The largest dollar amount of changes was for the category bookkeeping, which is used to move funds from one fund to another, to correct for a mismeasurement, or to pay an unpaid bill. Over 20 percent of the change order dollar amount was made due to an item left out of plans or a quantity error (16.6 percent) or a design change (4.4 percent).

Exhibit 5-6
CHANGE ORDERS FOR CONTRACTS CLOSED
In Calendar Year 1996 By Type of Change

Code	Description	# of Change Orders	% of Total	Net Change	% of Net Change
1	Normal Adjustment to Quantities	4,828	53.82%	$7,002,404	13.48%
2	Design Change	79	.88%	$2,297,775	4.42%
3	Left Out of Plans or Quantity Error	627	6.99%	$8,619,536	16.60%
4	Correct Unstable Condition	86	.96%	$1,168,671	2.25%
5	Anticipated Additions	319	3.56%	$2,800,336	5.39%
6	Claims	22	.25%	$6,169,881	11.88
7	Erosion Control	175	1.95%	$1,804,440	3.47%
8	Engineering Errors	40	.45%	$419,619	.81%
9	Winter Work	6	.07%	$87,622	.17%
10	Expedite Work	9	.10%	$217,801	.42%
11	Unpredictable Additions/Deductions	1,242	13.84%	$8,611,394	16.58%
12	Local Agency Project	852	9.50%	$2,701,827	5.20%
13	Change in Bridge Plans or Quantities	45	.50%	$897,983	1.73%
14	Bookkeeping Changes	464	5.17%	$9,026,692	17.38%
99	Other	177	1.97%	$105,125	.20%
Totals		**8,971**	**100%**	**$51,931,105**	**100%**

Note: Totals may not add due to rounding.
Source: OAG analysis of IDOT data

IDOT's Efforts to Improve the Change Order Process

Because of the large number of change orders, IDOT formed a Total Quality Management Team in January 1996 to review the Department's change order process. The mission of this team was to improve the change order process and to address the issue of avoidable change orders. The IDOT team found that:

- The overall State average of contract changes has increased;
- There were too many avoidable change orders;
- There was a lack of communication and feedback between program development and project implementation;
- There was too much variability in the change order process;

- There were too many "anticipated additions" built into contracts;
- There was inconsistency in plan quality; and
- The original scope of work was not being followed in the construction phase.

Specific causes of these problems were cited, including:

- Plan preparation was often hurried to meet the letting deadline resulting in plan quantity errors, plan omissions, and incomplete plans;
- Errors in quantity and pay items may be attributable to an overall younger and less experienced staff of designers and to the overall fewer number of personnel;
- Plan notes, details, and special provisions were not specific enough and this has caused confusion among contractors and resident engineers; and
- Sometimes only limited information was available during the Central Office review to accurately determine the cause of the change for tracking purposes.

During 1997 the Department implemented changes that changed the district engineers' approval authority and increased the level of review and approval for large change orders. As of August 1, 1997, district engineers can approve minor change orders up to $50,000. Prior to August 1997, district engineers could approve change order authorizations of less than $15,000 per line item. All major change orders require prior approval by the Bureau of Construction, and by the Federal Highway Administration (FHWA) on federal projects. Change orders that exceed $100,000 require approval by the Director of Highways and must include additional supporting information. Change orders of $250,000 or more now require the signatures of the Secretary of Transportation, the Director of Highways, the Director of Finance & Administration, and IDOT's Chief Counsel.

Recommendation Number Eleven

The Illinois Department of Transportation should continue efforts to reduce the number of avoidable change orders. Such efforts should include training and developing younger inexperienced staff, improving the design and construction staff review of final plans, and conducting post-construction meetings.

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Illinois Department of Transportation Response:

The ongoing efforts to reduce avoidable change orders will continue with emphasis on staff training and development, plan review and post-construction follow-up.

VALUE ENGINEERING AND OTHER INNOVATIVE CONTRACTING PROCEDURES

There are many types of innovative contractual procedures that can be used to improve the quality and timeliness of road projects. One common technique, value engineering, gives contractors the opportunity to propose ways to complete a project at a lower cost, without sacrificing safety, quality, or environmental integrity. Any cost savings are shared at a variable rate between the contractor and the contracting agency. The FHWA recognizes that value engineering, when applied in the development of highway projects, is an effective and proven technique for improving quality, fostering innovation, reducing project costs, and eliminating unnecessary and costly design elements. An FHWA study concluded that a significant improvement in effectiveness would result if all states had active value engineering programs.

IDOT has used value engineering on a small number of road projects since 1980. In 1996, 15 of IDOT's 889 contracts (less than two percent) involved value engineering. According to IDOT, the use of value engineering in these 15 projects resulted in a savings of $464,157. This amount represented only about 0.05 percent of the value of construction projects awarded in 1996.

Besides value engineering, IDOT uses alternate bids to allow contractors to select options which would aid in reducing the overall cost of a project, incentives/disincentives that reward contractors for completing projects before the deadline and penalize them for not completing projects on time, A + B (Cost + Time) bidding where the winning bid is based not only on low cost but also on the ability to complete the job quickly, and lane rental fees where contractors pay for the time spent working on a particular lane of road.

Examples of innovative contracting procedures IDOT has not used include work guarantees, which require the contractor to guarantee the work they do on a project for a specified period of time, and total maintenance, which requires the contractor to build and maintain the road.

Recommendation Number Twelve

IDOT should continue to explore the possible uses of value engineering and other innovative contracting procedures as ways to reduce roadbuilding costs.

Illinois Department of Transportation Response:

IDOT will continue exploration of innovative contracting procedures and encourage value engineering as ways to reduce costs and implement recommendations that prove beneficial.

APPENDIX A

LAC Resolution #111

RESOLUTION NO. 111
Prcscntcd by Representative Deering

WHEREAS, a well **developed** and maintained system of **roads** is an essential **component of the State's overall infrastructure** and critical from an economic development perspective

WHEREAS, the State budget proposal for Fiscal Year 1998 contains a 12.5% decrease in road spending **from** Fiscal Year 1997 levels;

WHEREAS, officials have projected further **shortfalls** in the State's Road fund for future years and concluded that additional revenue may be needed to maintain Illinois roads;

WHEREAS questions have been raised whether Illinois is efficiently using its existing roadbuilding funds;

WHEREAS published accounts have reported that in recent years. Illinois has paid more than other states for certain roadbuilding costs, including 91 cents for a pound of reinforcing steel compared to the national average of 55 cents, and S31.66 for a ton of asphalt compared to $27.37 paid by Indiana; therefore be it

RESOLVED, BY THE LEGISLATIVE AUDIT COMMISSION that the Auditor General is directed to conduct a management audit of the Illinois Department of Transportation's road construction program; and be it further

RESOLVED, that this audit shall include, but not be limited to, the following determinations

- Whether the costs paid by the Illinois Department of Transportation for roadbuilding materials are comparable with costs paid by other Midwestern states;
- If Illinois* costs arc significantly different than other Midwestern states, determine the cause for such differences and
- Whether changes in the Department of Transportation's procurement methods arc **warranted;** and be it further

RESOLVED, that all State agencies, including the Department of Transportation, and all other entities which may have information relevant to this audit shall cooperate fully and promptly with the Office of the Auditor General in the conduct of this audit; and be it further

RESOLVED, that the Auditor General commence this audit as soon as possible and report this findings and recommendations upon completion to the Legislative Audit Commission the Governor, and members of the General Assembly in accordance with the provisions of the Illinois State Auditing Act

Adopted this 5th day of May, 1997.

Senator Thomas J. Walsh
Cochairman

Representative Terry W. Deering
Cochairman

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APPENDIX B

Other States Survey Methodology

APPENDIX B
OTHER STATES SURVEY METHODOLOGY

As part of this audit we were required to determine if road building materials cost in Illinois are comparable to that of other midwestern states. To answer this determination, we surveyed and collected data from other midwestern states Departments of Transportation. In all, six states and Illinois were surveyed. We generally collected calendar year 1996 data for the most purchased pay items in the same general categories that the FHWA collects data for: (1) Common Excavation; (2) Portland Cement Concrete; (3) Bituminous Concrete (Asphalt); (4) Reinforcing Steel; (5) Structural Steel; and (6) Structural Concrete. We collected data for three types of asphalt pavement (Base, Binder, and Surface Course) and two types of reinforcing steel (Epoxy Coated and Plain). The most used individual pay items for each category was defined in the other states survey as the item that had the highest dollar amount purchased.

States selected for survey were determined to be in the midwestern region of the country if they were either adjacent to Illinois or in the same general climatic zone. Exhibit B-1 shows the states that were surveyed.

Exhibit B-1
Midwestern States Surveyed

1. Indiana
2. Iowa
3. Kentucky
4. Missouri
5. Ohio
6. Wisconsin

The information collected was generally for Calendar Year 1996 highway construction contracts let and awarded by each state's transportation agency. IDOT provided a list of state division of highway directors and their contacts. IDOT also made the initial contact with the other state officials. These states were then surveyed initially with a mailed or faxed instrument to collect general data about the procurement process the state follows when letting a contract and basic information related to road building materials costs. This information was supplemented with a follow up survey instrument and interviews that provided detailed information about each material including the quantity, total dollar amount, and unit cost for each. The follow up instrument also collected data regarding the specific uses and mixes of these materials.

The information received from each was summarized and follow-up was conducted with each state during fieldwork to ensure that unit cost data provided was for the most used or a comparable type of that general road building material and included all costs. During fieldwork we also conducted on-site visits to Indiana, Missouri, and Wisconsin to collect data and discuss survey responses with DOT officials in these states. The following are the types of analysis we used in comparing the unit cost of roadbuilding materials in Illinois to the unit costs in other states.

Statewide Average Comparisons

Exhibit B-2 Road building Materials Selected for Comparisons
Excavation
Portland Cement Concrete
Asphalt - Surface Course
Asphalt - Binder Course
Asphalt - Base Course
Structural Concrete
Reinforcing Steel - Plain
Reinforcing Steel - Epoxy Coated
Structural Steel

Data received from the other midwestern states initial and follow up surveys were compiled into summary tables for each of the pay items we selected for comparison. Exhibit B-2 shows the road building materials that were used in the comparison. The information collected was reviewed to assure that the data presented for other states generally were of the same or higher quality as that presented for Illinois. Data presented in the statewide averages, in most cases, represents the total of the English and Metric measures of the individual pay item. The comparisons for statewide averages were made by using the range and average unit cost for the material in the other midwestern states as compared to the unit cost for materials in Illinois. A ratio of Illinois' unit cost to the average of the other six states unit costs for each material was then developed. In some cases the most used pay items reported by other midwestern states were not comparable and were replaced with a more comparable pay item from that state.

Project Comparisons

In addition to general statewide average comparisons, we also compared individual construction projects in Illinois to projects in other midwestern states. We collected information regarding all road construction contracts awarded in Calendar Year 1996 from Indiana, Iowa, Kentucky, Missouri, Ohio, and Wisconsin. We then selected contracts and collected awarded unit bid prices and other related information from the contracts.

Each state's list of contracts was analyzed to identify paving, resurfacing, rehabilitation, and reconstruction projects that were on either U.S. routes or interstate highways. Projects were selected using these criteria in conjunction with other factors such as project size and project proximity to Illinois. We generally selected projects that involved some form of paving so that we could compare the cost of asphalt between Illinois and the other states. We also selected projects that involved both paving and bridge construction so that we might compare reinforcing steel and excavation between projects in Illinois and other midwestern states.

Whenever possible we tried to select projects that were on the same route or highway in each state. If this was not possible we selected the next most comparable road project that was closest to the other state project selected. After these projects were selected, we requested the contract information from the other states including the unit costs for materials involved in the project.

Projects selected from other midwestern states were compared in two ways. One comparison was made by grouping projects using characteristics such as the type of road construction project (i.e.,

resurfacing, reconstruction, rehabilitation, widening, new construction, or bridge), whether the projects was in an urban or rural area, and the type of road (i.e., interstate or U.S highway). We also compared construction projects on roads that were in close proximity to one another in Illinois and an adjacent state. Because grouping projects by characteristics narrowed the number comparable project for each material, these comparisons were only conducted for asphalt surface course, epoxy coated reinforcing steel, and excavation.

APPENDIX C

Other Midwestern States Survey Results

APPENDIX C
Summary of Other Midwestern States Survey Results
Comparison of Selected Materials for Calendar Year 1996

State	Roadway Excavation $/CY	Portland Cement Concrete Pavement $/SY	Asphalt Base Course $/Ton	Asphalt Binder Course $/Ton	Asphalt Surface Course $/Ton	Structural Concrete $/CY	Reinforcing Steel - Plain $/LB	Reinforcing Steel - Epoxy $/LB	Structural Steel $/LB
Indiana	4.14	26.27	25.56	23.45	26.62	324.08	0.53	0.57	1.03
Iowa	1.39*	21.28	23.85	24.28	27.32	223.63	0.44	0.51	1.03
Kentucky	3.86	33.73	28.15	29.60	33.29	306.84	0.59	0.63	1.23
Missouri	1.84	26.24	22.50	22.21	23.37	278.39	0.62*	0.68	1.07
Ohio	3.73	31.29	22.45*	21.38*	23.58	338.69	0.58	0.56*	0.87
Wisconsin	1.90	14.68*	13.53	NA	24.29*	236.65*	0.48	0.55	0.98
6-State Average	2.81	25.58	22.67	24.18	26.41	284.71	0.54	0.58	1.04
Illinois	4.24	29.87	36.63	30.68	34.03	480.45	0.59	0.66	0.92 *

* High quantity state

NA - Information was not available

1. Averages presented are for the most used pay item in each state for each category of materials except as noted below.
2. Illinois material costs include mobilization and QC/QA cost.
3. The most commonly used asphalt surface course for Missouri (402) and Kentucky (I-O) were replaced with items that were more comparable to Illinois' most used surface course (Class D T2). For Kentucky class AK/A was used and for Missouri class I-C was used. These mixes are both for interstate high volume roads.
4. Structural concrete for Illinois, Indiana, Wisconsin, and Ohio is for bridge superstructures only. Other states structural concrete may include structural concrete for bridges, box culverts, substructure and other uses.

FACTORS AFFECTING PAY ITEM AVERAGE UNIT COSTS SHOWN IN APPENDIX C

The differences in average unit costs by specific pay item shown in Exhibit 2-4 can be attributable to a number of factors. A pay item is comprised of several types of costs, including labor, materials, equipment, and contractors' overhead. There are many factors which impact pay item costs reported by the various states. For example, Illinois generally has higher labor costs than the other states. Consequently, the higher cost of labor in Illinois can increase IDOT's pay item unit costs versus those in other states. Other factors which impact costs include:

- Higher workers compensation rates in Illinois
- Work rules and local preference requirements regarding the staffing of road projects
- More strict project requirements and specifications
- Inability to obtain high quality aggregate from local supplies, thereby requiring more costly transport of this material
- Quantity of a pay item used on a project

The amount of cost differences attributable to these factors is difficult to project because of the varying nature and composition of pay items, size and type of projects, and ways in which contractors structure their bids.

There were also differences in pay item reporting between Illinois and the other states reviewed. For example, Illinois does not separate mobilization costs from its pay items, which other states report separately. Consequently, the cost for some IDOT pay items may be higher because of the inclusion of mobilization costs. Other differences identified based on our review and a recent survey conducted by IDOT included:

Surface Course and Binder Course Asphalt: Unit costs for Missouri and Wisconsin exclude aggregate certification costs (about $1.00 per ton in Illinois). Also, Wisconsin unit costs for surface course asphalt exclude QC/QA (estimated at $1 - $2 per ton). Conversely, Illinois unit costs do not include anti-strip costs whereas Kentucky and Missouri unit costs do (estimated by IDOT at about $0.65 per ton).

Base Course Asphalt: Illinois uses base course asphalt primarily for temporary roads, side streets, or detour roads which can be a more costly use than new construction, according to IDOT.

Portland Cement Concrete: Unit costs for Indiana exclude the cost of sealing contraction joints. Indiana, Iowa, Kentucky and Missouri unit costs exclude subgrade preparation. Conversely, Illinois unit cost does not include QC/QA costs whereas Kentucky unit costs do. In addition, the thickness of the portland cement pavement varied among the states, with Illinois' 9 ½ inch pavement being the thinnest of the states reviewed.

Structural Concrete: Unit costs for Indiana, Iowa, Missouri, and Wisconsin exclude parapet costs; Missouri also excludes sidewalk costs. Kentucky and Wisconsin unit costs exclude the cost of protective shields. Conversely, Illinois unit cost does not include admixtures whereas the Iowa unit cost does. Also, Illinois unit cost does not include QC/QA whereas Kentucky and Ohio unit costs do.

Earth Excavation: Illinois unit costs for excavation include the costs of clearing, undercutting, compaction, dust control, overhaul, borrow material, settlement platforms, and disposal of unsuitable materials. Many of these items are paid for separately in other states, and may, therefore, lower their unit costs for excavation.

For a more detailed discussion of the pay items reviewed and the various factors affecting pay item unit costs, see chapters two through five of the audit report.

Asphalt "Surface Course"											
State	Unit Type	Total Quantity	Total Amount	Unit Price	Pay Item Inclusion						
					Material	Equipment	Transportation	Labor	Mobilization	Traffic Control	Other
Indiana	Ton	390,943	$10,407,112	$26.62	yes	yes	yes	yes	no	no	
Iowa	Ton	432,110	$8,297,662	$27.32	yes	yes	yes	yes	no	no	
Kentucky *	Ton	128,499	$4,277,804	$33.29	yes	yes	yes	yes	no	no	
Missouri *	Ton	351,459	$8,212,274	$23.37	yes	yes	yes	yes	no	no	
Ohio	Ton	548,444	$12,933,073	$23.58	yes	yes	yes	yes	no	no	
Wisconsin	Ton	1,520,932	$25,541,857	$24.29	yes	yes	yes	yes	no	no	
Average	Ton	562,064	$11,611,630	$26.41							
Illinois	Ton	941,807	$32,051,164	$34.03	yes	yes	yes	yes	yes	no	

* A more comparable pay item was used instead of the most commonly used pay item in that state.
The cost of liquid asphalt was added to the cost of Iowa's and Wisconsin's unit cost.
Source: Survey Of Various States

Asphalt "Binder Course"											
State	Unit Type	Total Quantity	Total Amount	Unit Price	Pay Item Inclusion						
					Material	Equipment	Transportation	Labor	Mobilization	Traffic Control	Other
Indiana	Ton	269,710	$6,325,158	$23.45	yes	yes	yes	yes	no	no	
Iowa	Ton	627,671	$10,142,605	$24.28	yes	yes	yes	yes	no	no	
Kentucky	Ton	226,939	$6,717,755	$29.60	yes	yes	yes	yes	no	no	
Missouri	Ton	116,942	$2,596,929	$22.21	yes	yes	yes	yes	no	no	
Ohio	Ton	924,864	$19,770,954	$21.38	yes	yes	yes	yes	no	no	
Wisconsin	na	na	na	na							
Average	Ton	433,225	$9,110,680	$24.18							
Illinois	Ton	247,610	$7,597,098	$30.68	yes	yes	yes	yes	yes	no	

the cost of liquid asphalt was added to the cost of Iowa's unit cost.
na - not available
Source: Survey Of Various States

Asphalt "Base Course"											
State	Unit Type	Total Quantity	Total Amount	Unit Price	Pay Item Inclusion						
					Material	Equipment	Transportation	Labor	Mobilization	Traffic Control	Other
Indiana	Ton	226,717	$5,795,348	$25.56	yes	yes	yes	yes	no	no	
Iowa	Ton	672,847	$10,084,924	$23.85	yes	yes	yes	yes	no	no	
Kentucky	Ton	738,627	$20,794,962	$28.15	yes	yes	yes	yes	no	no	
Missouri	Ton	735,107	$16,541,813	$22.50	yes	yes	yes	yes	no	no	
Ohio	Ton	1,618,854	$36,344,241	$22.45	yes	yes	yes	yes	no	no	
Wisconsin	Ton	157,965	$952,546	$13.53	yes	yes	yes	yes	no	no	
Average	Ton	691,686	$15,085,639	$22.67							
Illinois	Ton	72,193	$2,644,762	$36.63	yes	yes	yes	yes	yes	no	

The cost of liquid asphalt was added to the cost of Iowa's and Wisconsin's unit cost.
Source: Survey Of Various States

Roadway Excavation												
State	Unit Type	Total Quantity	Total Amount	Unit Price	Pay Item Inclusion						
					Material	Equipment	Transportation	Labor	Mobilization	Traffic Control	Other
Indiana	CY	5,200,819	$21,547,533	$4.14	yes	yes	yes	yes	no	no	
Iowa	CY	24,951,983	$34,640,404	$1.39	no	yes	yes	yes	no	no	
Kentucky	CY	4,303,575	$16,609,585	$3.86	yes	yes	yes	yes	no	no	
Missouri	CY	7,912,741	$14,529,095	$1.84	yes	yes	yes	yes	no	no	
Ohio	CY	7,858,658	$29,308,219	$3.73	no	yes	yes	yes	no	no	
Wisconsin	CY	3,449,050	$6,551,329	$1.90	yes	yes	yes	yes	no	no	
Average	CY	8,946,138	$20,531,028	$2.81							
Illinois	CY	6,826,638	$28,971,519	$4.24	yes	yes	yes	yes	yes	no	
CY - cubic yard											
Source: Survey Of Various States											

Portland Cement Concrete Pavement												
State	Unit Type	Total Quantity	Total Amount	Unit Price	Pay Item Inclusion						
					Material	Equipment	Transportation	Labor	Mobilization	Traffic Control	Other
Indiana	SY	248,745	$6,534,422	$26.27	yes	yes	yes	yes	no	no	
Iowa	SY	844,195	$17,964,529	$21.28	yes	yes	yes	yes	no	no	
Kentucky	SY	61,342	$2,068,911	$33.73	yes	yes	yes	yes	no	no	
Missouri	SY	769,872	$20,202,711	$26.24	yes	yes	yes	yes	no	no	
Ohio	SY	143,427	$4,487,271	$31.29	yes	yes	yes	yes	no	no	
Wisconsin	SY	1,523,204	$22,367,022	$14.68	yes	yes	yes	yes	no	no	
Average	SY	598,464	$12,270,811	$25.58							
Illinois	SY	390,782	$11,674,592	$29.87	yes	yes	yes	yes	yes	no	
SY - square yard											
Source: Survey Of Various States											

Structural Concrete												
State	Unit Type	Total Quantity	Total Amount	Unit Price	Pay Item Inclusion						
					Material	Equipment	Transportation	Labor	Mobilization	Traffic Control	Other
Indiana	CY	51,381	$16,651,368	$324.08	yes	yes	yes	yes	no	no	
Iowa	CY	83,488	$18,670,305	$223.63	yes	yes	yes	yes	no	no	
Kentucky	CY	37,136	$11,394,836	$306.84	yes	yes	yes	yes	no	no	
Missouri	CY	19,893	$5,537,948	$278.39	yes	yes	yes	yes	no	no	
Ohio	CY	42,740	$14,475,662	$338.69	yes	yes	yes	yes	no	no	
Wisconsin	CY	113,521	$26,864,481	$236.65	yes	yes	yes	yes	no	no	
Average	CY	58,026	$15,599,100	$284.71							
Illinois	CY	57,463	$27,608,217	$480.45	yes	yes	yes	yes	yes	no	
CY - cubic yard											
Source: Survey Of Various States											

Reinforcing Steel "Plain"												
State	Unit Type	Total Quantity	Total Amount	Unit Price	Pay Item Inclusion						
					Material	Equipment	Transportation	Labor	Mobilization	Traffic Control	Other
Indiana	LB	3,681,724	$1,933,419	$0.53	yes	yes	yes	yes	no	no	
Iowa	LB	9,426,565	$4,108,949	$0.44	yes	yes	yes	yes	no	no	
Kentucky	LB	5,006,762	$2,933,336	$0.59	yes	yes	yes	yes	no	no	
Missouri	LB	13,232,875	$8,158,456	$0.62	yes	yes	yes	yes	no	no	
Ohio	LB	191,197	$111,156	$0.58	yes	yes	yes	yes	no	no	
Wisconsin	LB	4,845,590	$2,305,303	$0.48	yes	yes	yes	yes	no	no	
Average	LB	6,064,119	$3,258,436	$0.54							
Illinois	LB	4,312,184	$2,545,710	$0.59	yes	yes	yes	yes	yes	no	

LB - pound
Note: table does not foot due to rounding.
Source: Survey Of Various States

Reinforcing Steel "Epoxy"												
State	Unit Type	Total Quantity	Total Amount	Unit Price	Pay Item Inclusion						
					Material	Equipment	Transportation	Labor	Mobilization	Traffic Control	Other
Indiana	LB	13,353,029	$7,594,057	$0.57	yes	yes	yes	yes	no	no	
Iowa	LB	6,515,750	$3,296,264	$0.51	yes	yes	yes	yes	no	no	
Kentucky	LB	6,375,891	$3,994,880	$0.63	yes	yes	yes	yes	no	no	
Missouri	LB	1,795,250	$1,226,634	$0.68	yes	yes	yes	yes	no	no	
Ohio	LB	26,365,142	$14,828,223	$0.56	yes	yes	yes	yes	no	no	
Wisconsin	LB	11,166,573	$6,147,950	$0.55	yes	yes	yes	yes	no	no	
Average	LB	10,928,606	$6,181,335	$0.58							
Illinois	LB	21,137,008	$14,017,975	$0.66	yes	yes	yes	yes	yes	no	

LB - pound
Source: Survey Of Various States

Structural Steel												
State	Unit Type	Total Quantity	Total Amount	Unit Price	Pay Item Inclusion						
					Material	Equipment	Transportation	Labor	Mobilization	Traffic Control	Other
Indiana	LB	8,821,772	$9,086,425	$1.03	yes	yes	yes	yes	no	no	*
Iowa	LB	3,408,771	$3,508,595	$1.03	yes	yes	yes	yes	no	no	
Kentucky	LB	7,942,363	$9,794,626	$1.23	yes	yes	yes	yes	no	no	
Missouri	LB	3,521,670	$3,777,137	$1.07	yes	yes	yes	yes	no	no	
Ohio	LB	10,487,128	$9,147,986	$0.87	yes	yes	yes	yes	no	no	
Wisconsin	LB	2,967,953	$2,897,998	$0.98	yes	yes	yes	yes	no	no	
Average	LB	6,191,610	$6,368,794	$1.04							
Illinois	LB	31,024,672	$28,695,188	$0.92	yes	yes	yes	yes	yes	no	

LB - pound
Note: table does not foot due to rounding.
* includes painting
Source: Survey Of Various States

APPENDIX D

Top 100 Pay Items for Calendar Year 1996

APPENDIX D
TOP 100 PAY ITEMS IN ILLINOIS

Calendar Year 1996

Overall Rank	Pay Item Number	Pay Item Description	Unit of Measure	Total Pay Item Quantity	Total Pay Item Awarded Amount	Average Unit Price	Percent of Total	Contract Occurances
1	20200100	EARTH EXCAVATION	CU YD	5,134,251.10	$24,359,13 1.78	s4.74	2.72%	263
2	50300255	CONC SUP-SIR	CU YD	41,882.50	$20,880,557.79	S498.55	2.33%	86
3	40600850	BIT CON SC "D" CLI T2	TON	516,605.30	$17,265,051.58	533.42	1.93%	193
4	50500 105	F & E STRUCT STEEL	L SUM	35	$17,199,091.78	$491,402.62	I .92%	35
5	20500 150	EMBANKMENT	C U M	4,404,328.30	$15,320,855.73	S3.48	1.71%	222
6	M4060850	BIT CON SC "D" CLI T2	M TON	385,845.80	$14,786,112.76	S38.32	1.65%	103
7	X0320990	D1 ELECT MAINT	L SUM	1	$14,762,234.62	$4,762,234.62	1.65%	1
8	50300225	CONC STRUCT	CU YD	38.033.70	$14,290,530.82	s375.73	1.59%	137
9	42000412	PCC PVT 9 1/2 HIN IT	SQ YD	343.581.00	$9,969,519.02	$29.02	1.11%	10
10	50800205	REINF BARS, EPOXY CTD	POUND	14.123.489.00	$9,516,185.12	SO.67	1.06%	125
II	M5050105	F & E STRUCT STEEL	L SUM	8	$9,204,610.77	$1,150,576.35	1.03%	8
12	42100345	CONT R FCC PVT 12 1/4	SQ YD	278,772.00	$8,627,920.00	$30.95	0.96%	3
13	20001050	AGG SUBGRADE12	SQ YD	1,130,955.00	$7,678,012.71	S6.79	0.86%	21
14	42000502	PCC PVT 10 HIN JT	SQ YD	258,631.00	$7,099,487.40	527.45	0.79%	8
15	48200600	BIT SHOULDERS 8	SQ YD	490,693.00	$6,745,185.27	$13.75	0.75%	57
16	M5030360	CONC SUP-SIR	CUM	11,912.00	$6,727,659.17	S564.78	0.75%	27
17	M2050150	EMBANKMENT	CUM	1,401,252.90	$6,723,739.24	$4.80	0.75%	91
18	40600760	BIT C BIND CSE "B" T2	TON	197.61300	$6,116,235.75	$30.95	0.68%	102
19	40600840	BIT CON SC "C" CLI T2	TON	166,251.30	$5,777,238.16	s34.75	0.64%	76
20	60605000	COMB CC&G TB6.24	FOOT	417,466.30	$5,508,732.82	$13.20	0.61%	94
21	50100100	REM EXIST STRUCT	EACH	1 7 7	$5,398,789.06	$30,501.63	0.60%	119
22	40600830	BIT CON SC "E" CLI T1	TON	149,661 .00	$5,300,338.50	S35.42	0.59%	24
23	M5030350	CONC STRUCT	CUM	10,731.50	$5,237,138.79	$488.02	0.58%	40
24	M2020010	EARTH EXCAVATION	CUM	1,293,874.00	$4,612,387.13	53.56	0.51%	89
25	T5040100	RAISED REFL PAVT MKR	EACH	168.544.00	$4,538,064.78	526.93	0.51%	237
26	44000100	PAVEMENT REM	SQ YD	926.702.30	$4,501,062.40	S4.86	0.50%	164
27	48201000	BIT SHOULDERS	TON	140.094.00	$4,354,691.95	$31.08	0.49%	34
28	40600860	BIT CON SC "E" CLI T2	TON	125,640.00	$4,248,655.25	S33.82	0.47%	31
29	MS080205	REINF BARS, EPOXY CTD	KG	3,016,512.60	$4,237,385.39	51.40	0.47%	33
30	42001 165	BR APPR PAVT	SQ YD	30,649.40	$4,212,975.42	S137.46	0.47%	52
31	40600540	LEV BIND MM T2	TON	128,142.80	$4,127,387.37	532.21	0.46%	56
32	40600570	LEV BIND MM "C" T-2	TON	121,121.20	$4,094,682.67	533.8 I	0.46%	69
33	40600720	BIT C BIND CSE "B" Tl	TON	130,799.00	$3,920,045.32	529.97	0.44%	11
34	20013798	CONSTRUCTION LAYOUT	L SUM	71	$3,731,866.10	$52,561.49	0.42%	71
35	M4060820	BIT CON SC "D" CLI T1	M TON	95,815.10	$3,659,603.09	$38.19	0.41%	17
36	44200970	CL B PATCH T2 10	SQ YD	43,532.90	$3,606,235.49	$82.84	0.40%	37
37	40600820	BIT CON SC "D" CLI T1	TON	91,889.00	$3,458,945.85	S37.64	0.39%	32

38	48101200	AGGREGATE SHLDS B	TON	284.695.10	$3,363,869.61	$11.82	0.38%	172
39	63100165	TRAF BAR TERM T1 SPL	EACH	1,019.00	$3,333,347.91	$3,271.20	0.37%	116
40	M4820000	BIT SHOULDERS	M TON	104.753.40	$3,286,816.54	$31.38	0.37%	19
41	42400200	PC CONC SIDEWALK 5	SQ FT	1,013,073.10	$3,244,024.33	53.20	0.36%	4
42	31200100	STAB SUB-BASE4	SQ YD	427.75 1 .OO	$3,135,702.49	s7.33	0.35%	12
43	4070121 1	BIT C PVT FD T1 16.5	SQ YD	104,627.00	$3,131,479.09	S29.93	0.35%	2
44	54003000	CONC BOX CUL	CUYD	8,316.00	$3,084,052.14	$370.86	0.34%	38
45	35600400	BIT CONC BC WID 9	SQ YD	179,981 .00	$3,038,082.42	$16.88	0.34%	17
46	90101700	TRAF CONT & PROT	L SUM	84	$3,036,296.98	$36,146.39	0.34%	14
47	40500300	BIT MIX COMPL	TON	104,147.00	$2,990,312.73	S28.71	0.33%	7
48	M4060720	BIT C BIND CSE "B" T1	M TON	78,129.00	$2,949,850.18	$37.76	0.33%	5
49	M4202250	PCC PVT 250 HIN JT	SQ M	58.073.00	$2,805,563.60	S48.31	0.31%	2
50	20800 150	TRENCH BACKFILL	CU YD	168,968.20	$2,803,476.95	$16.59	0.31%	142
51	44000006	BIT SURF REM 1 1/2	SQ YD	2.508.499.50	$2,796,289.36	$1.11	0.31%	9
5 2	ZOO4033(	PIN & LINK PLATE REPL	EACH	617	$2,721,680.00	$4,411.15	0.30%	6
53	40600740	BIT C BIND CSE T2	TON	85,054.00	$2,712,525.48	531.89	0.30%	8
54	42100945	PAVT REINF 12 1/4	SQ YD	278,772.00	$2,653,760.00	69.52	0.30%	3
55	50102400	CONC REM	CUYD	5.7 15.42	$2,609,496.96	$456.57	0.29%	4
56	21101300	F & P TOP SOIL 4	SQ YD	3,097,474.00	$2,590,525.41	S0.84	0.29%	6
57	63000000	SPBGR TY A	FOOT	187,943.50	$2,551,584.59	$13.58	0.28%	122
58	40701141	BITCPVTFDTI 13	SQ YD	104,074.00	$2,545,348.00	S24.46	0.28%	2
59	48200400	BIT SHOULDERS 6	SQ YD	214,510.00	$2,462,523.21	$11.48	0.27%	13
60	20700420	POROUS GRAN EMB SUBGR	CUYD	190.348.00	$2,456,310.70	S12.90	0.27%	6
61	67000400	ENGR FIELD OFFICE A	CAL MO	2.430.75	$2,437,132.89	$1,002.63	0.27%	309
62	40701171	BITCPVTFDTI 14.5	SQ YD	122,607.00	$2,422,714.32	S19.76	0.27%	1
63	M4060840	BIT CON SC "C" CLI T2	M TON	63,578.50	$2,381,621.47	S37.46	0.27%	0
64	90100800	TRAF CONT & PROT 2316	L SUM	87	$2,379,929.56	$27,355.51	0.27%	8
65	60107600	PIPE UNDERDRAINS 4	FOOT	784,943.00	$2,305,594.32	S2.94	0.26%	12
66	50600300	CLEAN PAINT STEEL BR	L SUM	18	$2,224,592.00	$123,588.44	0.25%	8
67	50101500	REM EXIST SUP-SIR	EACH	19	$2,184,062.45	$114,950.66	0.24%	14
68	20006 1 IC	BR DK MICRO CON OVLAY	SQ YD	44,807.50	$2,157,130.15	$48.14	0.24%	13
69	50104720	REM EXIST CONC DECK	EACH	23	$2,027,282.00	$88,142.70	0.23%	10
70	31100910	SUB GRAN MAT A 12	SQ YD	274,113.00	$1,986,822.35	S7.25	0.22%	13
71	M4812000	AGGREGATE SHLDS B	M TON	159,275.00	$1,971,492.17	S12.38	0.22%	96
72	M5403000	CONC BOX CUL	CUM	4.033.10	$1,946,811.59	5482.71	0.22%	17
73	42000300	PCC PVT 8	SQ YD	67,134.00	$1,944,235.75	528.96	0.22%	18
74	40600710	BIT C BIND CSE T1	TON	57,227.00	$1,902,136.09	S33.24	0.21%	8
75	XX00 I77 I	PARAPET MODIFICATION	FOOT	8,135.00	$1,871,050.00	5230.00	0.21%	1
76	40800040	INCIDENTAL BIT SURF	TON	30,147.77	$1,869,348.49	$62.01	0.21%	12
77	50200500	COFFERDAMS	EACH	41	$1,864,387.98	$45,472.88	0.21%	4
78	X9019957	TR C-PROTEXPRESSWAYS	L SUM	18	$1,831,105.00	$101,728.06	0.20%	8
79	M4820200	BIT SHOULDERS 200	SQ M	102,947.60	$1,751,114.14	$17.01	0.20%	21
80	M4060570	LEV BIND MM "C" T2	M TON	49.876.60	$1,750,509.81	$35.10	0.20%	37
81	35500500	BIT BASE CSE 8	SQ YD	108.705.20	$1,748,940.83	$16.09	0.20%	41
82	90103815	TR CONT SURVEILLANCE	CAL DA	1 1,065.00	$1,748,517.44	$158.02	0.20%	211
83	M4202240	PCC PVT 240 HIN JT	SQ M	39,466.00	$1,705,072.52	$43.20	0.19%	2
84	48200825	BIT SHOULDERS 1 I 1/4	SQ YD	136,368.00	$1,690,963.20	$12.40	0.19%	1
85	40600510	LEV BIND MM T1	TON	50,361 .00	$1,680,925.04	S33.38	0.19%	8
86	M60 10605	PIPE UNDERDRAINS 100	METER	157,71 I .oo	$1,672,522.30	$10.60	0.19%	19

81	90101800	TRAF CONT & PROT SPL	L SUM	34	$1,661,273.06	$48,860.97	0.19%	34
88	T5010200	THPL PVT MK LINE 4	FOOT	4,664,794.00	$1,659,809.88	SO.36	0.19%	160
89	44001430	BIT SHOULDER REMOV	SQ YD	502,154.00	$1,631,317.43	S3.25	0.18%	43
90	50500405	F & E STRUCT STEEL	POUND	497.365.50	$1,624,681.09	S3.27	0.18%	47
91	35300300	PCC BSE CSE 8	SQ YD	63,880.00	$1,621,285.34	S25.38	0.18%	16
92	42400100	PC CONC SIDEWALK 4	SQ FT	528.350.90	S1.616.754.52	53.06	0.18%	67
93	25 100630	EROSION CONTR BLANKET	SQ YD	1,637,038.00	$1,606,318.62	SO.98	0.18%	90
94	ZOO 16200	DECK SLAB REP (PART)	SQ YD	9,138.70	$1.601.609.95	S175.26	0.18%	23
95	42000417	PCC PVT 9 3/4 HIN JT	SQ YD	53,974.00	$1,592,700.27	S29.51	0.18%	3
96	90 100700	TRAF CONT & PROT 23 15	L SUM	102	$1,592,023.98	$15,608.08	0.18%	102
97	42000500	PCC PVT IO	SQ YD	45,303.00	$1,570,588.41	S34.67	0.18%	16
98	M4402000	PAVEMENT REM	SQ M	214,688.80	$1,525,651.66	$7.11	0.17%	59
99	35101400	AGGBASECSEB	TON	137.127.00	$1,504,570.10	$IO.97	0.17%	64
100	M4060760	BIT C BIND CSE "B" T2	M TON	45,369.60	$1,480,862.19	S32.64	0.17%	28

Source. IDOT

Unit of Measure Legend

CU YD = Cubic Yard
L SUM = Lump Sum
M TON = Metric Ton
SQ YD = Square Yard
CU M = Cubic Meter
KG = Kilogram
CAL MO = Calendar Month

APPENDIX E

Calendar Year 1996 Single Bid Contracts

APPENDIX E
1996 SINGLE BID CONTRACTS BY IDOT DISTRICT

Calendar Year 1996

*Map #	Contractor Name	Contract Number	State Estimate	Low Bidder Amount	% Away From State Estimate
	District 1				
1	A.C. Pavement Striping Co.	44539	$462,000.00	$397,501.00	-13.96%
2	Callaghan Paving, Inc.	83182	$213,872.25	$183,271.40	-14.31%
3	G.F. Structures Corporation	60036	$261,547.00	$231,493.30	-11.49%
4	G.F. Structures Corporation	60066	$598,387.00	$577,113.00	-3.56%
5	G.F. Structures Corporation	60067	$702,816.00	$693,544.00	-1.32%
6	Marking Specialists Corporation	44549	$574,845.45	$563,237.20	-2.02%
7	R.W. Dunteman Company	60034	$856,722.20	$934,622.84	9.09%
8	The Concrete Doctor, Inc.	60054	$89,720.00	$127,400.00	42.00%
9	The Pacific Company	83192	$85,150.00	$101,814.05	19.57%
	Total Single Bid Contracts for District 1	9	$3,845,059.90	$3,809,996.79	-0.91%
	District 2				
10	A.C. Pavement Striping Co.	44544	$173,810.00	$175,050.00	0.71%
11	Advanced Asphalt Co.	85134	$1,063,308.50	$1,088,577.73	2.38%
12	Alliance Contractors, Inc.	64044	$733,994.19	$699,876.98	-4.65%
13	Civil Constructors, Inc. of Illinois	64087	$150,328.75	$155,846.98	3.67%
14	Civil Constructors, Inc. of Illinois	84719	$368,030.55	$312,148.76	-15.18%
15	Civil Constructors, Inc. of Illinois	85137	$886,274.64	$874,897.74	-1.28%
16	McNeill Asphalt Company	64048	$689,071.00	$672,922.10	-2.34%
17	Northwest Illinois Construction Co.	64102	$56,022.80	$60,022.50	7.14%
18	Rockford Blacktop Construction Co.	64052	$491,940.10	$497,026.34	1.03%
19	Rockford Blacktop Construction Co.	64088	$11,205.40	$14,776.00	31.86%
20	Rockford Blacktop Construction Co.	84867	$177,782.00	$152,124.78	-14.43%
21	Rockford Blacktop Construction Co.	85091	$867,566.32	$789,415.06	-9.01%
	Total Single Bid Contracts for District 2	12	$5,669,334.25	$5,492,684.97	-3.12%
	District 3				
22	Azzarelli Construction Co.	86651	$902,582.46	$943,167.14	4.50%
23	Azzarelli Construction Co.	86672	$230,098.13	$234,714.67	2.01%
24	Azzarelli Construction Co.	86682	$109,326.80	$113,352.01	3.68%
25	Azzarelli Construction Co.	86712	$176,544.92	$189,395.62	7.28%
26	Azzarelli Construction Co.	86716	$269,688.45	$271,409.56	0.64%
27	Azzarelli Construction Co.	87069	$226,650.00	$225,686.30	-0.43%
28	Azzarelli Construction Co.	87099	$97,100.00	$94,814.80	-2.35%
29	Azzarelli Construction Co.	87115	$2,621,774.40	$2,733,762.46	4.27%
30	Central Illinois Contracting Corportation	87122	$1,953,876.65	$1,923,313.40	-1.56%
31	D. Construction, Inc.	86694	$80,267.00	$62,224.60	-22.48%
32	G.F. Structures Corporation	86714	$327,880.00	$330,808.00	0.89%
33	Iroquois Paving Corporation	86586	$2,900,000.00	$2,903,266.12	0.11%

*Map #	Contractor Name	Contract Number	State Estimate	Low Bidder Amount	% Away From State Estimate
34	Iroquois Paving Corporation	86674	$3,753,947.55	$3,921,839.57	4.47%
35	Iroquois Paving Corporation	86700	$97,700.00	$92,014.00	-5.82%
36	Iroquois Paving Corporation	86702	$790,000.00	$742,304.01	-6.04%
37	Iroquois Paving Corporation	86706	$662,387.80	$691,054.36	4.33%
38	Iroquois Paving Corporation	86723	$57,100.00	$38,229.75	-33.05%
39	LaSalle County Asphalt Company	86649	$300,941.20	$309,479.11	2.84%
40	The Concrete Doctor, Inc.	86728	$1,560,850.00	$1,760,450.00	12.79%
41	Tobey's Construction & Cartage, Inc.	87116	$89,411.00	$91,073.70	1.86%
42	Tobey's Construction & Cartage, Inc. & T&T	86618	$1,644,000.73	$1,604,811.72	-2.38%
43	Advanced Asphalt Co.	88704	$45,333.00	$51,063.50	12.64%
	Total Single Bid Contracts for District 3	22	$18,897,460.09	$19,328,234.40	2.28%
	District 4				
44	Hillyer, Inc.	89156	$327,146.00	$352,728.60	7.82%
45	McNeill Asphalt Company	89173	$284,284.34	$286,103.77	0.64%
46	Pschirrer Asphalt Company	88494	$999,522.15	$974,189.53	-2.53%
47	R.A. Cullinan & Son, Inc.	88678	$383,277.89	$396,992.47	3.58%
48	R.A. Cullinan & Son, Inc.	88710	$70,155.25	$69,973.75	-0.26%
49	R.A. Cullinan & Son, Inc.	88786	$28,604.00	$29,773.00	4.09%
50	R.A. Cullinan & Son, Inc.	88808	$8,680.00	$19,800.00	128.11%
51	R.A. Cullinan & Son, Inc.	89144	$1,129,916.05	$1,129,759.35	-0.01%
52	Seneca Petroleum Co., Inc.	88723	$68,289.00	$68,225.00	-0.09%
	Total Single Bid Contracts for District 4	9	$3,299,874.68	$3,327,545.47	0.84%
	District 5				
53	A.J. Walker Construction Company	91139	$150,679.95	$149,297.50	-0.92%
54	Champaign Asphalt Company & Apcon Corp. &	90389	$1,959,899.10	$1,897,364.65	-3.19%
55	Champaign Asphalt Company & Apcon Corp. &	90480	$2,474,684.20	$2,584,998.55	4.46%
56	G.W. Prosser Company	90584	$969,975.39	$1,017,203.09	4.87%
57	G.W. Prosser Company	90854	$165,760.85	$180,890.88	9.13%
58	Howell Asphalt Company	90848	$511,056.95	$469,915.12	-8.05%
59	Howell Asphalt Company & Howell Paving, Inc.	90458	$4,002,922.52	$3,966,989.78	-0.90%
60	Howell Asphalt Company & Howell Paving, Inc.	90535	$5,578,952.30	$5,504,010.52	-1.34%
61	Howell Asphalt Company & Howell Paving, Inc.	90857	$134,308.75	$134,490.01	0.13%
62	Howell Paving, Inc.	90811	$22,524.40	$20,466.49	-9.14%
63	Illinois Valley Paving Co.	90624	$3,270,843.50	$3,444,364.77	5.31%
64	Illinois Valley Paving Co.	90798	$503,453.95	$507,896.54	0.88%
65	Illinois Valley Paving Co.	90851	$259,682.75	$226,977.13	-12.59%
66	Illinois Valley Paving Co.	90856	$170,462.72	$187,107.00	9.76%
67	O'Neil Bros., a Division of MACC of Ill., Inc. &	90277	$7,239,934.35	$7,389,197.72	2.06%
	Total Single Bid Contracts for District 5	15	$27,415,141.68	$27,681,169.75	0.97%
	District 6				
68	Charles E. Mahoney Co.	92610	$3,447,615.62	$3,441,048.19	-0.19%
69	Egizii Electric, Inc.	72203	$103,273.76	$107,286.38	3.89%
70	Freesen, Inc.	72086	$36,670.60	$36,965.29	0.80%
71	R.A. Cullinan & Son, Inc.	93208	$208,276.40	$212,851.55	2.20%
	Total Single Bid Contracts for District 6	4	$3,795,836.38	$3,798,151.41	0.06%
	District 7				
72	Ambraw Asphalt Materials, Inc.	94547	$86,118.00	$89,662.34	4.12%

*Map #	Contractor Name	Contract Number	State Estimate	Low Bidder Amount	% Away From State Estimate
73	Ambraw Asphalt Materials, Inc.	94548	$83,370.48	$87,730.33	5.23%
74	Ambraw Asphalt Materials, Inc.	94595	$154,861.19	$136,652.01	-11.76%
75	Ambraw Asphalt Materials, Inc.	95197	$688,713.85	$704,215.98	2.25%
76	General Contractors, Inc.	94413	$623,873.77	$630,085.29	1.00%
77	Howell Asphalt Company & Howell Paving, Inc.	94380	$734,651.60	$696,557.05	-5.19%
78	Howell Asphalt Company & Howell Paving, Inc.	94389	$2,396,768.30	$2,509,491.02	4.70%
79	Howell Asphalt Company & Howell Paving, Inc.	94502	$407,754.09	$392,342.53	-3.78%
80	Howell Asphalt Company & Howell Paving, Inc.	94556	$567,481.82	$528,761.84	-6.82%
81	Howell Asphalt Company & Howell Paving, Inc.	94564	$568,103.94	$517,234.56	-8.95%
82	Howell Asphalt Company & Howell Paving, Inc.	94575	$103,344.35	$107,171.88	3.70%
83	Howell Asphalt Company & Howell Paving, Inc.	95189	$498,815.12	$492,629.31	-1.24%
84	Howell Asphalt Company & Howell Paving, Inc.	95190	$999,408.20	$970,682.88	-2.87%
85	Howell Paving, Inc.	94551	$111,532.30	$96,948.67	-13.08%
86	Howell Paving, Inc.	94576	$56,698.65	$54,330.15	-4.18%
87	Howell Paving, Inc.	94620	$74,018.81	$66,867.95	-9.66%
88	Perry County Construction Company	95191	$297,996.00	$252,000.00	-15.44%
89	Southern Illinois Asphalt Co., Inc.	94172	$671,327.82	$714,734.24	6.47%
90	Southern Illinois Asphalt Co., Inc.	94577	$47,623.00	$53,015.77	11.32%
91	Southern Illinois Asphalt Co., Inc.	95196	$302,078.98	$285,564.92	-5.47%
92	Wabash Asphalt Co., Inc.	94477	$957,773.21	$1,003,543.83	4.78%
93	Wabash Asphalt Co., Inc.	94554	$195,995.90	$177,461.59	-9.46%
94	Wabash Asphalt Co., Inc.	94566	$89,230.93	$94,974.26	6.44%
95	Wabash Asphalt Co., Inc.	95178	$402,255.25	$419,054.89	4.18%
96	Wabash Asphalt Co., Inc.	95185	$267,741.20	$263,390.04	-1.63%
97	Wabash Asphalt Co., Inc.	95186	$63,847.30	$63,468.45	-0.59%
98	Wabash Asphalt Co., Inc.	95193	$352,655.89	$362,992.78	2.93%
	Total Single Bid Contracts for District 7	27	$11,804,039.95	$11,771,564.56	-0.28%
	District 8				
99	C.D. Peters Construction Co.	96952	$89,050.00	$91,850.00	3.14%
100	Charles E. Mahoney Co.	97104	$161,118.80	$172,809.69	7.26%
101	Illinois Valley Paving Co.	96735	$235,530.20	$260,278.86	10.51%
102	Illinois Valley Paving Co.	97092	$875,356.30	$847,344.80	-3.20%
103	Kinney Contractors, Inc.	76005	$11,992.10	$19,339.00	61.26%
104	Womack Brothers	96949	$10,040.00	$14,418.00	43.61%
	Total Single Bid Contracts for District 8	6	$1,383,087.40	$1,406,040.35	1.66%
	District 9				
105	E.T. Simonds Construction Company	98342	$268,036.38	$287,117.87	7.12%
	Total Single Bid Contracts for District 9	1			
	Statewide				
106	Western Industries, Inc.	44538	$816,919.00	$789,820.00	-3.32%
	Total Statewide Single Bid Contracts	1			
	Totals	106	$77,194,789.71	$77,692,325.57	0.64%

* Note: See Exhibit 4-5

Source: OAG analysis of IDOT data

APPENDIX F

Number of Prequalified Contractors
By Work Category
As of August 1997

APPENDIX F
PREQUALIFIED CONTRACTORS BY WORK CATEGORY

As of August 1997

	Work Category	Dist. 1	Dist. 2	Dist. 3	Dist. 4	Dist. 5	Dist. 6	Dist. 7	Dist. 8	Dist. 9	Out of State	Total
1	Earthwork	177	55	48	23	33	53	15	50	24	60	538
2	Portland Cement Concrete Paving	17	4	4	3	9	4	3	6	3	9	62
3	Bituminous Plant Mix	22	12	12	5	13	12	4	4	2	9	95
4	Bituminous Aggregate Mixtures	0	2	0	0	0	1	0	0	0	3	6
5	Miscellaneous Bituminous Paving	26	0	5	0	2	4	0	6	0	12	55
6	Cleaning and Sealing Cracks & Joints	7	3	2	2	2	5	1	2	0	6	30
7	Soil Stabilization and Modification	1	1	1	0	8	4	2	3	0	4	24
8A	Aggregate Bases & Surfaces (A)	102	40	38	14	26	28	11	27	12	40	338
8B	Aggregate Bases & Surfaces (B)	3	4	3	4	3	7	1	5	6	2	38
9A	Highway Structures	44	14	10	9	11	28	8	21	10	18	173
9B	Highway and Railroad Structures	18	5	8	5	8	5	1	3	1	21	75
9C	Highway, Railroad and Waterway Structures	6	0	0	1	0	1	0	0	0	11	19
10	Structures Repair	7	1	1	0	3	4	0	2	1	9	28
11	Anchors and Tiebacks	2	0	0	0	0	1	0	0	1	5	9
12	Drainage	161	45	38	21	31	49	13	43	21	54	476
13	Drainage Cleaning	4	0	0	0	0	0	0	2	0	2	8
14	Electrical	39	11	14	9	12	11	3	16	4	20	139
15A	Cover and Seal Coats (A)	14	14	19	5	19	15	6	6	2	15	115
15B	Cover and Seal Coats (B)	3	1	3	0	1	2	1	2	0	2	15
16	Slurry Applications	2	1	1	1	0	1	0	0	0	2	8
17	Miscellaneous Concrete Construction	196	47	35	20	34	48	16	50	23	57	526
18	Landscaping	26	6	7	4	3	8	3	12	5	5	79
19	Seeding and Sodding	4	3	1	0	2	9	3	6	4	6	38
20	Vegetation Spraying	2	0	2	0	0	0	0	0	0	4	8
21	Tree Trimming and Selective Tree Removal	3	0	2	0	0	1	0	1	0	2	9
22	Fencing	21	11	3	4	8	17	5	15	4	11	99
23	Guardrail	9	4	2	3	6	4	2	5	2	9	46
24	Grouting	3	0	0	1	1	1	0	1	1	6	14
25	Painting	7	0	0	1	0	1	0	2	2	20	33
26	Signing	15	4	3	3	1	6	3	4	4	9	52
27	Paint Pavement Marking	13	1	0	0	1	2	2	2	1	7	29
28	Thermoplastic Pavement Marking	5	1	0	0	1	0	0	0	0	5	12
29	Epoxy Pavement Marking	3	0	0	0	0	0	0	0	0	3	6
30	Installation of Raised Pavement Markers	8	1	0	0	4	6	1	1	1	9	31
31	Pavement Texturing and Surface Removal	2	2	0	0	0	3	0	2	1	6	16
32	Cold Milling, Planing and Rotomilling	19	8	7	3	2	8	2	5	2	10	66
33	Erection	5	0	0	0	1	2	0	0	0	6	14
34	Demolition	62	30	21	12	16	33	7	34	17	30	262
35	Fabrication	1	0	0	0	0	0	0	0	0	6	7
36	Tunnel Excavation	4	1	0	0	0	0	0	0	1	5	11
37	Expressway Cleaning	2	1	0	0	0	0	0	0	0	1	4
38	Railroad (Track) Construction	2	1	0	0	0	0	0	0	0	5	8
39	Marine Construction	5	0	0	1	0	0	0	1	0	13	20
40	Hydraulic Dredging	4	0	0	0	0	0	0	1	0	4	9
41	Hot (in-place) Recycling	2	0	0	0	0	0	0	0	0	2	4
42	Cold (in-place) Recycling	4	2	0	0	1	2	0	1	0	0	10

Source: OAG analysis of IDOT data

APPENDIX G

IDOT Responses

Illinois Department of Transportation

Office of the Secretary
2300 South Dirksen Parkway / Springfield, Illinois I62764
Telephone 217/782-5597

May 14, 1998

MEMORANDUM TO WILLIAM G. HOLLAND, AUDITOR GENERAL

SUBJECT: Auditor General's Report on Highway Construction Costs

Enclosed are the Illinois Department of Transportation's comments on the Auditor General's report comparing Illinois' highway construction costs with six other midwestern states.

I sincerely appreciate the work you and your staff have done to accommodate the Department's concerns. However, there are still three major issues that should have been addressed if your report is to be accurate and consistent with Resolution Ill, enacted by the Legislative Audit Commission on May 5, 1997.

The report should have pointed out that the specifications and scope of the work items are different in each state, making it impossible to get a fair comparison of unit costs. For example, for bituminous surface course alone, there are 24 differences in specifications among the six states that are not reflected in the comparisons.

Even if it would have been possible to get a fair comparison of highway construction costs from a limited number of unit cost components, your report failed to address the Legislative Audit Commission's directive to determine the reasons for differences in road construction costs. The two major factors that increase costs in Illinois--higher labor costs and compressed construction schedules to reduce travel delays to motorists and minimize disruptions to businesses--are given short shrift in the report.

Labor costs in Illinois, which are not under the Departments control, are significantly higher than in other states. If labor costs were equalized, Illinois' unit costs would rank near the middle of the states surveyed.

Illinois' asphalt paving unit costs are higher because the Department puts much more stringent timelines in its contracts than the other states in the survey. While this increases the cost of a project, it benefits the public by reducing travel delays and other inconveniences to motorists.

Instead of focusing on the relevant factors, the report concludes that the primary reason for the higher unit costs in Illinois is lack of competition. This conclusion is not supported by any data in the report.

The report addresses these differences: "Differences in project requirements, bid item reporting, and specifications among the states also account for some of the differences in unit prices." (Chapter Two conclusions; see also pages 20, 21, 24, 27-28, & 5 l-53). Differences in specifications can increase, decrease, or have no impact on unit cost. While IDOT's written comments do not identify the 24 differences in specifications, the audit report acknowledges the impact of differences in specifications on pay item unit costs.

Chapters Three, Four and Five (see pages 41-87) are dedicated to reviewing causes for differences in road construction costs. Factors examined in great detail include labor, quantity of items purchased, differences in project requirements, availability of materials, and competition.

We do not agree with certain assumptions in IDOT's methodology for adjusting pay item unit costs for labor differentials. For example, IDOT uses labor costs for selected positions in one metropolitan area and applies them to statewide data; IDOT's methodology also assumes that crew size and the percent of labor in a pay item will not vary from state to state. See the auditor comments on page 165 for additional details.

1 Nowhere does the audit report conclude that the primary reason for Illinois' higher unit costs is the lack of competition. Rather, the report concludes that there are many factors such as labor, availability of materials, project requirements, as well as competition, which affect roadbuilding costs.

I am aware of the complexity of the task you were directed to accomplish and want to thank you for your cooperation.

I request that you include the Department's entire written comments and responses in the final published report. I also would appreciate receiving a copy of the report and digest 24 hours prior to their public release.

Kirk Brown
Secretary

No Auditor Comments have been included for this page.

IDOT Response to the *Management Audit* Conducted by the Office of the Auditor General

May 14, 1998

No Auditor Comments have been included for this page.

Response Summary

While the Office of the Auditor General's (OAG) report acknowledges there are a number of factors which affect highway construction costs, the report failed to incorporate these factors in the cost comparisons. The report neither adjusted other states' costs to reflect substantially different labor rates, nor varying specifications, such as shortened project schedules, that impact Illinois' road building costs. As an example, there are as many as six differences in specifications just between Illinois and Missouri that affect the cost of asphalt surface course for roadways that were not addressed. The other nine road building items surveyed in the other states also contained numerous differences in specifications being compared with Illinois.

As a result of the failure to compare like items and specifications, it is impossible to accurately determine the cost differences between Illinois and the six surveyed states'based on the ten unit price costs examined by the OAG report.

Additionally, the report incorrectly draws the conclusion that the lack of competition is the primary cause of cost differences between Illinois, Wisconsin, Indiana, Missouri, Kentucky, Iowa and Ohio. The majority of the findings dwell on competition, an area where the Illinois Department of Transportation has limited control. The lack of competition, as the OAG report concludes, is limited to just a few areas of the state. The data in the OAG report also shows that single bids are less of a oroblem in Illinois than in Kentucky, and the oercentaae of single bids over the engineer's estimate in Illinois was less than the averaae of the other states.

Even if Illinois could eliminate all single bids, the Department would save less than 1 percent of its construction costs by the Office of the Auditor General's own calculation. Since it appears there are no significant differences between the states on single bids, the alleged lack of competition does not play an important role in accounting for any perceived cost difference.

Labor Cost Differences

Labor costs for highway construction are 18 to 48 percent higher in Illinois than in the surveyed states for the various types of workers involved in road construction. This data has been provided to the Office of the Auditor General. Labor makes up anywhere from nearly 16 percent to 64 percent of the costs of unit work items, such as asphalt, concrete paving and structural concrete for bridges compared in the report If the premium for workers' compensation insurance were included, Illinois' labor costs would be even higher in several categories.

If labor data is used to adiust the unit costs of all the states to a common labor base. Illinois no lonaer ranks hiahest in cost in anv cateaorv (Chart I -- Construction Costs Adjusted for Labor Differentials). When adjusted for labor rates alone, Illinois ranks 2nd in four categories of unit cost; 3rd in two items; 4th in one category and 6th in two of the categories.

AUDITOR COMMENTS

LAC Resolution #1 11 directed the Auditor General to compare costs and identify reasons for cost differences. As directed by the resolution, the report compares the *actual* costs of materials, **not** *adjusted* or *hypothetical* costs.

In making pay item comparisons, the OAG selected similar pay items in each state surveyed. Specification differences may cause Illinois' costs to be higher or lower, as discussed on page 20 and throughout the audit report.

The report does not conclude that the lack of competition is the primary cause for cost differences between the states; the report does conclude that IDOT's current efforts to increase competition are limited and, therefore, contains several recommendations to address this issue.

As disclosed in the audit report, one percent of IDOT's construction costs represents a potential $8.9 million cost savings for the Department.

IDOT does not track the actual labor component of individual pay items. IDOT obtained an estimated percentage of labor from some of its largest contractors and extrapolated these percentages to pay items used in other states. We do not agree with certain assumptions in IDOT's methodology for adjusting pay item unit costs for labor differentials. For example, IDOT uses labor costs for selected positions in one metropolitan area and applies them to statewide data; IDOT's methodology also assumes that crew size and the percent of labor in a pay item will not vary from state to state. See the auditor comments on page 165 for additional details.

The charge by the Legislative Audit Commission to the Office of the Auditor General was to identify reasons for specific cost differences. Labor rates are clearly the most significant variable in explaining the differences and were never included in the OAG cost charts and are not explained in detail in the report.

Differences in Specifications for Road Building and Materials

Specifications between the states surveyed varied widely due to availability of certain materials, differences in geology and in road building practices. In comparing the pay items, the Department found there were numerous and significant differences in the cost components for each of the selected road construction material costs, as indicated in the chart below. These differences were not accounted for in the OAG report.

Number of Differences in Other States' Specifications

Pay Item	Bituminous Concrete	Bituminous Concrete	Bituminous Base Course	Portland Cement Concrete Pavement	Concrete Superstructure
State	Surf. Crse.	Bind. Crse.			
Illinois		CONTROL STATE			
Indiana	1	0	Not Applicable	5	6
Iowa	4	2	1	7	9
Kentucky	5	4	0	4	6
Missouri	6	5	2	7	6
Ohio	3	3	0	7	6
Wisconsin	5	5	Not Applicable	3	6

Illinois' Expedited Construction Schedules Vs the Survey States

Illinois requires its contractors to complete resurfacing projects in less than one-half the time required by the other states included in the OAG's survey. These shortened work schedules cut motorist delay costs which are borne by the public but result in increased project cost for IDOT. The OAG's report did not account for these differences in work schedules.

Following are the Department's detailed comments on the OAG's analysis of highway construction costs in Illinois and the six other states listed in the table above, as well as the Department's responses to the Auditor General's recommendations.

AUDITOR COMMENTS

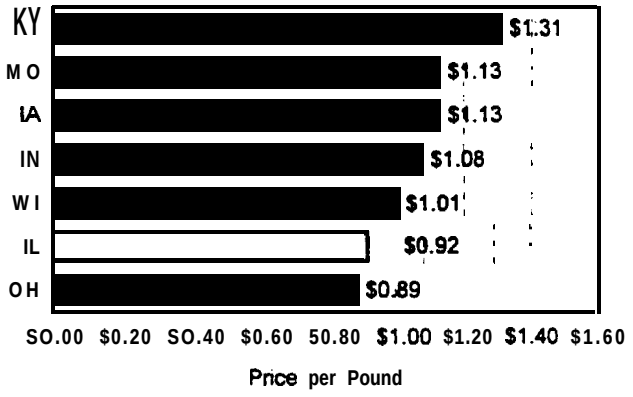
The audit resolution directed the Auditor General to determine whether IDOT's costs are comparable with costs paid by other midwestem states and, if those costs are significantly different, to determine the reasons for those differences. We determined that IDOT's costs are, in fact, significantly different-in most cases higher-and we identified reasons for those differences, including labor rates which are discussed in detail in the report (see pages 42-46). However, the OAG cost charts did not "adjust" Illinois pay item costs for perceived differences in labor rates among states because those charts were intended to show *actual*-not *hypothetical-costs* paid by Illinois.

While IDOT's written responses do not identify the specific differences in specifications cited, the audit report acknowledges the impact of differences in specifications on pay item unit costs.

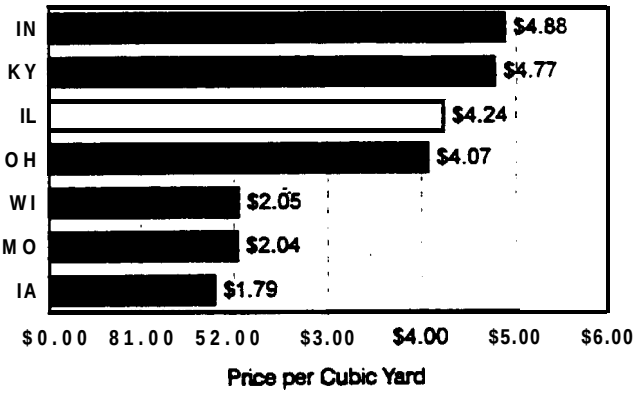
Chart I

CONSTRUCTION COSTS ADJUSTED FOR LABOR DIFFERENTIALS

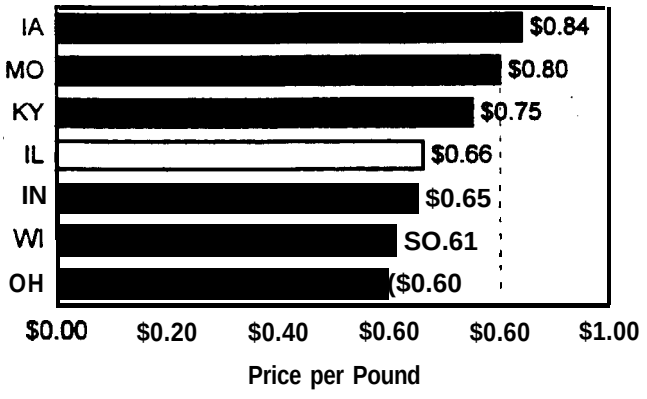
STRUCTURAL STEEL



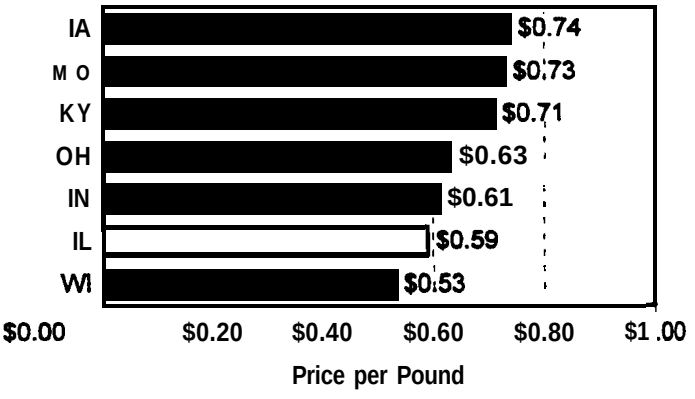
EXCAVATION



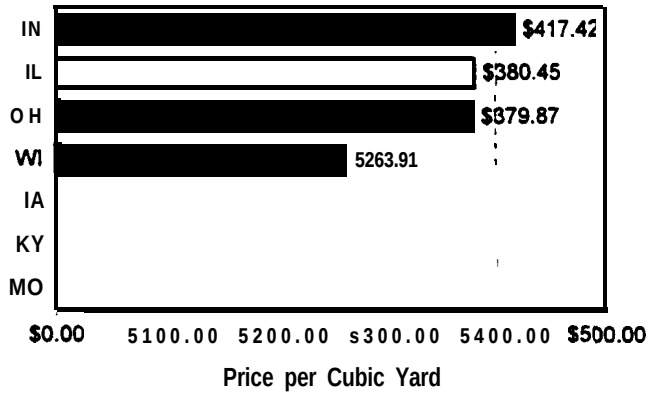
EPOXY REBAR



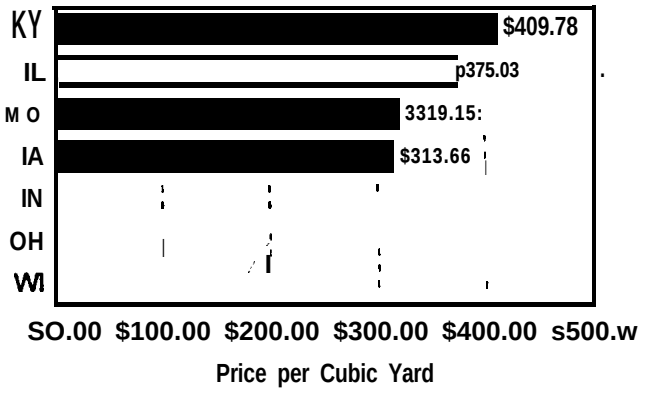
PLAIN STEEL REBAR



STRUCTURAL CONCRETE



OTHER STRUCTURAL CONCRETE



1

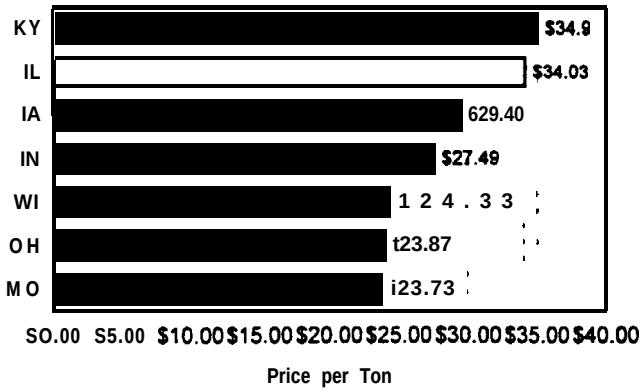
We do not agree with certain assumptions in IDOT's methodology for adjusting pay item unit costs for labor differentials. For example, IDOT uses labor costs for selected positions in one metropolitan area and applies them to statewide data; IDOT's methodology also assumes that crew size and the percent of labor in a pay item will not vary from state to state. See the auditor comments on page 165 for additional details.

IDOT's deduction of $100 from its unit price for structural concrete (reported as concrete superstructure in this audit report) is inappropriate for several reasons. See auditor comments on page 173 for additional details on IDOT's adjustment for concrete superstructure.

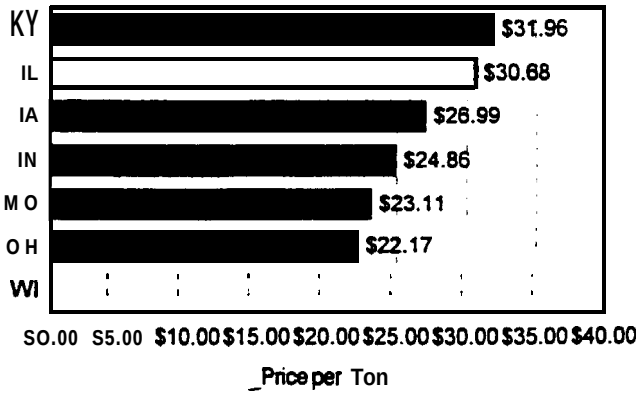
Chart I cont.

CONSTRUCTION COSTS ADJUSTED FOR LABOR DIFFERENTIALS

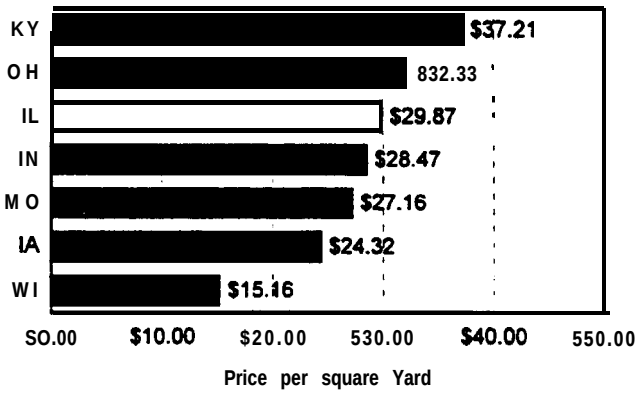
BITUMINOUS SURFACE



BITUMINOUS BINDER



PCC PAVEMENT



AUDITOR COMMENTS

1 We do not agree with certain assumptions in IDOT's methodology for adjusting pay item unit costs for labor differentials. For example, IDOT uses labor costs for selected positions in one metropolitan area and applies them to statewide data; IDOT's methodology also assumes that crew size and the percent of labor in a pay item will not vary from state to state. See the auditor comments on page 165 for additional details.

COMPARATIVE ANALYSIS OF HIGHWAY CONSTRUCTION COST FACTORS BETWEEN THE STATES

The Auditor General concludes that 'Illinois' unit costs, on average, were generally higher than those reported by other midwestem states." Based on the presentation of information in Chapter Two most readers would readily agree. Unfortunately, this conclusion would be in error. The reasons for this mistake are because of a combination of the following factors. First, the OAG's report did not compare "apples to apples" in the pay items discussed; second, the report did not equalize pay item costs for the significant differences in prevailing wage rates and workers compensation insurance rates between Illinois and the surveyed states; and third, the report did not provide the reader with a comparison of the limited number of work days Illinois allows its contractors to complete projects without incurring penalties versus the more liberal number of work days generally allowed by the other surveyed states for similar projects. The following paragraphs discuss each of these items and the impact they have on the comparison of highway construction costs in Illinois and the surveyed states.

"APPLES TO APPLES?" (A COMPARISON OF NON-IDENTICAL PAY ITEMS)

Each of the pay items discussed by the OAG exist in name in each of the surveyed states. However, in many instances that is where the comparison ends. This is particularly true for asphalt pay items (base, binder and surface course), earth excavation, and concrete superstructure.

Bituminous base course, for example, is not comparable to the base course pay items in the other states. In Illinois, bituminous base course is used on low volume roads, on pavement widening which is hand work, and on temporary roadways in which the pay item includes the cost of placement and removal. IDOT surveyed the other states and found that Iowa, Kentucky, Missouri, and Ohio use the base course pay item as the bottom layer of asphalt in new mainline pavements. This results in a high volume of this material being used by these states in a work environment that maximizes a contractor's ability to place large amounts of this material in a minimal amount of time. In Appendix C of the report the volume of this material used by the other states is shown. Iowa, Kentucky, Missouri, and Ohio consumed on average 940,000 tons of bituminous base course in 1996. Illinois used only 72,193 tons of this material but in a significantly different manner.

Wisconsin's response to the question of their use of base wurse at the remarkably low price of $13.53 per ton (see Appendix C) was, "We don't use the bituminous base wurse pay item.' Wisconsin stated that they told the OAG that they do not use this item. In our review of the Wisconsin job numbers provided to us by the OAG as being similar to Illinois projects, we have not found a single project which used the bituminous base course pay item. For these reasons, we do not believe the tables on pages 19 and 29 and the base course narrative which appears primarily on page 28 of the report provide the reader with an accurate understanding of the costs and use of bituminous base wurse in Illinois and the other surveyed states.

1

In making pay item comparisons, the Office of the Auditor General selected similar pay items in each state surveyed and acknowledged differing uses or specifications. Regarding "equalizing" differences in pay item costs for labor rates, where costs are given, we reported actual costs rather than costs ***adjusted*** for possible factors impacting pay item unit prices. Finally, the report mentions time requirements as a factor impacting costs (see page 74).

Illinois' reportedly unique use of base course is disclosed in the audit report (see page 27). IDOT tracks asphalt base course by depth in square yards. The 72,193 tons represents the most used base course depth. All depths of asphalt base course used by IDOT in calendar year 1996 totaled 260,061 tons and averaged $35.30 per ton.

1

During fieldwork, and again after we received IDOT's written comments to the audit report, Wisconsin Department of Transportation officials confirmed the accuracy of the asphalt base course pay item information as presented in this audit report.

The OAG makes the point in the second paragraph on page one of the Report Conclusions that 'Illinois' unit cost for a ton of surface course asphalt was almost 30 percent higher than the average unit cost reported by the other states." This statement is misleading and inaccurate. While some footnotes such as those in the table on page 26 point out differences in what is included in the pay item, the average prices are not adjusted for these differences. In order to provide the reader with a clearer understanding of what cost items are not included in the other states bituminous surface course pay item, we performed a detailed analysis of the non-Illinois asphalt surface course projects listed on page 33 and adjusted them for bituminous surface course related pay items the other states bid as separate pay items. We did not include Project Number 14 in Hopkins County, Kentucky or Project Number 15 in Marion County, Missouri, because they represent shoulder paving for Projects, 7 and 13 listed in this same table. A summary of the cost adjustments of the remaining projects are provided in IDOT Table One.

As the reader can see, the cost of these projects increased by an average amount of $2.42 per ton. Some states' projects were not adjusted significantly, but in other cases these adjustments to the base price were of major proportion. Projects selected from Indiana for example, incurred cost increases on average of 11.7% and $3.39 per ton. The total adjustment for all projects resulted in an average increase of 8.7%.

Earth excavation is very similar to bituminous surface course in that states other than Illinois split the costs of this item among a number of different pay items. Once again IDOT performed a detailed analysis on the non-Illinois projects listed on page 37 which compares earth excavation projects between the states. The results of these adjustments are provided in IDOT Table Two. The table shows that the total adjustment exceeded $.26 per cubic yard or an increase of 7.4%. The report does not make the necessary adjustments in the other states' pay item costs thereby leaving the reader with an inaccurate and misleading comparison.

The report also does not effectively point out the impact production 'rates have on earth excavation unit prices. On page 3 of the report, the OAG provides a table which shows that Iowa, Missouri, and Wisconsin had construction program mixes that averaged 33% in new construction compared to Illinois' 4.19% in 1996. When a contractor can utilize its largest pieces of earth moving equipment on a project, production rates increase significantly. This is typically the case in the construction of a new roadway. It is interesting to note that the states that had the highest unit prices in this area also had the lowest percentages of new construction in their program mix for 1996 - Illinois at 4.19% being the lowest and Kentucky which had a new construction program size equaling 11 .00% and a unit cost of $3.86 per cubic yard of earth excavation being next in line.

A contributing factor affecting earth excavation prices in Illinois unlike the other states is the comparability of work performed in the Chicago metropolitan area. With 45% of all projects being constructed in this region, contractors are faced with significant challenges particularly when it involves earth moving. When interviewed by IDOT and the OAG, Walsh Construction Company located in Chicago stated that they typically have to haul excavated material approximately thirty miles on Chicago projects in order to dispose of it. They estimated the cost of this hauling to add approximately $3.00 per cubic yard to the price of earth excavation. In most other states the cost of hauling waste material would have been paid for as a separate

AUDITOR COMMENTS

1 The Hopkins County and Marion County projects have been removed from Exhibit 2-14. The 14 remaining projects continue to support our conclusions.

1 Some of IDOT's adjustments to the other states' data are either unclear or questionable. See more detailed auditor comments on page 165.

As is specifically disclosed in the audit report, Iowa constructed several new roads in 1996 which may have affected their unit costs for excavation (see page 21). Regarding Missouri's new construction, a Missouri official stated that a significant portion of Missouri's new construction was for several bridges which did not affect Missouri's excavation unit costs.

pay item, thereby not reducing the project costs one penny but resulting in a significant decrease in the costs of the earth excavation pay item. The report in its explanation of this item on page 21 does not provide the reader with this information.

The OAG in its comparison of major earth excavation projects on page 37 fails to point out the unique aspects of the two Illinois projects which make them atypical for comparison purposes with major earth excavation projects from the other states. The I-280/80/74 project in Henry County was not a typical earth excavation project. A large portion of the earth excavation pay item involved constructing a wetland. Included in the cost of the excavation was the stockpiling of topsoil for the wetland and preserving existing wetland vegetation until the topsoil could be reused on the project. The cost of the construction of a haul road was also included in the earth excavation pay item for this project. The U.S. 67 project in Macoupin County was 10 miles in length and involved the m-establishment of the ditches parallel to the roadway. The earth excavation averaged less than 7,000 cubic yards per mile. The changing of the ditchline involved the replacing of culverts at some of the entrances along U.S. 67. The removal of these culverts which numbered over 80 were included in the cost of the earth excavation. This project was not a typical earth excavation due to the low quantities per mile and the incidental cost of removing culverts. In reviewing the projects from the other states, IDOT found no unusual incidental items that would have significantly affected costs.

The OAG also fails to adjust Illinois' costs for the concrete superstructure pay item to make it comparable to a number of the other states that allow the use of stay-in-place bridge deck forms and pay for bridge parapets as a separate pay item. Illinois requires contractors to use wood forms which have to be constructed by hand and removed after the deck is poured. The primary purpose of this requirement is to allow IDOT to be able to visually inspect the underside of the bridge deck. This safety enhancement is not required by all states and greatly affects the cost of bridge construction. Walsh Construction Company, who constructs bridges in both Illinois and Indiana, told the OAG and IDOT that the cost of including wood forming and the parapet in the Illinois concrete superstructure pay item adds $100.00 per cubic yard to the cost of this pay item as compared to the Indiana concrete superstructure pay item. The report does not reflect the dollar impact of this difference in the pay item costs shown on page 24.

The report mentions several times that mobilization is a separate pay item in all states other than Illinois. However, it does not tell the reader the dollar magnitude of this pay item, nor does it adjust the price of Illinois pay items that are inflated because of the inclusion of these costs. In order to provide the reader with a clearer understanding of mobilization, IDOT tabulated the amount of this pay item for all projects sampled by the OAG from the other states. Mobilization costs on these projects ranged from 1 .1% of total project award amounts to 13.2%. The average price of mobilization for these projects was 4.5% of the total project awarded price.

IDOT believes that the task the OAG faced in researching highway construction cost differences among the various states was difficult at best. At the commencement of this audit, IDOT suggested that the OAG would be well served to enlist the resources of a consulting engineer imminently involved in highway construction in the Midwest if at all possible. This person would be available to compare pay item specifications between the states, asphalt mix designs, determine comparable projects based on a review of project plans and specifications and provide additional engineering advise on an as-needed basis. It appears from our review of the projects chosen as comparable and the pay item costs identified as similar, the OAG was unable to acquire this assistance.

IDOT's deduction of $100 from its unit price for superstructure concrete is inappropriate for several reasons. First, use of wood forms in Illinois is a requirement established by IDOT and therefore represents an *actual* cost of doing business in Illinois and should **not** be *adjusted* out of Illinois' unit cost. Second, IDOT does not make a similar adjustment to unit costs in Wisconsin and Ohio-states which, according to survey information collected by IDOT, also require wood forms (i.e., IDOT adjusted its unit cost down but did not reduce Ohio's and Wisconsin's unit costs). Finally, IDOT's adjustment is based on an interview with one of their contractors; another bridge contractor the OAG and IDOT interviewed did not mention the use of wood forms as a significant cost factor.

IDOT abolished its separate pay item for mobilization in 1993. Throughout the audit, IDOT officials were unable to quantify the mobilization costs associated with each Illinois project or to identify into which pay items contractors included such costs.

1 IDOT officials suggested we retain an engineer familiar with midwestern states' road construction programs. We obtained the services of a professional engineer from the nationally recognized consulting firm of Booz·Allen & Hamilton Inc. The engineer has provided services to transportation entities in Illinois and other midwestern states, in addition to the Federal Highway Administration.

THE IMPACT OF LABOR ON COMPARATIVE CONSTRUCTION COST DATA

IDOT and the OAG conducted several interviews of highway construction companies that work in Illinois and neighboring states. Each of these firms stressed the impact labor costs have on bid prices in each of the states. Quotes from the OAG's interview summaries from each of the three out-of-state firms they talked to independent of IDOT follows:

- "Labor is the reason a bid price might be different in one area than another. Labor is a major factor on all jobs, and the rates vary by region."

  Rock Road Companies, Inc.
  Janesville, Wisconsin.

- "Labor Rates - Workers' compensation and unemployment insurance rates are higher in Illinois.'

  J.H. Randolph & Company
  Evansville, Indiana

- 'The prevailing wage in Illinois is $1.00 to $1.50 higher (maybe 5% to 8% higher) than Missouri. The total 'labor burden', which was defined as labor rates, workers' compensation rates, and unemployment rates may make labor up to 15% higher in Illinois than Missouri."

  Bleigh Construction Company
  Hannibal, Missouri

The report on pages 42-48 addresses Illinois' higher prevailing wage rates, workers' compensation rates, and unemployment insurance rates. The OAG concludes this discussion on page forty-six by stating, 'If Illinois' labor costs were 20% higher than the other states, adjusting Illinois' labor costs to be consistent with other states would result in a reduction of $1.08, or a reduction in the unit cost for a ton of surface course asphalt from $34.03 to $32.95, which is still a 25 percent difference from the average for the six other states ($26.41)" IDOT believes that this conclusion is misleading and shortchanges the reader of the report in understanding the significant impact labor cost differentials have on not only the surface course asphalt pay item but all other pay items.

Workers' compensation insurance rates for highway construction workers in Illinois are dramatically higher than comparable rates in the surveyed states. The report on page 46 states that for excavation, Illinois' workers' compensation rates are 14% higher and for steel erection, Illinois' rates are 100% higher than the other states. IDOT Table Three represents current workers' compensation rates in Illinois and the other surveyed states. As the table points out, Illinois' rates for bridge workers is 128% higher and roadway workers 30.2% higher than the average for the other states. However, the significant issue these percentages do not adequately-depict is the dollar impact of the rate differentials. For every $100 in wages an Illinois contractor pays a bridge or overpass worker, this contractor is also going to pay $25.78 in workers' compensation insurance premiums compared to the Indiana bridge contractor who is going to pay $7.04 for the same coverage. Will costs of this magnitude get passed on to the public contracting agency and thereby impact construction costs? The answer to this question is a resounding - "Most definitely."

No Auditor Comments have been included for this page.

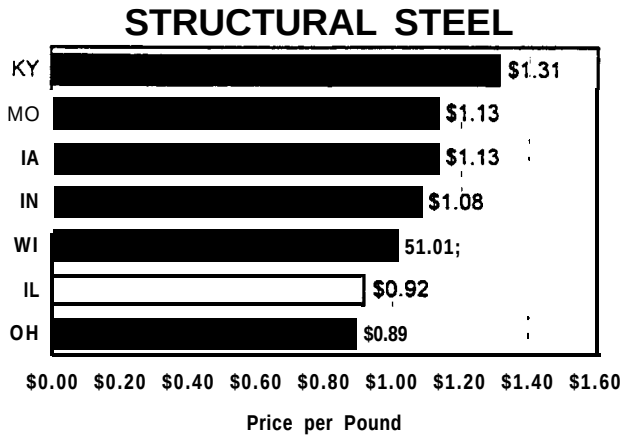
The impact of wage differentials between the states is as significant a factor as workers' compensation rates. In order to assess the impact of labor rate differentials on the unit costs of the surveyed pay items, IDOT contacted five of its largest contractors and asked them to estimate the percentage that labor represents of the unit cost bid prices for the items surveyed by the OAG except for. the bituminous base course pay item discussed previously. The five firms contacted were:

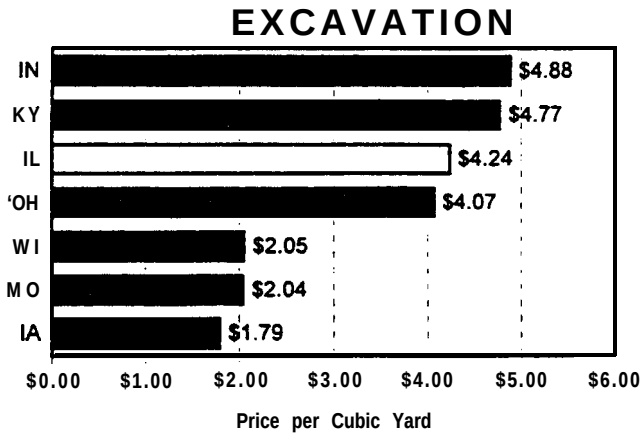
Freesen, Inc. - Bluffs
Ganna Construction, Inc. - Itasca
Halverson Construction Co., Inc. - Springfield
Lorig Construction Company - Des Plaines
The Plote Companies - Elgin

These firms ranked among the top eleven contractors in Illinois by dollar awards by IDOT for 1996. In aggregate they were low bidders and awarded projects totaling over $202 million. This amount represented 23% of the total awards for this year.

The results of this survey indicated that the labor component of each pay item ranged from 15.6% for structural steel to 64% for concrete superstructure. IDOT then obtained labor rates from U.S. Department of Labor Statistics data for 1996 for each of the largest cities in each state. In the case of Missouri, IDOT averaged the labor rates for the cities of St. Louis and Kansas City. Labor rates were used for the largest cities in each state to ensure reasonable comparisons and because more Illinois highway construction occurs in the Chicago area than in any other area of the State. With this information assembled, IDOT re-computed the OAG's pay item unit costs listed on page 19 after equalizing for wage differences. The results of these adjustments are shown graphically below and in IDOT Tables 4 - 12.

CONSTRUCTION COSTS
ADJUSTED FOR LABOR DIFFERENTIALS



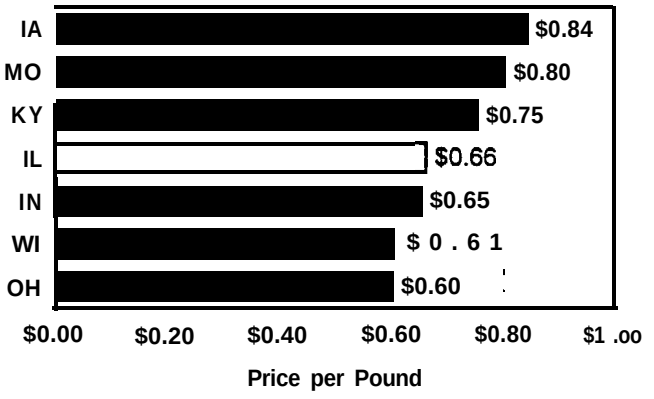


AUDITOR COMMENTS

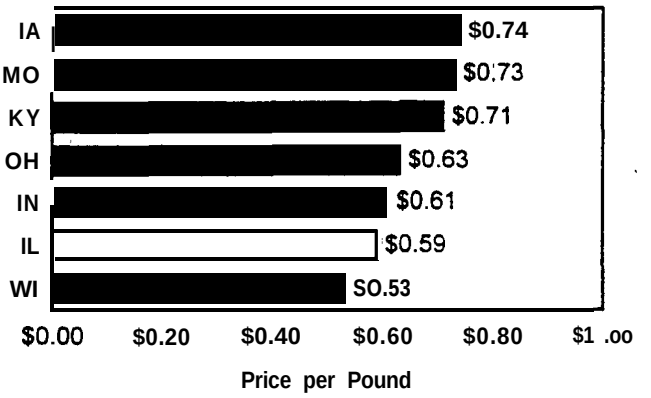
1 After the auditors identified significant cost differences between Illinois and the other midwestern states, IDOT consulted some of its largest road construction contractors to assist IDOT in identifying some possible causes for those cost differences. The contractors identified varying-and sometimes inconsistent-reasons. Where appropriate, the auditors included the causes cited by IDOT's road construction contractors in the report.

1 We do not agree with certain assumptions in IDOT's methodology for adjusting pay item unit costs for labor differentials. For example, IDOT uses labor costs for selected positions in one metropolitan area and applies them to statewide data; IDOT's methodology also assumes that crew size and the percent of labor in a pay item will not vary from state to state. See the auditor comments on page 165 for additional details.

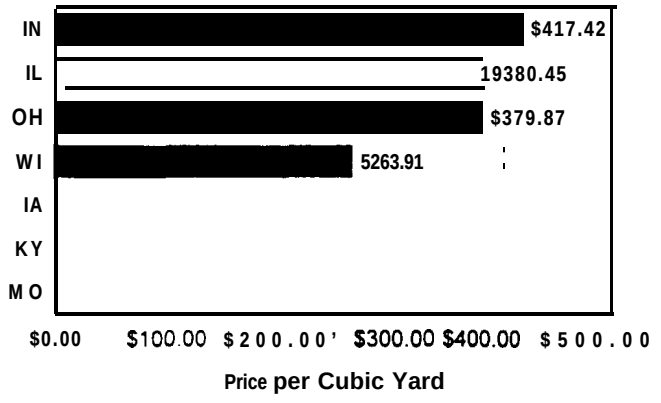
EPOXY REBAR



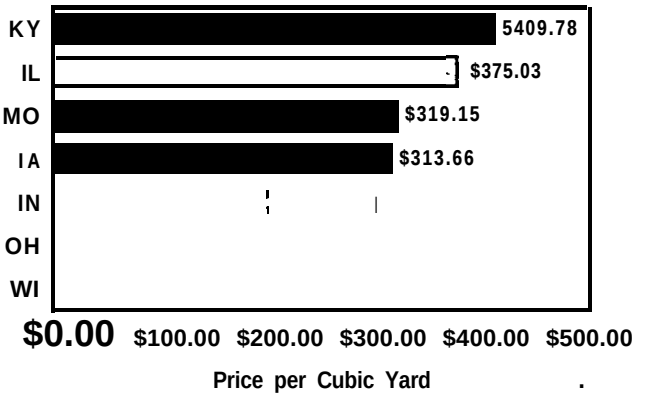
PLAIN STEEL REBAR



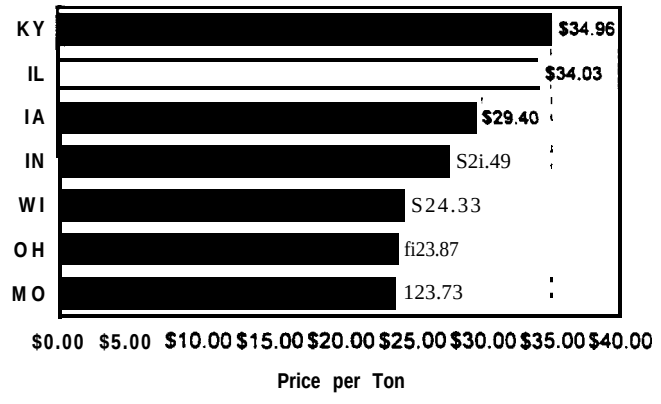
STRUCTURAL CONCRETE



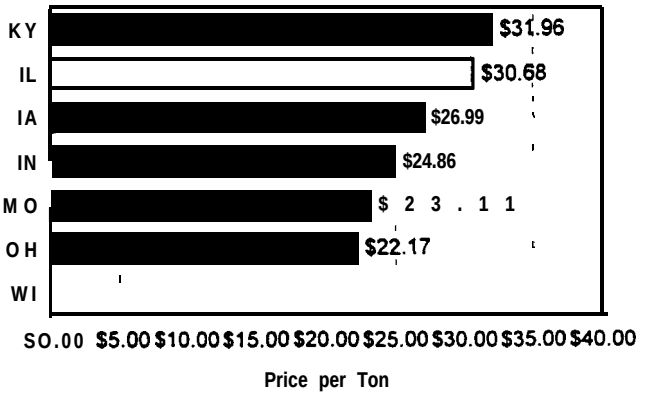
OTHER STRUCTURAL CONCRETE



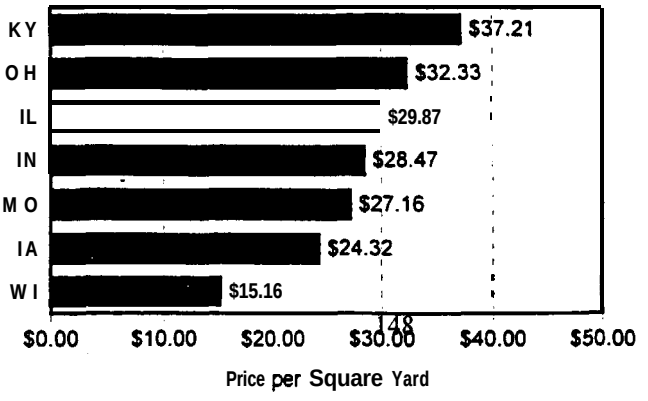
BITUMINOUS SURFACE



BITUMINOUS BINDER



PCC PAVEMENT



AUDITOR COMMENTS

1 IDOT's deduction of $100 from its unit price for structural concrete (reported as concrete superstructure in this audit report) is inappropriate for several reasons. See auditor comments on page 173 for additional details on IDOT's adjustment for concrete superstructure.

We do not agree with certain assumptions in IDOT's methodology for adjusting pay item unit costs for labor differentials. For example, IDOT uses labor costs for selected positions in one metropolitan area and applies them to statewide data; IDOT's methodology also assumes that crew size and the percent of labor in a pay item will not vary from state to state. See the auditor comments on page 165 for additional details.

COMPARISON OF WORK DAYS ALLOWED TO COMPLETE PROJECTS

IDOT and the OAG interviewed Midwest Foundation, Inc. of Tremont, Illinois in April, 1998. Midwest is a major bridge contractor who regularly works and bids on projects in Illinois, Missouri, and Iowa. During the course of this interview, Midwest stated that Illinois limits working days to a greater degree than other states. Midwest went on to say, 'Illinois is the only state that we typically include labor overtime rates because of the tighter time periods allowed to complete the work."

There is a definite correlation between work days allowed and production costs incurred by a contractor. The Department places a high priority on completing projects as quickly as possible and minimizing the extent of lane closures. Halverson Construction Co., Inc. of Springfield when responding to the pay item labor survey stated, 'Illinois is more aware of public inconvenience caused by construction projects than other states in which we work."

The beliefs of these contractors are substantiated when one compares the working days allowed and the associated contractor production requirements on the projects selected by the OAG for comparison purposes. The first of these comparisons appears on page 37 of the report. For these excavation projects, a column for the contractual working days allowed the contractor and a column for cubic yards of earth excavation per working day were added.

COMPARISON OF LARGE QUANTITY EXCAVATION PROJECTS IN MIDWESTERN STATES REVIEWED INCLUDING WORK DAYS AND PRODUCTION REQUIREMENTS

#	State	Highway	County	Urban/ Rural	Cubic Yards	Cost Per Cubic Yd.	Work Days	Cu.Yds. Per Work Day
1	MO	I-55	Jefferson	U	52,648	$3.82	135	389.99
2	IL	I-280/80/74	Henry	U	158,193	$3.80	113	1399.94
3	MO	I-55	St.Louis	U	85,457	$3.20	260	328.68
4	IA	I-80	Polk	U	45,991	$2.10	90	511.01
5	IN	I-74	Shelby	R	130,057	$6.12	169	769.57
6	IN	I-74	Decatur	R	60,695	$4.50	202	300.47
7	IL	US 67	Macoupin	R	69,686	$6.69	76	916.92
8	IA	US 52	Jackson	R	87,681	$2.70	125	701.45

When looking at the four urban projects selected by the OAG, the production requirements of the Illinois project (1,399.94 cubic yards of earth excavation a day) were triple the average production requirements of the three out-of-state projects (410 cubic yards per day). The rural project differences, while not as dramatic, clearly show that the Illinois production requirements were significantly higher than those of the other states.

Concluding that higher daily project production rates automatically translate into higher pay item unit costs is not necessarily valid. Factors other than work days and overtime need to be considered. These factors include the number of work crews used (if additional crews are used, the need for overtime may be reduced or eliminated), the number of project sites worked simultaneously, the depth of the pavement placed, and the type of equipment used. All these factors impact the project's costs and can significantly affect the amount of overtime needed to provide a certain level of daily production.

The OAG compares asphalt surface course projects on page 39. The work days and the corresponding production requirements are once again provided for these projects.

PROJECT COMPARISONS **BETWEEN** ILLINOIS AND OTHER STATES FOR ASPHALT SURFACE COURSE

#	State	Highway	County	Tons	Cost Per Ton	Work Days	Tons Per Work Day
1	IL	US 45	Effingham	5,534	$38.36	60	92.23
	IN	US 50	Daviees	2,720	$28.75	40	68.00
2	IL	US 24	Iroquois	9,351	$36.75	100	93.51
	IN	US 231	Porter/Jasper	3,803	$29.03	50	76.06
3	IL	US 50	Clinton	6,951	$35.10	30	231.70
	KY	US 641	Calloway	7,141	$32.00	80	89.26
4	IL	US 67/IL 111	Macoupin	12,566	$36.81	76	165.34
	MO	US 54	Pike	13,530	$20.05	82	165.00
5	IL	US 24	Adams	7,127	$37.95	40	178.18
	MO	US 24	Marion	3,646	$24.80	32	113.94
6	IL	I-74	McLean	15,617	$26.54	120	130.14
	IN	I-74	Montgomery	22,610	$32.46	40	565.25
7	IL	I-74/80/280	Henry	3,966	$36.90	113	35.10
	IA	I-80	Johnson	2,124	$36.50	75	28.32

In all but one of the project comparisons, the production requirements for the Illinois projects exceed those of the other states. In the one comparison that Illinois does not have the higher production requirements (Comparison Number Six), the Indiana unit cost for a ton of surface course is $32.48 as compared to the Illinois unit cost of $26.64.

No Auditor Comments have been included for this page.

The OAG concludes their comparisons by looking at projects that contained varying quantities of epoxy coated reinforcing steel (page 40). Once again IDOT has provided work days and production rate information for these projects.

PROJECT COMPARISON BETWEEN ILLINOIS AND OTHER STATES FOR EPOXY COATED REINFORCING STEEL

#	State	Highway	County	Rural/ Urban	Pounds	cost Per Pound	work Days	Pounds Per Work Day
1	IL	I-74/80/280	Henry	U	63,760	$1.00	113	564.25
	IA	I-80	Johnson	R	3,114	$0.70	75	41.52
2	IL	I-74	Champaign	R	388,030	$0.67	299	1.297.76
	IN	I-65	Lake	R	114,936	$0.59	90	1,277.07
3	IL	I-74/80/280	Henry	U	63,760	81.00	113	564.25
	IL	I-55/74	McLean	U	263,880	$0.79	152	1.736.05
	WI	i-94	Milwaukee	U	21,180	$0.60	65	325.85
4	IL	I-74/80/280	Henry	U	63,760	81.00	113	564.25
	IL	I-55/74	McLean	U	263.880	80.79	152	1.736.05
	WI	I-94	Milwaukee	U	640,182	SO.47	76	8.423.45

As this information depicts, Illinois had higher production rate standards in all comparisons other than one. This was a bridge project in Milwaukee that was compared with two Illinois projects, one of which was in Bloomington and the other in Henry County on the outskirts of the Quad Cities.

IDOT concludes its review of working days and production rates by analyzing the variances in these items for the rural, non-interstate asphalt resurfacing projects listed on page 33 of the report. IDOT excluded project numbers 12 and 16 because they were more than double the tonnage of the next closest project. Project numbers 14 and 15 were also not used because they represented the shoulder mix for project numbers 7 and 13 in Hopkins County, Kentucky and Marion County, Missouri. IDOT also compared the award prices and total project costs per ton of asphalt course for each project.

1 The Hopkins County and Marion County projects have been removed from Exhibit 2-14. The 14 remaining projects continue to support our conclusions.

PROJECT REQUIREMENTS FOR SURFACE ASPHALT TONNAGE PER WORKING DAY

State	County	Route	Asphalt Tonnage	Work Days	Tons Per Work Day	Awarded Bid (000)	Project Cost/Ton
IL	Knox/Henry	US 150	8,155	30	271.8	$ 471.6	$ 57.83
IL	Effingham	US 45	5,534	60	92.2	$ 696.6	$125.87
IL	Adams	US 24	7,127	40	178.2	$ 523.3	$ 73.43
IL	Macoupin	US 67/IL 111	12,566	76	165.3	$3,441.0	$273.84
IL	Iroquois	US 24	9,351	100	93.5	$2,903.2	$310.48
IL	Clinton	US 50	6,951	30	231.7	$ 415.1	$ 59.84
IL	Gallatin	IL 1	15.489	120	129.1	$1,971.4	$127.28
Illinois Average Tons Per Work Day and Project Cost Per Ton:					166.0		$146.94
KY	Hopkins	WKP	5,168	84	61.5	$2,448.6	$473.81
KY	Calloway	US 641	7,141	80	89.3	$ 402.3	$ 56.33
IN	Porter/Jasper	US 231	3,803	50	76.1	$ 519.2	$136.52
IN	Daviees	US 50	2,720	40	68.0	$ 344.0	$126.45
MO	Marion	US 24	3,646	32	114.0	$ 461.5	$126.59
Other States' Average Tons Per Work Day and Project Cost Per Ton:					81.8		$183.94

The results of these calculations hold true to form for working days and the associated contractor production requirements. Illinois' tons per working day were more than double those of the other states (166.0 to 61.6 tons). However, what is striking about this data is the total project cost per ton. The Illinois project costs per ton of surface course were $37.00 a ton less expensive than those of the other states. This amount equaled a 20% savings in total project costs per ton. Surface course being a material that is placed at virtually the same thickness (1 1/2" - 2 1/2") on all projects throughout the country and the added fact that rural traffic lanes are very close in width to one another among the various states makes this comparison a very creditable one. Had this information been provided in Chapter Two of the report, IDOT believes the conclusions would have been significantly different.

Does Illinois experience added costs by compressing work days and allowing rehabilitation work to be conducted only at night on the current Eisenhower Expressway Project in Chicago? Does Illinois experience added costs by requiring the contractor to work two shifts a day to shorten the time the bridge at Havana is closed over the Illinois River? The answer to both questions is obviously – "Yes.' IDOT definitely places a high priority on reducing public inconvenience whether it be for the family car, school bus, ambulance, or local merchant. Is it too high a price? No, based on this analysis of the projects selected by the OAG, IDOT strongly believes that one would conclude Illinois is cost competitive with the other states if the issues we have discussed are fairly presented and reasonably considered.

AUDITOR COMMENTS

The table on Page 10 of IDOT's comments compares the "total project cost" per ton of surface asphalt for projects in Illinois and other midwestern states. This is not an appropriate basis for comparing the unit costs of roadbuilding materials (in this case, surface asphalt) because "total project cost" includes all pay items comprising the project scope, regardless of whether the other pay items are related to the amount of asphalt used in the project. As a result, the ratio overstates the cost per ton of asphalt by the unit cost of other pay items included in the project scope. The unit costs shown throughout this audit report are based on the ratio of an individual pay item cost per quantity of that pay item used on a project.

Table 1

Non-Illinois Asphalt Surface Course Projects
Adjusted for Additional Pay Item Costs
(From Page 33)

#	State	Highway	County	Tons	Cost/Ton	(1)	(2)	(3)	(4)	(5)	(6)	Total Adjustment	Total
7	KY	WKP*	Hopkins	5188	$32.44'	$0.00	$0.94	$0.00	$4.87	$0.00	SO.00	$5.81	$38.25
8	KY	US 841	Calloway	8293	$32.00	$0.00	$0.48	$0.00	$0.00	$0.00	$0.00	$0.48	$32.48
10	IN	US 231	Port/Jas	3803	$29.03	$0.00	$1.43	$0.06	$0.00	$0.00	$1.91	$3.40	$32.43
11	IN	US 50	Daviees	2720	$28.75	$0.00	$0.60	$0.00	$0.00	$0.00	$2.78	$3.36	$32.13
12	WI	US 12	Walworth	41856	$25.06	$0.00	$0.30	$0.00	$0.00	$0.19	$0.00	$0.49	$25.55
13	MO	US 24	Marion	3646	$24.80	$0.00	$0.27	$0.00	$1.24	$0.00	$0.00	$1.51	$28.31
18	MO	US 36	Shelby	34276	$21.80	$0.00	$0.31	$0.00	$1.53	$0.00	SO.00	$1.84	$23.64

Average Adjustment $2.42 or 8.7%

*Western Kentucky Parkway

Definitions

1. QC/QA: Quality Control and Quality Assurance costs for bituminous paving.
2. Mobilization/Demobilization: Costs associated with the movement of equipment and materials
3. Construction Engineering: Costs associated with Construction Engineering Services.
4. Performance Incentive: Monies paid to the Contractor for exceptional work.
5. Profilograph: Costs to check the smoothness of pavements.
6. Bridge Approaches: Costs associated with paving bridge approach pavements.

The appropriateness of IDOT's adjustment of the other states' pay item unit costs to include mobilization costs (Column 2) is questionable. IDOT's allocation of mobilization costs in Table 1 presumes that all pay items in a given state share a pro rata proportion of mobilization costs. However, during the course of the audit, IDOT officials stated that the proportion of mobilization costs in specific pay items varies.

Table 2

Non-Illinois Excavation Project Unit Prices Adjusted for Additional Pay Item Costs (From Page 37)

#	State	Type	Urban/ Rural	Interstate/ Non-Interstate	Highway	Cubic Yards	Cost per C.Y.	(1)	(2)	(3)	Total Adjustment	Total
1	MO	Rehabilitation	U	I	I-55	52648	$3.82	$0.00	$0.00	$0.05	$0.05	$3.87
3	MO	Reconstruction	U	I	I-55	85457	$3.20	$0.00	$0.00	$0.07	$0.07	$3.27
4	IA	Rehabilitation	U	I	I-80	45991	$2.10	$0.00	$0.17	$0.08	$0.25	$2.35
5	IN	Rehabilitation	R	I	I-74	130057	$6.12	$0.00	$0.00	$0.35	$0.35	$6.47
6	IN	Reconstruction	R	I	I-74	60695	$4.50	$0.63	$0.00	$0.23	$0.86	$5.36
8	IA	Widen/Resurface	R	N	US-52	87681	$2.70	$0.00	$0.07	$0.13	$0.20	$2.90
9	KY	New Construction	R	N	KY-293	61489	$2.00	$0.00	$0.00	$0.03	$0.03	$2.03

Average Adjustment $0.26 or 7.4%

Definitions:

1. Linear Grading: Cost associated with grading of roadbeds.
2. Overhaul: Costs associated with hauling excavated material farther than a specified distance.
3. Mobilization: Costs associated with the movement of equipment.

AUDITOR COMMENTS

1

The appropriateness of IDOT's adjustment of the other states' pay item unit costs to include mobilization costs (Column 3) is questionable. IDOT's allocation of mobilization costs in Table 2 presumes that all pay items in a given state share a pro rata proportion of mobilization costs. However, during the course of the audit, IDOT officials stated that the proportion of mobilization costs in specific pay items varies.

Table 3

WORKERS' COMPENSATION INSURANCE RATES

Rates per $100 Payroll

	Class Code 5222 Bridge Workers in Highway Construction	**Class Code 5506* Streets & Roads Workers, Paving or Repaving**
Illinois	**$25.76**	**$9.76**
Iowa	$ 1 2 . 8 1	$8.70
Indiana	$ 7.04	64.74
Kentucky	$17.33	$8.89
Missouri	$13.35	$7.57
Wisconsin	$ 8.02	$7.70
Ohio	$ 9.29	$9.58
6 Comparison State Average	**$11.31**	**$7.50**
Illinois Over 6-State Average	**126.0%**	**30.2%**

● **5508** code not applicable in Wisconsin, so code 5507 was used. This classification includes streets and road workers, sub-surface, clearing right-of-way, excavation, filling and grading.

Source: The St. Paul Company, except Ohio source is from the Ohio Bureau of Worker's Compensation. Ohio is a 'monopolistic" state, and the workers' compensation insurance rate is set by the state government; every agency can only charge that rate.

No Auditor Comments have been included for this page.

Table 4

Structural Steel Costs Adjusted For Labor Differentials

City	Auditor General Price Per Pound.	% Labor	Labor Rate for Structural Steel Crew*	% Increase	Price Per. Pound	Rank Order
Chicago	0.92	15.6%	264.95	0%	0.92	6
Des Moines	1.03	15.6%	160.59	65%	1.13	2-Tie
Milwaukee	0.98	15.6%	221.99	19%	1.01	5
Louisville	1.23	15.6%	187.55	41%	1.31	1
Cleveland	0.87	15.6%	224.81	18%	0.89	7
Indianapolis	1.03	15.6%	201.15	32%	1.08	4
St. Louis/Kansas City	1.07	15.6%	197.04	34%	1.13	2-Tie

*Labor Rates obtained from the U.S. Department of Labor Statistics.
These rates are not adjusted for workers' compensation, unemployment insurance, overtime or work rule differences between union locals.

Crew Size: 2 Power Equipment Operators, and 5 Ironworkers

IDOT's adjustments of pay items for labor differentials have several limitations, some of which include:

- One metropolitan area's labor rates for selected positions were used to project the effect of labor on statewide data. One metropolitan area's labor rates are not representative of statewide labor rates. The metropolitan area used for Illinois was the Chicago metropolitan area which had the highest labor rates of all metropolitan areas reviewed in the report. (see page 45)

  The adjustment uses a single labor percentage for each pay item. The amount of labor included in each pay item can vary by project; the amount of labor needed may also vary from state to state. Also, the percentage labor was derived from information provided by IDOT road construction contractors which may or may not be representative of labor requirements in Illinois, or in other states.

  IDOT used the same crew size for each pay item for each state. However, crew sizes vary among states, and even within Illinois, for the same type of job.

Table 5

Excavation Costs Adjusted For Labor Differentials

City	Auditor General Price Per Cu. Yd.	% Labor	Labor Rate Operator & Laborer*	% Increase	Adjusted Price Per cu. Yd.	Rank Order
Chicago	4.24	**46.3%**	**62.77**	**0%**	4.24	**3**
Des Moines	**1.39**	46.3%	39.51	**59%**	1.79	**7**
Milwaukee	1.90	46.3%	**54.29**	16%	2.05	**5**
Louisville	3.66	46.3%	42.15	**49%**	4.77	**2**
Cleveland	3.73	46.3%	52.71	19%	4.07	4
Indianapolis	4.14	46.3%	45.87	37%	4.88	1
St. Louis/Kansas City	1.84	48.3%	51.40	22%	2.04	6

*Labor Rates obtained from the U.S. Department of Labor Statistics.
These rates are not adjusted for workers' compensation, unemployment insurance, overtime or work rule differences between union locals.

Crew Size: 1 Power Equipment Operator and 1 Laborer

IDOT's adjustments of pay items for labor differentials have several limitations, some of which include:

- One metropolitan area's labor rates for selected positions were used to project the effect of labor on statewide data. One metropolitan area's labor rates are not representative of statewide labor rates. The metropolitan area used for Illinois was the Chicago metropolitan area which had the highest labor rates of all metropolitan areas reviewed in the report. (see page 45)

- The adjustment uses a single labor percentage for each pay item. The amount of labor included in each pay item can vary by project; the amount of labor needed may also vary from state to state. Also, the percentage labor was derived from information provided by IDOT road construction contractors which may or may not be representative of labor requirements in Illinois, or in other states.

- IDOT used the same crew size for each pay item for each state. However, crew sizes vary among states, and even within Illinois, for the same type of job.

Table 6

Epoxy Reinforcement Rebar Costs Adjusted For Labor Differentials

City	Auditor General Price Per Pound.	% Labor	Labor Rate For Ironworker*	% Increase	Adjusted Price Per Pound	Rank Order
Chicago	**0.66**	46.2%	**38.89**	**0%**	0.66	4
Des Moines	0.51	46.2%	16.09	142%	0.84	1
Milwaukee	0.55	46.2%	31.97	22%	0.61	**6**
Louisville	0.63	**46.2%**	**27.73**	40%	**0.75**	**3**
Cleveland	0.56.	46.2%	**33.23**	17%	0.60	**7**
Indianapolis	**0.57**	46.2%	**29.59**	**31%**	**0.65**	**5**
St. Louis/Kansas City	0.68	46.2%	**28.35**	37%	0.80	**2**

*Labor Rates obtained from the U.S. Department of Labor Statistics.
These rates are not adjusted for workers' compensation, unemployment insurance, overtime or work rule differences between union locals.

Crew Size: 1 Ironworker (Except Iowa where laborers place reinforcement bars.)

AUDITOR COMMENTS

IDOT's adjustments of pay items for labor differentials have several limitations, some of which include:

- One metropolitan area's labor rates for selected positions were used to project the effect of labor on statewide data. One metropolitan area's labor rates are not representative of statewide labor rates. The metropolitan area used for Illinois was the Chicago metropolitan area which had the highest labor rates of all metropolitan areas reviewed in the report. (see page 45)

- The adjustment uses a single labor percentage for each pay item. The amount of labor included in each pay item can vary by project; the amount of labor needed may also vary from state to state. Also, the percentage labor was derived from information provided by IDOT road construction contractors which may or may not be representative of labor requirements in Illinois, or in other states.

- IDOT used the same crew size for each pay item for each state. However, crew sizes vary among states, and even within Illinois, for the same type of job.

Table 7

Plain Steel Rebar Costs Adjusted For Labor Differentials

City	Price Auditor General Per Pound.	% Labor	Labor Rate For Ironworker*	% Increase	Adjusted Price Per Pound	Rank Order
Chicago	0.59	48.8%	38.89	0%	0.59	6
Des Moines	0.44	48.8%	16.09	142%	0.74	1
Milwaukee	0.48	48.8%	31.97	22%	0.53	7
Louisville	0.59	48.8%	27.73	40%	0.71	3
Cleveland	0.58	48.8%	33.23	17%	0.63	4
Indianapolis	0.53	48.8%	29.59	31%	0.61	5
St. Louis/Kansas City	0.62	48.8%'	28.35	37%	0.73	2

*Labor Rates obtained from the U.S. Department of Labor Statistics.
These rates are not adjusted for workers' compensation, unemployment insurance, overtime or work rule differences between union locals.

Crew Size: 1 Ironworker (Except Iowa where laborers place reinforcement bars.)

IDOT's adjustments of pay items for labor differentials have several limitations, some of which include:

- One metropolitan area's labor rates for selected positions were used to project the effect of labor on statewide data. One metropolitan area's labor rates are not representative of statewide labor rates. The metropolitan area used for Illinois was the Chicago metropolitan area which had the highest labor rates of all metropolitan areas reviewed in the report. (see page 45)

- The adjustment uses a single labor percentage for each pay item. The amount of labor included in each pay item can vary by project; the amount of labor needed may also vary from state to state. Also, the percentage labor was derived from information provided by IDOT road construction contractors which may or may not be representative of labor requirements in Illinois, or in other states.

- IDOT used the same crew size for each pay item for each state. However, crew sizes vary among states, and even within Illinois, for the same type of job.

Table 8

Structural Concrete Costs Adjusted For Labor Differentials

City	Auditor General Price /Cu. Yd.	% Labor	$ Per Hour Labor Rate Structural Concrete Crew*	% Increase	Adjusted Price Per Cu. Yd.	Rank Order
Chicago	380.45**	64%	349.73	0%	380.45	2
Milwaukee	236.65	64%	296.31	18%	263.91	4
Cleveland	338.69	64%	293.16	19%	379.87	3
Indianapolis	324.08	64%	241 .00	35%	417.42	1

*Labor Rates obtained from the U.S. Department of Labor Statistics.
These rates are not adjusted for workers' compensation, unemployment insurance, overtime or work rule differences between union locals.

** $100 per cubic yard is deducted from the Auditor General's $480.45/c.y. due to specification differences for concrete superstructure. Illinois does not allow stay-in-place forms to be used and the cost of the' parapet is included unlike other states (such as Indiana) in the concrete superstructure pay item.

Crew Size: 3 Power Equipment Operators, 4 Laborers, 2 Finishers, and 2 Carpenters

IDOT's adjustments of pay items for labor differentials have several limitations, some of which include:

- One metropolitan area's labor rates were used to project the effect of labor on statewide data. One metropolitan area's labor rates for selected positions are not representative of statewide labor rates. The metropolitan area used for Illinois was the Chicago metropolitan area which had the highest labor rates of all metropolitan areas reviewed in the report. (see page 45)

- The adjustment uses a single labor percentage for each pay item. The amount of labor included in each pay item can vary by project; the amount of labor needed may also vary from state to state. Also, the percentage labor was derived from information provided by IDOT road construction contractors which may or may not be representative of labor requirements in Illinois, or in other states.

- IDOT used the same crew size for each pay item for each state. However, crew sizes vary among states, and even within Illinois, for the same type of job.

- IDOT's deduction of $100 from its unit price for superstructure concrete is inappropriate for several reasons. First, use of wood forms in Illinois is a requirement established by IDOT and therefore represents an ***actual*** cost of doing business in Illinois and should **not** be ***adjusted*** out of Illinois' unit cost. Second, IDOT does not make a similar adjustment to unit costs in Wisconsin and Ohio-states which, according to survey information collected by IDOT, also require wood forms (i.e., IDOT adjusted its unit cost down but did not reduce Ohio's and Wisconsin's unit costs). Finally, IDOT's adjustment is based on an interview with one contractor; another bridge contractor the OAG and IDOT interviewed did not mention the use of wood forms as a significant cost factor.

Table 9

Other Structural Concrete Costs Adjusted for Labor Differentials

City	Auditor General Price /Cu. Yd.	% Labor	$ Per Hour Labor Rate Structural Concrete Crew*		Adjusted Price Per	Rank
Chicago	375.03	61%	349.73	0%	375.03	2
Des Moines	223.63	61%	210.54	66%	313.66	4
St. Louis/Kansas City	276.39	61%	262.70	24%	319.15	3
Louisville	306.84	61%	226.11	55%	409.78	1

*Labor Rates obtained from the U.S. Department of Labor Statistics.
These rates are not adjusted for workers' compensation, unemployment insurance, overtime or work rule differences between union locals.

Crew Size: 3 Power Equipment Operators, 4 Laborers, 2 Finishers, and 2 Carpenters

IDOT's adjustments of pay items for labor differentials have several limitations, some of which include:

- One metropolitan area's labor rates for selected positions were used to project the effect of labor on statewide data. One metropolitan area's labor rates are not representative of statewide labor rates. The metropolitan area used for Illinois was the Chicago metropolitan area which had the highest labor rates of all metropolitan areas reviewed in the report. (see page 45)

- The adjustment uses a single labor percentage for each pay item. The amount of labor included in each pay item can vary by project; the amount of labor needed may also vary from state to state. Also, the percentage labor was derived from information provided by IDOT road construction contractors which may or may not be representative of labor requirements in Illinois, or in other states.

- IDOT used the same crew size for each pay item for each state. However, crew sizes vary among states, and even within Illinois, for the same type of job.

Table **10**

Bituminous Surface Costs Adjusted For Labor Differentials

City	Auditor General Price /Ton	% Labor	$ Per Hour Labor Rate Laydown Crew*	% Increase	Adjusted Price Per Ton	Rank Order
E. St. Louis/Peoria	34.03	17.3%	203.40	0%	34.03	2
Des Moines	27.32	17.3%	141.15	44%	29.40	3
Milwaukee	24.29	17.3%	201.71	1%	24.33	5
Louisville	33.29	17.3%	158.25	29%	34.96	1
Cleveland	23.58	17.3%	190.25	**7%**	23.87	6
Indianapolis	26.62	17.3%	171.54	19%	**27.49**	**4**
St. Louis/Kansas City	**23.37**	17.3%	186.63	**9%**	23.73	7

*Labor Rates obtained from the U.S. Department of Labor Statistics.
These rates **are not** adjusted for workers compensation, unemployment insurance, overtime or work rule differences between union locals.

Crew Size: **2** Power Equipment Operators **-** Paving Machine, 3 Power Equipment Operators **-** Rollers, and 2 Laborers

AUDITOR COMMENTS

IDOT's adjustments of pay items for labor differentials have several limitations, some of which include:

- One metropolitan area's labor rates for selected positions were used to project the effect of labor on statewide data. One metropolitan area's labor rates are not representative of statewide labor rates. The metropolitan area used for Illinois was the Chicago metropolitan area which had the highest labor rates of all metropolitan areas reviewed in the report. (see page 45)

- The adjustment uses a single labor percentage for each pay item. The amount of labor included in each pay item can vary by project; the amount of labor needed may also vary from state to state. Also, the percentage labor was derived from information provided by IDOT road construction contractors which may or may not be representative of labor requirements in Illinois, or in other states.

- IDOT used the same crew size for each pay item for each state. However, crew sizes vary among states, and even within Illinois, for the same type of job.

Table 11

Bituminous Binder Costs Adjusted For Labor Differentials

City	Auditor General Price /Ton	% Labor	$ Per Hour Labor Rate Laydown Crew*	% Increase	Adjusted Price Per Ton	Rank Order
Chicago	30.68	17.7%	229.64	0%	30.68	2
Des Moines	24.28	17.7%	141.15	63%	26.99	3
Louisville	29.60	17.7%	158.25	45%	31.96	1
Cleveland	21.38	17.7%	190.25	21%	‘22.17	6
Indianapolis	23.45	17.7%	171.54	34%	24.86	4
St. Louis/Kansas City	22.21	17.7%	186.63	23%	23.11	5

*Labor Rates obtained from the U.S. Department of Labor Statistics.
These rates are not adjusted for workers’ compensation, unemployment insurance, overtime or work rule differences between union locals.

Crew Size: 2 Power Equipment Operators.- Paving Machine, 3 Power Equipment Operators - Rollers, and 2 Laborers

AUDITOR COMMENTS

IDOT's adjustments of pay items for labor differentials have several limitations, some of which include:

- One metropolitan area's labor rates for selected positions were used to project the effect of labor on statewide data. One metropolitan area's labor rates are not representative of statewide labor rates. The metropolitan area used for Illinois was the Chicago metropolitan area which had the highest labor rates of all metropolitan areas reviewed in the report. (see page 45)

- The adjustment uses a single labor percentage for each pay item. The amount of labor included in each pay item can vary by project; the amount of labor needed may also vary from state to state. Also, the percentage labor was derived from information provided by IDOT road construction contractors which may or may not be representative of labor requirements in Illinois, or in other states.

- IDOT used the same crew size for each pay item for each state. However, crew sizes vary among states, and even within Illinois, for the same type of job.

Table 12

PCC Pavement Costs Adjusted For Labor Differentials

City	Auditor General Price Per Sq. Yd.	% Labor	Labor Rate for PCC Pavement	% Increase	Price Per Sq. Yd.	Rank Order
Chicago	29.87	22%	945.77	0%	29.87	3
Des Moines	21.28	22%	574.51	85%	24.32	8
Milwaukee	14.68	22%	824.65	15%	15.16	7
Louisville	33.73	22%	641.93.	**47%**	37.21	1
Cleveland	31.29.	22%	821.15	16%	32.33	2
Indianapolis	26.27	2 2 %	685.18	38%	28.47	4
St. Louis/Kansas City	26.24	22%.	818.38	1 6 %	27.16	5

*Labor Rates obtained from the U.S. Department of Labor Statistics.
These rates are not adjusted for workers' compensation, unemployment insurance, overtime or work rule differences between union locals.

Crew Size: 2 Teamster/Truck Drivers, 5 Power Equipment Operatdrs, 20 Laborers, and 6 Cement Finishers.

AUDITOR COMMENTS

[IDOT's adjustments of pay items for labor differentials have several limitations, some of which include:

- One metropolitan area's labor rates for selected positions were used to project the effect of labor on statewide data. One metropolitan area's labor rates are not representative of statewide labor rates. The metropolitan area used for Illinois was the Chicago metropolitan area which had the highest labor rates of all metropolitan areas reviewed in the report. (see page 45)

- The adjustment uses a single labor percentage for each pay item. The amount of labor included in each pay item can vary by project; the amount of labor needed may also vary from state to state. Also, the percentage labor was derived from information provided by IDOT road construction contractors which may or may not be representative of labor requirements in Illinois, or in other states.

- IDOT used the same crew size for each pay item for each state. However, crew sizes vary among states, and even within Illinois, for the same type of job.

Recommendation Number One

IDOT should develop procedures to more accurately track the associated costs for materials, such as establishing separate pay items for mobilization and QC/QA, and should consistently classify materials into the appropriate pay items category.

IDOT will incorporate separate pay items for mobilization and project engineering (QC/QA, contractor staking, etc.). It is anticipated this change will be incorporated into IDOT contracts let in the summer of '98.

Although we agree to implement this recommendation, IDOT does not believe this will reduce the total project cost. IDOT now advances three percent of the contract amount for mobilization to the contractor upon execution of a contract. Although IDOT does not have a separate pay item for QC/QA, contractors include this cost in various asphalt pay items. In both instances, the bottom line costs will virtually be the same with or without separating costs by creating more pay items.

No Auditor Comments have been included for this page.

Recommendation Number Two

The Illinois Department of Transportation should increase its efforts to encourage and develop competition on road construction projects in the State. IDOT should follow up with contractors who requested and received bid authorization, but then did not subsequently bid, to determine why they did not bid. IDOT could also routinely follow up with firms not requesting bid authorization to determine actions the State could take to get them to participate in the bidding process.

IDOT will follow up with contractors who requested and received bid authorization, but then did not subsequently bid beginning with the April 24, 1998 Letting. This information will be forwarded to the Director of Highways. IDOT will develop a survey form for prequalified firms that only infrequently request bid authorization to determine the reason(s) for their non-participation- in the bidding process. These forms will be sent on a regular basis beginning this fall. This information will be evaluated to determine if there are actions IDOT can take to encourage them to participate. An annual summary report of the results of these surveys will be sent to the Director of Highways.

Although we agree to implement these recommendations, IDOT does not believe they will be substantive in increasing competition and lowering costs. None of the six surveyed states demonstrated efforts to increase competition beyond IDOT's efforts.

No Auditor Comments have been included for this page.

Recommendation Number Three

IDOT should establish formal guidelines governing the award of roadbuilding contracts. Specifically, the guidelines should delineate the factors and criteria the Department will use in deciding whether to award or rebid a contract, such as the number of bidders, the size and nature of the project, and the amount that the lowest bid may exceed the engineer's estimate. Consideration should be given to formally adopting the guidelines for competition established by the FHWA, which suggest not awarding contracts to single bidders whose bid exceeds the engineer's estimate.

IDOT has guidelines to govern its awards committee in making decisions on awards. However, no written policies or procedures have been produced. IDOT will establish written guidelines governing the award of roadbuilding contracts that reflect the current award process and have them in effect for the June 12, 1998 Letting.

The report mentions that 43 projects were rebid by IDOT in 1996. One of the factors IDOT's award committee uses in making an awards decision is whether a rebid is likely to result in a lower or higher bid. The 43 projects looked at in this review are those which the awards committee felt would produce a lower bid if they were rebid. When these projects were rebid, the low bid-averaged eight percent lower than the original low bid, yielding a savings of $1.9 million. In 31 of the 43 projects, the original low bidder submitted an even lower bid when the project was rebid. The lower bids verify the awards committee's judgment.

IDOT follows the guidelines for competition established by Federal Highway Administration in Technical Advisories T5080.4 and T5080.6 and is considered by FHWA to be in compliance with those advisories.

FHWA guidelines recognize that projects in areas of historically poor competition specifically should be reviewed independently of FHWA or any alternative guideline. IDOT will continue to try to balance the need for roadwork in an area of poor competition against the cost of awarding to a single bidder such that the best interests of the taxpayers are served.

Although we agree to implement this recommendation, IDOT does not believe it will result in lower costs.

No Auditor Comments have been included for this page.

Recommendation Number Four

IDOT should review the capability of its current computer systems to identify bidding irregularities such as bid rigging/rotating and update them as necessary.

As detailed in the report, IDOT produces many reports aimed at detecting bidding irregularities and provides reports to the Attorney General's Office when circumstances warrant.

IDOT will continue to review the capability of our current computer systems to identify bidding irregularities.

No Auditor Comments have been included for this page.

Recommendation Number Five

The Illinois Department of Transportation should improve the accuracy of ifs project cost estimation process. The Department should identify cost areas where ifs estimates deviate from the lowest bid amount and promptly update the unit costs used in future estimates. The Department should continue to routinely check assumptions and allowances used in developing cost estimates and regularly review and update unit cost information to ensure if reflects current competitive construction unit costs.

IDOT believes its project cost estimation process is accurate and reliable. We note from FHWA data on accuracy of the engineer's estimate that Illinois is the only state among the six surveyed states that has met the 50% criteria every year of the past eight years on federally-funded projects. We also note that Illinois' percent of winning bids under the estimate is in a range of, or of a like magnitude of, four of the six surveyed states. See the attached chart entitled "Accuracy of Engineer's Estimate".

We believe Illinois is the only state among the six surveyed states that employs the method found in Technical Advisory T5080.6 of using both actual cost and historical data in preparing the estimate. IDOT uses detailed unit cost worksheets on the major work items that together usually total a substantial portion of the contract amount. These detailed unit cost sheets are project specific and reflect those costs dictated by current market conditions. IDOT uses historical data to estimate the costs related to those items of a lesser impact whose costs are slower to react to changes in the construction industry.

In 1992-l 993, IDOT's estimating procedures were reviewed and updated by a task force of construction, design, bridge and estimating personnel. In conjunction, construction production rates were reviewed and updated by a task force of construction, design and estimating personnel.

In 1992, IDOT revised the computer programs used in developing cost estimates in order to facilitate the review and updating of unit cost information. Also in 1992, IDOT implemented an estimator certification program to increase the uniformity and accuracy of'cost estimates.

IDOT believes it is appropriate to use an estimate that reflects the market in all situations. To use an estimate that is not representative of the market is to ignore reality.

IDOT agrees that it is essential that estimates be accurate and reliable. IDOT will continually strive to improve construction cost estimating by constantly monitoring, reviewing and updating our unit cost information.

No Auditor Comments have been included for this page.

. Ad&RACY OF ENGINEER'S ESTIMATE*

STATE	1992	1993	1994	1995	1996	5 Yr. Avg.
Illinois	**59.76**	**67.56**	**63.51**	**51 .11**	**51.40**	**58.67**
Illinois Rank	#1	#1	#1	#3	#4	#1
Indiana	38.57	35.89	41.66	31.67	38.33	37.22
Iowa	45.28	50.00	**49.52**	**52.46**	**56.86**	50.82
Kentucky	40.54	54.16	40.00	71.43	70.00	55.23
Missouri	53.33	63.46	50.00	45.33	48.33	52.09
Ohio	43.61	44.44	61.70	56.32	42.45	49.70
Wisconsin	53.19	**64.28**	**47.91**	**42.50**	**63.51**	**54.28**

***This information was compiled from the Bid Opening Reports provided by the FHWA and was received from the Internal Audits Division of the Missouri Department of Transportation.**

No Auditor Comments have been included for this page.

Recommendation Number Six

The Department of Transportation should not release the engineer's estimate to the public, even after the bids are opened.

IDOT currently keeps the engineer's estimate confidential until a project is considered awardable.

IDOT will implement not revealing the engineer's estimate beginning with the June 12, 1998 Letting.

However, since the estimate that is released is a single total project cost figure, IDOT does not believe keeping the estimate confidential will reduce costs.

No Auditor Comments have been included for this page.

Recommendation Number Seven

The Department of Transportation should continue its efforts to identify and evaluate differences in project requirements between Illinois and other states to identify areas where cost savings can be realized while maintaining the integrity of the project.

IDOT will continue its efforts to identify areas where cost savings can be realized while maintaining the integrity of the project. This includes identifying and evaluating differences in project requirements between Illinois and other states.

As their primary duties, IDOT has engineers assigned to the ongoing review of standards and specifications to keep them current with state-of-the art practices and to identify areas where cost savings can be realized by developing or revising standards and specifications. This includes ongoing communication with other states, both directly and through AASHTO, and regular discussions with material suppliers, manufacturers and other experts within the transportation field. The department's specification committee reviews and approves all proposed, new or revised specifications.

In evaluating the differences in project requirements between states, however, there are factors that must be considered in addition to costs. These include safety, quality/durability and service to the motorist by minimizing road closure times. For instance, certain aggregates may be required for their friction and durability characteristics which are not locally available and thus incur transportation costs. However, they provide anti-skid properties to the pavement which increase safety for the motorist.

IDOT allows fewer number of working days for many contracts than other states in order to complete construction sooner and open lanes to traffic. Reduction of delays to motorists can result in substantial user cost savings far beyond the additional cost required to expedite a contract.

Examples of conscious decisions IDOT has made to increase quality/durability include the use of removable forms for bridge decks so that the underside can be regularly inspected. Two other states use removable forms, while four states allow stay in place forms. IDOT specifications also regulate the speed of paving machines to 50 feet per minute to produce smoother pavements. Indiana regulates paver speed to 45 feet per minute. These types of decisions on project requirements may result in increased cost but produce a higher quality, more durable product which will result in lower costs over the life of the highway.

No Auditor Comments have been included for this page.

Recommendation Number Eight

IDOT should contact contractors whose prequalifications lapse, as well as existing contractors who are not prequalified, to identify if there are aspects of the IDOT prequalification or contracting process that may be hindering or limiting contractor participation.

IDOT will contact contractors whose prequalifications lapse to identify if there are aspects of the prequalification or contracting process that may be hindering or limiting contractor participation beginning immediately.

Although we agree to implement this recommendation, IDOT does not believe. it will lower costs.

No Auditor Comments have been included for this page.

Recommendation Number Nine

The Illinois Department of Transportation should improve ifs controls over the bid letting process by (a) discontinuing fhe practice of publishing fhe list of pofenfial bidders prior to the bid opening date; (b) supplying contractors with envelopes to use in submiffing bids, and stamping the receipt date on mailing envelopes and retaining the envelopes confracfors use to submif bids, information, and non-collusion affidavits; (c) increasing the number of bid leffings to at least one per month, and to more than one per month during peak construction periods; and (d) eliminating the bid collection box at DCCA and centralizing the collection of bids at the IDOT Central Office.

(a) IDOT believes it is important to publish the list of potential bidders. FHWA guidelines acknowledge both advantages and possible disadvantages of publishing the bidders' list. Specifically, FHWA recognizes the advantage of informing potential material suppliers and subcontractors of firms to contact to supply quotes for upcoming projects. IDOT believes that providing a bidders' list actually increases competition by allowing more subcontractors and suppliers to quote prices to bidders. The Auditor General's report points out that Illinois and all six surveyed states publish the bidders list. IDOT believes the advantage of publishing the list outweighs the potential for collusion.

(b) IDOT will provide envelopes for bidders once the consequences of the disclosure provisions of the new Illinois Procurement Code are understood insofar as envelope size, etc. are concerned. It is anticipated we will provide envelopes beginning with the September 18, 1998 Letting. Until then, IDOT will continue use of the identification form already required and will include a reminder in the Bulletin for the June 12, 1998 Letting, and others as needed, for bidders to carefully affix the provided form on the outside of the envelope identifying the contents as a bid. Although we agree to implement this recommendation, IDOT does not believe it will lower costs.

(c) The department has seven scheduled lettings per year. Three letting dates are scheduled prior to the start of the construction season to maximize the available time for contractors during the normal construction season from May 1 to November 30. A fourth letting date in June allows the possible advancement of projects from the next fiscal year to be advertised prior to July 1 but not awarded until after July 1 and an appropriation bill is signed. The three remaining dates are set for mid-summer or fall. Projects typically let on these lettings are short duration. maintenance projects or complex projects that require a full construction season or longer to build. This schedule allows contractors to arrange for the delivery of necessary materials (such as structural steel or traffic signal equipment) and utility relocations prior to starting work in earnest in the spring of the following construction season. IDOT does not believe that increasing the number of lettings to one or more per month will increase competition or reduce bid prices. In fact, more frequent lettings might increase bid prices due to less time to prepare bids resulting in greater risk and higher costs.

IDOT allows a five-week advertisement to give contractors subcontractors and suppliers adequate time to review the plans and specifications and prepare their bids. The current spacing of the lettings gives the department two weeks to review all bids before the next advertisement. If a bid is rejected, there is time to advertise the project again for the next letting.

No Auditor Comments have been included for this page.

(d) IDOT will eliminate the bid collection box at DCCA beginning with the June 12, 1998 Letting. For the April 24, 1998 Letting, 6 bids out of a total of 438 were received at the DCCA bid collection box.

No Auditor Comments have been included for this page.

Recommendation Number Ten

IDOT should review and update ifs list of employees required to file Statements of Economic Interests with the Board of Ethics and the Secretary of State fo ensure compliance wifh the Governor's Executive Order 77-3 and the Illinois Governmental Ethics Act, and IDOT should ensure that required Statements of Economic Interests are completed and submitted to the appropriate authorities.

Currently 1,205 IDOT employees file statements of economic interest with the Board of Ethics and 1,639 IDOT employees file statements of economic interest with the Secretary of State. The department is reviewing the filing requirements for both types of disclosure statements with respect to all positions in the department to ensure that the department and its employees are in compliance with the filing requirements established by the Board of Ethics and the Secretary of State. This analysis will be completed within 60 days.

AUDITOR COMMENTS

We selected 12 high level IDOT employees with key responsibilities in IDOT's contracting or review process, including contract administration, program management, cost estimates, contractor prequalification, and construction operations. We examined whether these key employees had filed economic interest statements. We found that 7 of the 12 employees did not file statements with the Board of Ethics. Three of the 12 also did not file statements with the Secretary of State.

Recommendation Number E/even

The Illinois Department of Transportation should continue efforts to reduce the number of avoidable change orders. Such efforts should include training and developing younger inexperienced staff, improving fhe design and consfrucfion staff review of final plans, and conducting post-construction meetings.

The ongoing efforts to reduce avoidable change orders will continue with emphasis on staff training and development, plan review and post-construction follow-up.

No Auditor Comments have been included for this page.

Recommendation Number Twelve

IDOT should continue to explore the possible uses of value engineering and other innovative contracting procedures as ways to reduce roadbuilding costs.

IDOT will continue exploration of innovative contracting procedures and encourage value engineering as ways to reduce costs and implement recommendations that prove beneficial.

No Auditor Comments have been included for this page.