

**REPORT
 HIGHLIGHTS**
 PERFORMANCE AUDIT

Subject

The Arizona Department of Transportation (ADOT) relies heavily on engineering consultants to design, develop, and manage highway projects, and on contractors to build and maintain the roads, bridges, and landscaping.

Our Conclusion

ADOT has increasingly used consultants to provide services traditionally provided by ADOT employees. ADOT should evaluate its use of consultants and identify ways to reduce use of consultants. To help ensure construction standards are complied with, ADOT should improve inspection consistency, documentation, and followup. ADOT also should address its backlog of consultant and construction contract audits.



2006

**ADOT Should Optimize
 Internal Resources
 To Reduce Consultant
 Usage**

ADOT's Intermodal Transportation Division (ITD) constructs and manages the State's highway system in five phases:

- **Scoping**—studies of where and when highways should be built;
- **Design**—project design, environmental studies, and right-of way acquisition;
- **Bidding**—selecting contractors to build highways;
- **Construction**—oversight of contractors building highways; and
- **Operation and maintenance**—oversight of maintenance, preservation, and landscaping once the highway is completed.

ITD relies heavily on consultants

ITD relies on consultants to provide services during the scoping, design, and construction phases. A 2003 national survey reported that almost all state departments of transportation use private consultants for the design and management of highway projects.

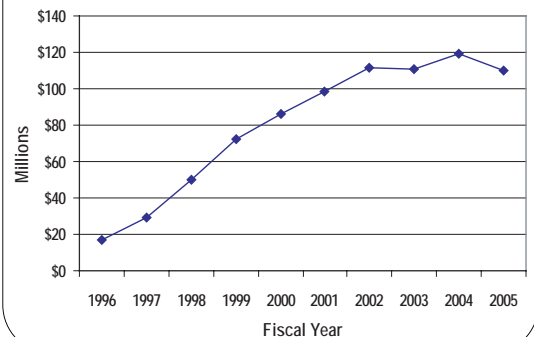
As of January 2006, ADOT had 430 contracts with 121 private consultants worth \$559 million. This included 72 contracts worth \$78 million with "supplemental consultants" who perform the duties of vacant employee positions, including resident engineers, field inspectors, and design engineers.



ADOT logo from Arizona Department of Transportation Web site.

The Governor's Efficiency Review Team reported that ADOT spends more on consultant contracts and uses more consulting services than all other Arizona state agencies combined.

Payments to consultants

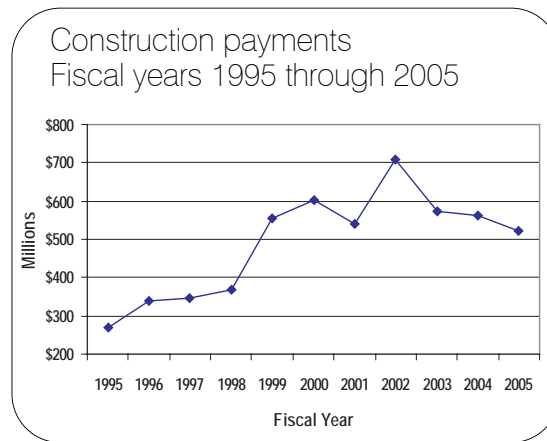


Increased consultant use—ADOT's use of consultants has increased by 424 percent over the last 10 years.

ADOT gives several reasons for the increased use of consultants, including:

- increased highway construction;
- increased complexity of construction projects; and
- high ADOT staff vacancies caused by low salaries.

Increased construction—The highway construction workload, as measured by construction payments, increased by about 76 percent from fiscal year 1999 to 2005, requiring more use of consultants.



28 percent vacancy rate—As of February 2006, almost 28 percent (79 of 286) of ADOT's engineering positions were vacant. ADOT attributes the high vacancy rate to employees retiring or leaving for the higher salaries paid by private consulting firms. A November 2005 ADOT salary survey disclosed that ADOT technical and engineering salaries were 13 to 26 percent lower than comparable public and private positions, even after a 5 percent pay increase.

Risks—The risks of using consultants include higher costs and lost competency. Most studies on the use of consultants in state departments of transportation agree that using consultants increases the cost of services.

Further, national research also shows that high consultant use can affect the ability to maintain employee core competencies, because state employees may not get enough experience with core functions and must spend more time monitoring consultant activities and contracts than performing core functions. Adding to this concern is a decline in experience levels among ADOT's engineers. For example, from 2000 to 2006, the average experience level for ADOT engineers has decreased by 2 years.

Need to evaluate consultant use

In addition to continuing its efforts to fill its vacancies, ITD needs to collect data to evaluate consultant usage. Better information can help ITD identify consultant work that could be done by in-house staff if sufficient in-house resources were available, and to analyze whether doing more in-house work could be cost-effective.

Recommendations

ADOT should:

- Fill existing vacancies;
- Continue to develop strategies to recruit and retain employees;
- Develop criteria for deciding when to use consultants;
- Perform more work in-house when appropriate and staff are available; and
- Track and monitor consultant usage.

ADOT Should Improve Highway Construction Inspections

More than 220 ADOT field inspectors observe contractors' compliance with construction specifications and standards. These inspectors have the authority to reject work or materials that

do not comply with plans and specifications. In addition to daily inspections, ADOT conducts at least one independent quality assurance (QA) inspection of each project.

ADOT can improve field inspections

ADOT can take several actions to improve its field inspections.

Inspections not fully recorded—Although field inspectors conduct daily inspections, they do not consistently record their observations and whether work met specifications. They also do not record whether problems were resolved. For example, in one instance, an inspector rejected 10 feet of concrete pipe and the contractor later removed 6 feet of the pipe. However, there was no documentation explaining the problem, nor why only part of the 10 feet of pipe was removed.

Checklists not used—Inspectors are given checklists to ensure that contractors complete the most critical aspects of construction properly. There are over 80 checklists that cover various parts of construction, such as concrete curing, grading, and concrete box culverts. However, we reviewed 9 projects and found that 27 of 47 inspectors failed to fill out any checklists.

ADOT has taken steps to make it easier to use checklists. Online database checklists are available on inspectors' laptop computers, and ITD has formed teams to create new checklists.

Application of inspection standards varies—Inspection results vary between field inspectors and QA inspectors. QA inspectors appear to apply a stricter

interpretation of quality standards than do field inspectors. As a result, based on two projects:

- Field inspectors determined work met standards 66 percent of the time, and
- QA inspectors found work met specifications only 35 percent of the time.

Field inspectors lack experience—An ADOT official stated that inspectors need about 5 years' experience to become fully proficient, and inspectors with less experience are usually assigned less-technical work. However, many field inspectors are relatively inexperienced.

Quality assurance inspections lack followup

Although QA inspectors may apply stricter standards, they cannot reject or change work in progress as the field inspectors are empowered to do. They can only recommend to ADOT project personnel that the work processes be changed.

Further, ITD does not require followup when QA inspections have significant findings. Of 1,970 QA inspections, 1,586 (80 percent) identified one or more critical or major noncompliant items. Critical noncompliant items include some that may potentially pose risks to human life, while major noncompliant items can have an impact on the quality of a project. ADOT does not require follow up on these noncompliant items.

ADOT Field Inspectors:

- 34 percent of inspectors had fewer than 5 years' experience
- 29 percent of inspectors were hired into lower-level positions because ADOT could not recruit someone who met the minimum position qualifications
- 32 percent of the positions were vacant.

Recommendations

ADOT should:

- Ensure that field inspectors document inspection results and consistently complete checklists;
- Provide training to inspectors and ensure that field inspectors and QA inspectors similarly apply standards; and
- Require followup for major and critical noncompliant items found by QA inspections.

ADOT Needs To Improve Its Contract Audits

ADOT is required to audit its consulting and construction contracting processes. ADOT uses audits to help it:

- Determine if consultant overhead billing rates are appropriate;
- Ensure that costs that are charged are proper;
- Ensure contractors comply with contract requirements governing payments, change orders, materials testing, etc.; and
- Ensure that ADOT staff follow ADOT's contract management requirements.

Audits help protect state dollars

Auditing helps detect overcharges and/or failures to deliver services. For example, one audit completed in September 2003 questioned \$272,500 in payments made to a contractor. Another audit completed in July 2004 found errors in the quantities of concrete delivered and questioned the payment of \$300,000.

Audits severely backlogged

ADOT has a 16-person unit within its Office of Audits and Analysis (Office), which is responsible for contract audits. However, the Office has hundreds of backlogged audits dating back to 2001. Of particular concern, many of the

backlogged audits involve large construction projects. The Office has only conducted about 74 percent of the required audits for the 10 largest construction projects, which range in value from \$15.7 to \$221 million.

Further, when the Office conducts audits it does not always issue its reports in a timely manner. At least 14 of 17 construction cost and administrative compliance audit reports issued in the first half of FY 2006 were issued, on average, 371 days after the reports were drafted.

Poor management and other problems

Several factors have contributed to the audit problems. The Office has not been able to fill 7 of its 16 positions. However, it has also not adequately managed the staff it has. For example, it has not followed its own policy to prioritize audits to ensure the projects with the highest risks are audited. Also, it has not tracked basic information such as the number of audits scheduled, in progress, and completed for recent fiscal years. In fact, the previous chief auditor suspended the use of performance measures and tracking reports. A new chief auditor hired in January 2006 is taking actions to correct the problems.

Recommendations

ADOT should:

- Fill audit staff vacancies;
- Ensure that the highest-risk projects are audited; and
- Reinstigate performance measures for its audit unit.

TO OBTAIN MORE INFORMATION

A copy of the full report can be obtained by calling
(602) 553-0333



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Contact person for this report:
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