United States Government Accountability Office

Report to Congressional Committees

April 2022

FEDERAL-AID HIGHWAYS

Information on State Use and Oversight of Engineering Consultants

GAO-22-104713

GAO Highlights

Highlights of GAO-22-104713, a report to congressional committees

April 2022

FEDERAL-AID HIGHWAYS

Information on State Use and Oversight of Engineering Consultants

Why GAO Did This Study

The federal-aid highway program is the primary source of federal funding for projects that build and preserve the nation's roads and bridges. The Infrastructure Investment and Jobs Act authorized an average of about $54.6 billion annually for this program. FHWA apportions this program's funding to state DOTs and provides oversight and technical assistance to them. State DOTs are generally responsible for implementing these federal-aid highway construction projects and are authorized by statute to contract with private engineering firms (engineering consultants) to help them do so.

The Explanatory Statement accompanying the Further Consolidated Appropriations Act, 2020 included a provision for GAO to review state DOTs' use of engineering consultants for federally funded projects. This report describes (1) state DOTs' use of engineering consultants on federal-aid highway construction projects and the factors that affect their decisions to do so, and (2) how FHWA oversees state DOTs' use of engineering consultants on federal-aid highway construction projects, among other things.

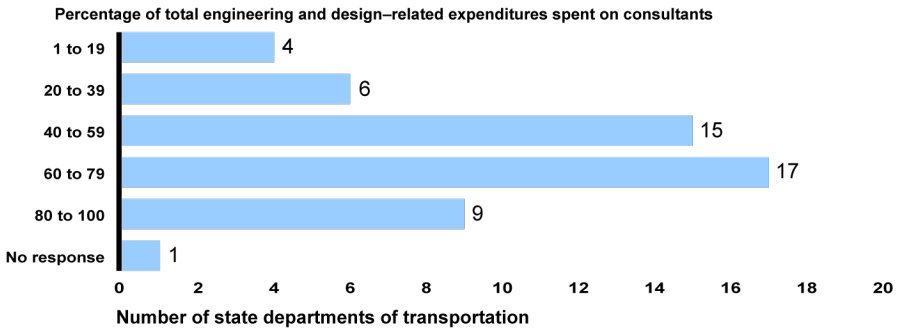
GAO surveyed all state DOTs (which include all 50 states, Washington, D.C., and Puerto Rico for 52 total); reviewed applicable statutes and regulations, and documentation from FHWA division offices and state DOTs in eight selected states; and interviewed officials from FHWA, state DOTs, and stakeholders in these selected states. GAO selected these states to obtain variation in the number of federal-aid lane-miles and geographic locations, and other factors.

View GAO-22-104713. For more information, contact Elizabeth Repko at (202) 512-2384 or RepkoE@gao.gov.

What GAO Found

In a survey GAO administered, state departments of transportation (state DOT)—in all 50 states, Washington, D.C., and Puerto Rico—reported using engineering consultants to assist them on federal-aid highway construction projects. The most important factors affecting state DOTs' decisions to use these consultants were related to the size and skills of their workforces. State DOT officials reported using engineering consultants on a variety of federal-aid highway construction projects, such as for bridge replacement. Moreover, half of state DOTs reported that they spent at least 60 percent of their engineering and design-related expenditures for these projects on engineering consultants. (See figure.) Almost all state DOTs (50 of 52) reported that factors related to state DOT workforce size and skills were very or moderately important in their decisions whether to use engineering consultants. For example, New Hampshire DOT officials said they used engineering consultants to supplement their staff and expedite project delivery during the summer construction season.

State Department of Transportation-Reported Use of Engineering Consultants on Federal-Aid Highway Construction Projects in the States' Most Recent Fiscal Year



Source: GAO survey of state departments of transportation. | GAO-22-104713

Note: For more details, see figure 1 in GAO-22-104713.

The Federal Highway Administration (FHWA) primarily oversees state DOTs' use of engineering consultants on federal-aid highway construction projects by ensuring that they have written policies and procedures for their use under federally funded contracts, and by assessing risks. Officials from FHWA division offices in eight selected states said they reviewed and approved state DOTs' written policies and procedures related to their use of engineering consultants, as required by regulation. GAO reviewed selected state DOTs' written policies and procedures and found they generally addressed items required by regulation related to engineering consultant contracts. FHWA also annually assesses risks to state DOTs' use of engineering consultants. According to FHWA's most recent assessments, state DOTs' use of engineering consultants generally poses a low risk to their respective federal-aid highway construction projects. FHWA officials also said that state DOTs addressed the few risks related to the use of engineering consultants that division offices had identified in assessments. For example, in response to an FHWA assessment, the California DOT established a new procedure to ensure conflict of interest decisions are documented.

Contents

Abbreviations

CAP	Compliance Assessment Program
FAHP project	federal-aid highway construction project
FHWA	Federal Highway Administration
state DOT	state department of transportation

U.S. GOVERNMENT ACCOUNTABILITY OFFICE
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April 19, 2022

The Honorable Brian Schatz
Chair
The Honorable Susan Collins
Ranking Member
Subcommittee on Transportation, Housing and Urban Development, and Related Agencies
Committee on Appropriations
United States Senate

The Honorable David Price
Chair
The Honorable Mario Diaz-Balart
Ranking Member
Subcommittee on Transportation, and Housing and Urban Development, and Related Agencies
Committee on Appropriations
House of Representatives

Federally-funded projects to construct, improve and maintain roads and bridges are fundamental to ensuring the nation's transportation system is safe, efficient, and reliable. The federal-aid highway program is the primary means of federal investment in road and bridge projects. Enacted in November 2021, the Infrastructure Investment and Jobs Act authorized an annual average of about $54.6 billion in funding for fiscal years 2022 through 2026 for the federal-aid highway program, through which the Federal Highway Administration (FHWA) provides funding to states to implement these projects.[1] FHWA also provides assistance to and oversight of state departments of transportation (state DOT) to help ensure they comply with applicable federal statutes and regulations when using federal-aid highway program funds, including those governing

[1]Pub. L. No. 117-58, § 11101(a)(1), 135 Stat 429, 443 (2021). This amount of funding represents a $13.2 billion increase from the annual average of about $41.4 billion authorized for fiscal years 2016-2020 under the last major surface transportation reauthorization act. Fixing America's Surface Transportation Act, Pub L. No. 114-94, § 1101(a)(1), 129 Stat. 1312, 1322 (2015).

project design, construction, and contract administration.[2] State DOTs generally select and prioritize eligible projects that will receive these funds and manage them, at times hiring private contractors to help.

In January 2008, we reported that state DOTs have increasingly used private contractors to deliver highway construction projects.[3] Specifically, state DOTs we surveyed in 2008 reported that over the prior 5 years they had increased the amount of contracting they used for engineering services, such as drafting preliminary designs of projects and inspecting completed construction and engineering work. We also reported that state DOT officials said that using contractors allowed them to obtain the staffing and expertise necessary to ensure timely delivery of their highway programs, given state DOTs' resource constraints. However, it is unclear how the costs of using engineering consultants—contractors that perform engineering and design-related services—compare to the costs of using state DOT staff for the same type of work.[4]

The Explanatory Statement accompanying the Further Consolidated Appropriations Act, 2020, included a provision for us to report on how state DOTs complete engineering and design-related work for federally-funded highway construction projects.[5] This report describes (1) the extent to which state DOTs use engineering consultants on federal-aid highway construction projects and the factors that affect their decisions to do so; (2) what is known about the comparative costs of state DOTs' use of engineering consultants and state DOT staff for engineering and design-related work on federal-aid highway construction projects; and (3)

[2]For the purposes of the federal-aid highway program, "state" refers to any of the 50 states, the District of Columbia, or Puerto Rico. 23 U.S.C. § 101(a)(28). In total, there are 52 state DOTs.

[3]GAO, *Federal-Aid Highways: Increased Reliance on Contractors Can Pose Oversight Challenges for Federal and State Officials*, GAO-08-198 (Washington, D.C.: Jan. 8, 2008). We made two recommendations to the Department of Transportation about FHWA's oversight of state DOTs' use of private contractors, including engineering consultants. The agency implemented both recommendations in 2010.

[4]Private firms or individuals that provide engineering and design-related services under federally-funded contracts with state DOTs are referred to as consultants in FHWA's regulations. 23 C.F.R. § 172.3. For the purposes of this report, we refer to them as "engineering consultants".

[5]Staff of H. Comm. on Appropriations, 116th Cong., *Explanatory Statement on Further Consolidated Appropriations Act, 2020,* Pub. L. No. 116-94, 133 Stat. 2534 (2019), at 1179 (Comm. Print 2020).

how FHWA oversees state DOTs' use of engineering consultants on federal-aid highway construction projects.

To address each of these objectives, we reviewed applicable statutes and regulations, and our prior work on the federal-aid highway program. In addition, we interviewed FHWA headquarters officials and representatives from selected national industry stakeholder groups representing professionals involved in federal-aid highway construction projects managed by state DOTs.[6] We also reviewed the use of engineering consultants within a sample of eight states.[7] We selected these eight states to obtain variation in geographic location, number of federal-aid highway system lane-miles, availability of reports comparing costs of using engineering consultants to the state DOT's staff, and presence of labor unions or employee associations representing state DOT staff. Within these states, we interviewed officials from state DOTs about their use of engineering consultants from 2016 through 2021. Although the results of our interviews are not generalizable to all state DOTs, they provide varied perspectives on state DOTs' use of engineering consultants and any related costs, and FHWA's oversight efforts.

To identify the extent to which state DOTs use engineering consultants on federal-aid highway construction projects and the factors that drive their decisions to do so, we surveyed state DOTs representing all 50 states, the District of Columbia, and Puerto Rico from June to October 2021. We received responses on our survey from all 52 state DOTs and analyzed the results.[8] We also corroborated survey responses related to why state DOTs use engineering consultants by reviewing 2008 and 2018 state DOT workforce data from the U.S. Census Bureau. We assessed the reliability of this data by reviewing related documentation and found the data to be sufficiently reliable for the purposes of our reporting objectives.

[6]We interviewed representatives from American Association of State Highway Transportation Officials, American Council of Engineering Companies, American Society of Civil Engineers, and National Association of State Highway and Transportation Unions.

[7]Our eight selected states were California, Connecticut, Iowa, Louisiana, New Hampshire, North Carolina, Texas, and Utah.

[8]Further information on this web-based survey and the corresponding results can be found in appendix I.

To gather additional perspectives on factors related to state DOTs' use of engineering consultants, we interviewed stakeholders within our eight selected states. Specifically, we interviewed officials from state audit organizations in six states, four labor organizations, and four engineering firms that have performed engineering and design-related services for federal-aid highway construction projects.[9] To identify which states in our sample had labor union or employee associations representing state DOT employees, we gathered information from state DOT and stakeholder interviews and reviewed labor organization websites. We interviewed all labor groups we identified.[10] We identified a potential pool of engineering firms to interview based on a review of state DOT websites and stakeholder recommendations. From this pool, we selected and interviewed a non-generalizable sample of four engineering firms of different sizes, one of which is certified as a disadvantaged business enterprise.[11] The interviews with state audit organizations, labor organizations, and engineering firms are not generalizable across the population of these groups, but these interviews provided perspectives on state DOTs' use of engineering consultants.

To identify what is known about the comparative costs of state DOTs' use of engineering consultants and state DOT staff for engineering and design-related work on federal-aid highway construction projects, we reviewed reports and documents provided by state DOTs and other stakeholders. We also interviewed the state audit organizations, labor

[9]We interviewed state auditing organizations in Connecticut, Iowa, Louisiana, New Hampshire, North Carolina, and Utah. We did not interview state auditing organizations from California and Texas because they told us they had not conducted prior work related to state DOTs' use of engineering consultants on federal-aid highway construction projects.

[10]These labor organizations were the Connecticut State Employees Association/Service Employees International Union Local 2001, Professional Engineers in California Government, State Employees Association/Service Employees International Union Local 1984 (New Hampshire), and Utah Public Employees Association.

[11]We interviewed representatives from HNTB Corporation (Central Division), Mark Thomas Company, Nobis Group, and Stanley Consultants. These firms have performed engineering and design-related services on federal-aid highway construction projects for six of our eight selected states. For the purposes of the federal-aid highway program, disadvantaged business enterprises are generally defined as for-profit small businesses predominantly owned and operated by socially and economically disadvantaged individuals, such those belonging to racial minorities and women. 23 U.S.C. § 101 note; 49 C.F.R. § 26.5.

organizations, and engineering firms from our selected states as described above.

To describe how FHWA oversees state DOTs' use of engineering consultants, we reviewed FHWA guidance for state DOTs on procuring engineering and design-related services and overseeing engineering consultants on federal-aid highway construction projects, and other FHWA headquarters and division office documents outlining various oversight efforts. For our selected states, we reviewed each state DOT's written policies and procedures regarding the use of engineering consultants, which state DOTs prepare and maintain and FHWA approves. We reviewed these state DOTs' approved written policies and procedures to determine whether they generally addressed the applicable items listed in regulation.[12] We also interviewed FHWA officials in each of the division offices within our selected states.

We conducted this performance audit from January 2021 through April 2022 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Background

Federal-Aid Highway Program Construction Projects

The federal-aid highway program refers to a collection of FHWA-administered grant programs that provide federal funding to states to build, improve, and preserve the nation's roadway and bridge infrastructure. Federal-aid highway program funding is primarily used for highway planning, design, and construction activities for about 1 million of the nation's 4 million miles of roads, most of which are locally or state owned and operated.[13] FHWA apportions federal-aid highway program funding to state DOTs, while also providing oversight and technical assistance to them. State DOTs may expend these funds for the

[12]These items are located in 23 C.F.R. § 172.5(c). We did not further assess whether the policies and procedures addressing the items complied with applicable federal and state requirements.

[13]The about 1 million miles of federal-aid eligible roads include the approximately 220,000-mile National Highway System, of which the nearly 49,000-mile Interstate System is a part.

planning, design, construction, reconstruction, and rehabilitation of eligible highways and bridges and for related activities, such as hiring contractors to help complete federal-aid highway construction projects. State DOTs are generally responsible for implementing these projects and overseeing project development and construction.

A State DOT-implemented federal-aid highway construction project commonly has four distinct phases: planning, preliminary design, final design and right-of-way acquisition, and construction.[14]

- **Planning:** State DOTs assess the need for a project in relation to other transportation needs and consider alternatives.
- **Preliminary design:** State DOTs identify potential transportation solutions including performing certain preliminary engineering activities, determining design concepts, identifying the general project location, estimating project costs, and performing studies needed to address environmental review requirements.
- **Final design and right-of-way acquisition:** State DOTs develop detailed engineering plans, finalize construction design, and acquire property.
- **Construction:** State DOTs award construction contracts and oversee construction, including inspecting work to ensure compliance with plans and specifications.

State DOTs may use their own staff or contract with private firms to perform engineering and design-related services. Specifically, state DOTs are expressly authorized by statute to contract with private engineering firms to the extent necessary or desirable to implement federal-aid highway construction projects.[15] Engineering and design-related services include program and construction management, preliminary and design engineering, surveying, and other engineering services performed by licensed professionals.[16] These services can occur during any phase of a

[14]Federal-aid highway construction projects are generally defined as any project or activity eligible for federal-aid highway program funds and includes the supervision, inspection, and actual building of these projects. 23 U.S.C. § 101(a). State DOTs may distribute federal-aid highway program funding to entities within their states, such as local public agencies, for them to implement projects. We focused on state DOT-implemented projects for the purposes of this report.

[15]23 U.S.C. § 302(a).

[16]23 C.F.R. § 172.3.

construction project. For example, engineering consultants may assess alternative designs during the preliminary design phase, and may inspect completed engineering work during the construction phase. Firms that provide engineering and design-related services to state DOTs range from multinational firms to smaller companies that only work on projects within one state, and that may specialize in certain types of work, such as designing movable bridges.[17] State DOTs may use federal, state, and other funds, or any combination of them, to pay or reimburse the costs of engineering and design-related contracts.

FHWA Oversight of State DOTs

FHWA uses a decentralized organizational structure to administer the federal-aid highway program. In this decentralized structure, oversight and administration of the program is largely delegated to FHWA's 52 division offices, one located in each of the 50 states, the District of Columbia, and Puerto Rico. According to FHWA, through its division offices, it engages in a range of activities to encourage the effective and efficient use of federal-aid highway funding and assists states in advancing projects through construction. To accomplish these tasks, FHWA works with states to identify and solve project issues and provides technical assistance and training to state DOTs. FHWA also must authorize state DOTs' proposed federal-aid highway construction projects before they may proceed with procuring engineering and design-related services for the projects.[18] To assess and ensure state DOTs' compliance with federal statutes and regulations, FHWA's division offices conduct oversight of these federally funded projects and review state DOT capacity and systems to administer authorized projects. In addition, FHWA division offices conduct annual assessments of state DOTs' programs (e.g., design program, construction program), to determine where to focus additional oversight activities.

FHWA uses a risk-based approach to decide how to divide project-level oversight responsibilities with state DOTs.[19] In this approach, FHWA seeks to balance risks of delegating certain responsibilities to state DOTs

[17]According to the American Council of Engineering Companies, the majority of the 6,000 member companies that it represents contract with public agencies in the U.S., including state DOTs, for engineering and design-related services.

[18]23 C.F.R. §§ 630.106, 630.205.

[19]State DOTs are generally permitted and in some cases required by statute to assume specific project-level responsibilities, such as design, cost estimates, contract awards, and inspection. 23 U.S.C. § 106(c)(1)-(2).

with its own staffing resources, available funding, and a state's overall transportation needs. While state DOTs conduct project-level oversight on the majority of federal-aid highway construction projects, FHWA must retain project-level oversight on a limited number of high-risk projects.[20] In cases where FHWA and the state DOT share oversight responsibilities, their respective responsibilities are generally mapped out in a state-specific Stewardship and Oversight Agreement. For example, FHWA's most recent Stewardship and Oversight Agreement guidance, published in 2015, outlines that for certain projects its division offices may assign some project-level responsibilities to state DOTs, such as approving final inspections of completed construction work.

Federal Requirements for State DOTs

When using federal-aid highway program funds, states must adhere to applicable federal and state statutes and regulations. If a state DOT decides to request reimbursement of engineering consultant contract costs in whole or in part with these funds, it must comply with certain FHWA requirements.[21] These requirements include:

- **Qualifications-based selection procurement.** State DOTs generally must use a qualifications-based selection method to procure engineering and design-related services, in compliance with the Brooks Act.[22] Under FHWA's regulations implementing this act, state DOTs may not use price or costs as a factor to evaluate, rank, and select engineering firms and instead generally must use criteria such as experience, expertise, and past performance. After a state DOT selects the most highly qualified firms through this process, it then considers and negotiates the costs of a firm's services for potential contract award.
- **Written policies and procedures.** State DOTs must prepare and maintain written policies and procedures for the procurement, management, administration, and oversight of engineering consultants' services.[23] In these written policies and procedures, state DOTs are required to address, as appropriate, 18 items listed in

[20]23 U.S.C. § 106(c)(4).

[21]FHWA's requirements applicable to the procurement, management, and administration of engineering and design-related services are located in 23 C.F.R. Part 172.

[22]23 U.S.C. § 112(b)(2). The Brooks Act has governed the federal procurement of architectural and engineering services since 1972. Pub. L. No. 92-582, 86 Stat. 1278 (codified as amended at 40 U.S.C. §§ 1101-1104).

[23]23 C.F.R. § 172.5(a), (c).

regulation, and these policies must comply with federal and state statutes and regulations. For example, state DOTs must have a written policy or procedure addressing how they will prevent, identify, and mitigate conflicts of interest for both state DOT staff and engineering consultants.[24]

- **Capacity and resources.** State DOTs must develop and sustain organizational capacity and provide the resources necessary for the procurement, management, and administration of engineering services. As part of this process, state DOTs are required to establish a procedure for estimating the costs of services needed and associated state DOT staffing and resources to manage and oversee engineering consultants. According to FHWA, these resource estimates can show whether the state DOT is suitably equipped and organized to use engineering consultants.
- **Approval for engineering consultant in management role.** State DOTs must receive FHWA's advance approval to use an engineering consultant in a management support role.[25] Management support role services may include managing or providing oversight of a project or the work of other consultants and contractors on the state DOT's behalf and are subject to review and oversight by the state DOT. As part of this oversight, FHWA requires state DOTs to employ and designate a full-time engineer as being in responsible charge of the project.[26]
- **Cost eligibility.** State DOTs must ensure the costs of engineering services are eligible for reimbursement with federal-aid highway program funds. This requirement means that the costs are allocable to a specific contract with a consultant for work directly related to implementing a federal-aid highway project and the costs are allowable under applicable federal cost principles.[27]

[24]23 C.F.R. § 172.5(c)(3).

[25]FHWA regulations also provide that the use of engineering consultants in these roles should be limited to certain circumstances, such as when unique technical or managerial expertise is required. 23 C.F.R. § 172.7(b)(5).

[26]Being in responsible charge includes, for example, being familiar with the qualifications and responsibilities of the consultant's staff and evaluating any requested changes in key personnel. 23 C.F.R. § 172.9(d); *see also id.* § 635.105(b).

[27]The applicable federal cost principles are located in 48 C.F.R. Part 31 of the Federal Acquisition Regulation.

All State DOTs Use Engineering Consultants, Primarily due to the Size and Skills of the State Workforce

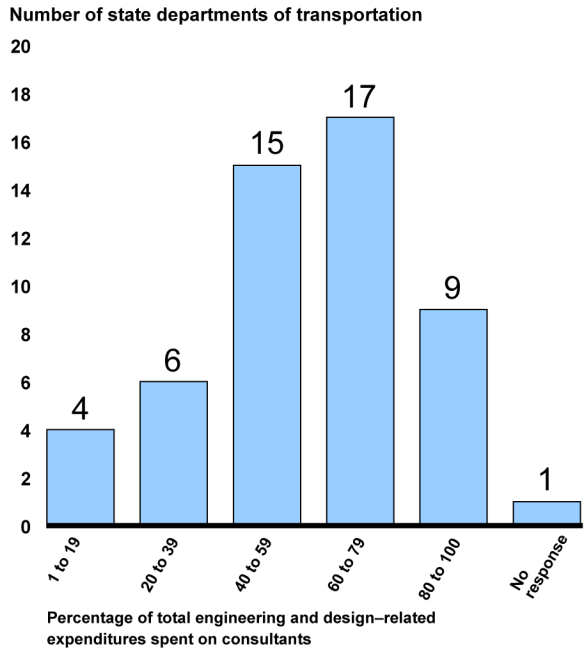
All State DOTs Use Engineering Consultants on Federal-Aid Highway Construction Projects, and Half Use Them Extensively

State DOTs rely on engineering consultants to assist them with engineering and design-related work on federal-aid highway construction projects. Specifically, all state DOTs (52 of 52) reported in our survey that they used engineering consultants for these projects in the last fiscal year.[28] Moreover, half of state DOTs (26 of 52) reported they used engineering consultants extensively. These state DOTs reported that their spending on engineering consultants accounted for 60 percent or more of their total engineering and design-related expenditures on federal-aid highway construction projects.[29] (See fig. 1.) Officials from all eight selected states we interviewed said they used these consultants to complete work on a variety of projects, such as bridge replacements, right-of-way appraisals, and highway preservation. However, officials from three selected state DOTs said expenditures for engineering and design-related work account for a relatively small percentage of their total federal-aid highway construction project expenditures, which include funds spent on construction, labor, and materials.

[28]We surveyed 52 state DOTs from June to October 2021 with a 100 percent response rate. Further information on this web-based survey and the corresponding results can be found in appendix I.

[29]These engineering and design-related expenditures included direct expenditures, such as wages, and indirect expenditures, such as overhead, and may be funded from federal, state, and other funding sources. According to selected state DOT officials, overhead expenses include funding for employee benefits, operation of facilities and equipment, and administrative expenses.

Figure 1: State Department of Transportation-Reported Use of Engineering Consultants on Federal-Aid Highway Construction Projects in the States' Most Recent Fiscal Year



Source: GAO survey of state departments of transportation. | GAO-22-104713

Note: The total engineering and design-related expenditures for federal-aid highway construction projects include direct expenditures, such as wages, and indirect expenditures, such as overhead.

Further, almost all (48 of 52) state DOTs responded that their use of engineering consultants for federal-aid highway construction projects increased or remained the same over the last 5 years. DOT officials from half of our eight selected states explained that their DOTs' reliance on engineering consultants had increased over time because their workloads had increased, while the number of state DOT staff had not. Officials from two other selected state DOTs said their use of consultants fluctuated year to year, depending on workload needs and amount of available funding. In 2008, we reported that a majority of state DOTs anticipated either increasing or maintaining the same level of use of contractors and consultants across all categories of highway construction activities, including engineering and design-related services.[30]

[30]GAO-08-198. For this report, we surveyed the state DOTs in 50 states.

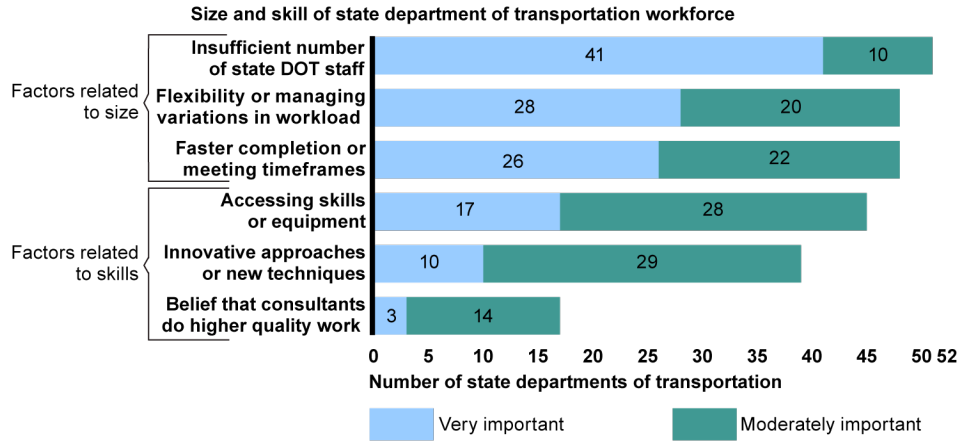
Many state DOTs (32 of 52) also reported using engineering consultants in management support roles. However, most of these 32 state DOTs (21 of 32) said they use engineering consultants infrequently in this capacity—on less than 20 percent of their federal-aid highway construction projects. For example, Connecticut DOT officials said they mainly use consultants in management support roles on larger projects, such as bridge corridors and bus express lanes, to perform project administration and oversee other consultants who are performing engineering and design-related work. Representatives from two labor organizations in selected states told us they were concerned about the use of engineering consultants in such roles, specifically in cases where consultants performed inspections of engineering work performed by other consultants. According to these representatives, state DOT staff are more effective than engineering consultants at safeguarding the public interest, including the safety and quality of infrastructure. However, officials from each of the three selected state DOTs that use engineering consultants in management support roles told us that state DOT staff always supervise such consultants, as required by regulation.

State DOTs Use Engineering Consultants Primarily Due to Factors Related to the Size and Skills of the State Workforce

The size and skills of the state DOT workforce were the most important factors affecting state DOT use of engineering consultants for federal-aid highway construction projects, according to our analysis of state DOT survey responses. (See fig. 2.) We previously reported that similar factors affected state DOTs' decisions to use contractors for certain engineering activities.[31]

[31]GAO-08-198.

Figure 2: Selected Reported Factors Affecting State Departments of Transportation (state DOT) Decisions to Use Engineering Consultants on Federal-Aid Highway Construction Projects



Source: GAO analysis of survey of state departments of transportation (DOT). | GAO-22-104713

The size of the state DOT workforce affects state DOTs' decisions to use engineering consultants on federal-aid highway construction projects. All state DOTs (52 of 52) reported at least one of the three factors related to the size of their workforce as being moderately or very important in their decisions whether to use engineering consultants on these projects. We previously reported that most state DOTs generally found similar factors to be very or moderately important in their decisions to contract out aspects of their engineering and design-related work on highway construction projects.[32] Factors related to size of state DOT workforce described by officials in selected states include:

- **Insufficient number of state DOT staff.** State DOTs sometimes do not have enough engineering staff available to meet departmental workload and use engineering consultants to supplement staffing levels. According to U.S. Census Bureau data, the number of state government highway employees declined by nearly 12 percent from

[32]GAO-08-198.

2008 to 2018.[33] In addition, representatives from the American Association of State Highway and Transportation Officials and two engineering firms and two labor organizations in selected states said that in general, state DOT staffing levels have not kept pace with increasing workloads. As a result, some state DOTs may be more likely to use engineering consultants. For example, Louisiana DOT officials told us they were more likely to use engineering consultants when they were unable to hire additional staff due to budget constraints imposed by the state legislature.

- **Flexibility or managing variations in workload.** State DOTs also use engineering consultants to respond to fluctuations in the amount of engineering and design-related work needed for federal-aid highway construction projects. For example, four selected state DOTs reported using engineering consultants to assist with temporary increases in workload. In one case, Utah DOT officials said they recently used engineering consultants to complete routine work, such as pavement preservation, because their state was experiencing a period of rapid growth and increased highway construction. These officials said using engineering consultants to help manage departmental workload created opportunities for state DOT staff to develop their skills and experience by working on more complex projects.
- **Faster completion or meeting timeframes.** State DOTs use engineering consultants to accelerate the completion of engineering and design-related work by augmenting the number of state DOT staff available to work on a given project. Officials from the New Hampshire DOT said they used engineering consultants as construction inspectors to supplement existing state DOT staff, which expedited project delivery during the summer construction season. Similarly, California DOT officials said they may use engineering consultants on work that needs to be completed as quickly as possible, such as reviews of emergency projects.

The skills of state DOT staff also play an important role in state DOTs' decisions to use engineering consultants. Almost all state DOTs (50 of 52) surveyed reported that one or more factors related to the skills of

[33]U.S. Census Bureau, *2008 Annual Survey of Public Employment & Payroll*, "State Government *Employment* and Payroll Data, March 2008" Revised December 2009), accessed December 8, 2021 https://www.census.gov/data/datasets/2008/econ/apes/annual-apes.html; *2018 Annual Survey of Public Employment & Payroll*, "State Government Employment & Payroll Data, June 2019" (Revised May 2021), accessed December 8, 2021 https://www.census.gov/data/datasets/2018/econ/apes/annual-apes.html.

state DOT staff were moderately or very important in their decisions to use engineering consultants. In addition, four engineering firms and two labor organizations we spoke with said factors related to skills may drive state DOTs to use engineering consultants. For example, one engineering firm told us the state DOT hired it for geotechnical work, such as understanding soil and ground properties for use in construction, when the state DOT did not have available staff with the expertise needed to do this work. In 2008, we reported that accessing specialized skills or equipment was a moderately or very important factor in most state DOTs' decisions to contract out aspects of their engineering and design-related work on highway construction projects.[34] State DOT officials we interviewed said the following factors related to the skills of their workforce affected their decisions to use engineering consultants:

- **Accessing skills or equipment.** State DOTs use engineering consultants to acquire skill specializations or material resources, such as equipment or software, not available to state DOT staff. For example, North Carolina DOT officials said they used engineering consultants to access specialized technical skills, such as subsurface surveying to identify underground geological features. Similarly, Connecticut DOT officials said using engineering consultants allowed them to complete highly technical projects, such as movable bridges, that would not have been possible if they had relied solely on their staff.
- **Innovative approaches or new techniques.** Engineering consultants may identify innovative technical approaches to engineering and design-related work with which state DOT staff are not familiar. For example, Utah DOT officials said engineering consultants contributed to an innovative approach when replacing a bridge by constructing the replacement bridge in parallel to existing highway lanes. Officials said using engineering consultants for this work—compared to the alternative of using only state DOT staff–reduced the length of time the bridge was closed to traffic and minimized inconvenience to motorists.

In addition to factors related to the size and skills of state DOT workforce, a majority of state DOTs (33 of 52) also reported that meeting state legislative mandates, other legal or departmental requirements, funding requirements, or policy initiatives was moderately or very important in their decisions to use engineering consultants. These requirements, many of which are outside the state DOT's control, may limit the ways state

[34]GAO-08-198.

DOTs can complete engineering and design-related work. In some cases, these requirements may affect the size and skills of a state DOT's workforce by limiting its ability to hire new staff. For example, Texas limits the total number of full-time employees that may work for the state DOT.[35] As a result, Texas DOT officials said they rely on engineering consultants to meet the requirements of their workload.

Stakeholder Views and Studies Vary on Comparative Costs of Engineering Consultants and State DOT Staff

Stakeholder Views Vary on the Comparative Costs of Using Engineering Consultants and State DOT Staff for Federal-Aid Highway Projects, Depending on Time Frame Considered

Selected state DOT officials and stakeholders we spoke to held varying views on the comparative costs of using engineering consultants and state DOT staff for federal-aid highway construction projects, depending on the time frame considered. According to these state DOT officials and certain stakeholders, engineering consultants may be costlier than state DOT staff in the short term. Officials from seven selected state DOTs and representatives from three labor organizations and one engineering firm said it was likely engineering consultants were more costly than state DOT staff on an hourly, daily, or project basis for performing similar work on projects. Selected state DOT officials said engineering consultants were comparatively more costly because of their higher salaries and potentially increased use of overtime pay relative to state DOT staff, as well as the need for engineering firms to generate a profit.

At the same time, officials from four selected state DOTs and two state audit organizations, as well as representatives from two engineering firms, said that, in certain situations, it may be more cost-effective over the long term to use engineering consultants on federal-aid highway construction projects. For example, officials from Utah state audit organizations said using engineering consultants rather than state DOT staff on federal-aid highway construction projects may be more cost-effective, depending on the project or task, when considering the long-

[35]*See* General Appropriations Act, 2021 Tex. Laws, 87th Regular Sess., art. VII, at VII-15, VII-29, art. IX § 6.10.

term costs of state employee salaries, benefits, and associated support. In addition, California DOT officials said it may be more cost-effective to hire a consultant with certain specialized skills on a temporary basis than to hire a permanent employee. For example, a California DOT official said that some specialized engineering expertise, such as analysis of storm water run-off and contamination, is not routinely needed for the state's federal-aid highway construction projects. As a result, they noted that hiring a permanent employee solely to analyze storm water run-off and contamination would be an inefficient use of state DOT resources.

While Some Selected State DOTs and Others Have Compared Costs, Findings Vary and Accurate Comparisons Are Difficult

Two selected state DOTs have conducted studies comparing the costs of using engineering consultants and state DOT staff, though these studies use different methodologies and are not always comparable. For example, before entering into an engineering consultant contract, Connecticut DOT must perform a cost-benefit analysis and document estimated costs, savings, and benefits that would result from the contract.[36] According to Connecticut DOT officials, factors used in this analysis include negotiated profits for consultants and employment benefits for state DOT staff. Connecticut DOT officials also said that overall, they initially found that engineering consultants were more expensive than state DOT staff, but are currently reviewing the methodology and results of their analysis. Texas DOT officials said they analyze expenditure data to compare the costs of using engineering consultants and DOT staff to complete work. While these officials also said it is generally more expensive to complete work using engineering consultants than state DOT staff, they found that the cost difference was not as great on larger projects.

Other organizations have used different methodologies to compare the costs of engineering consultants and state DOT staff. For example, the National Association of State Highway and Transportation Unions, an association of state DOT labor organizations, has published two reports documenting cost comparison studies indicating that using engineering consultants is more costly than state DOT staff, due to factors such as consultant overhead and profits and project cost overruns.[37] However, a study commissioned by the American Council of Engineering Companies, an industry association, found that the cost of using state DOT staff was

[36] *See* Conn. Gen. Stat. § 4e.16.

[37] The National Association of State Highway and Transportation Unions, *Highway Robbery* (October 2002) and *Highway Robbery II* (May 2007).

higher than that of using engineering consultants due to state DOT employee benefits and overhead costs.[38] Each of the comparison studies published by these associations factored in direct and indirect project expenditures, such as wages, benefits, and estimated overhead costs, but these studies are not comparable because they used different methodologies to calculate costs.

Officials from three state DOTs told us they do not conduct cost comparison studies, in part, due to the technical challenges of developing accurate, quantifiable cost comparisons. These challenges included difficulties comparing the skills of engineering consultants and state DOT staff and accurately calculating costs.

- **Comparing consultant and staff skills.** According to officials from seven state DOTs, and representatives from three audit organizations and two engineering firms, state DOTs may not always have staff with comparable skills to engineering consultants, which can make cost comparisons difficult. For example, officials from the Utah state audit organization said engineering consultants may possess advanced technical skills not possessed by state DOT staff, making direct cost comparisons between the two difficult. However, representatives from three labor organizations said this difference does not mean that it is not possible to conduct such comparisons. For example, representatives from two labor organizations said in the great majority of cases it is possible to make direct comparisons between the abilities of engineering consultants and those of state DOT staff.
- **Calculating overhead costs for state DOT staff.** In some cases, it may be difficult to calculate overhead costs for state DOT staff to use in comparisons with engineering consultants. Specifically, state DOT officials in four of the selected states said it is difficult to accurately calculate the overhead costs associated with using state DOT staff and compare their use with the cost of using engineering consultants. For example, Iowa DOT officials said it is difficult to accurately identify the costs of using state DOT staff due to uncertainty about what expenses to include when calculating overhead costs, such as those related to state DOT facilities and vehicles.

However, representatives from three labor organizations said issues related to calculating overhead costs do not mean it is not possible to conduct cost comparisons. For example, a Connecticut labor organization

[38]F.H. “Bud” Griffis, American Council of Engineering Companies, *Engineering Design Costs: In-House vs. Contracting Out* (New York, Aug.t 31, 2016).

said it is possible to overcome these challenges via a variety of methodological approaches, including use of cost-effectiveness evaluations, cost-benefit analyses, and an independent contract review board. We previously reported that it was difficult to establish an overhead rate for work by state DOT staff for use in cost comparisons.[39] Further, we previously found data on other state DOT staff costs needed to complete an accurate cost comparison, such as costs from retirement pensions, are often incomplete or unreliable.[40]

- **Quantifying non-financial costs of using engineering consultants.** The difficulty of quantifying certain non-financial costs of using engineering consultants may add to the challenge of conducting cost comparisons. Specifically, officials from seven selected state DOTs and representatives from two labor organizations said completing engineering and design-related work using DOT staff creates developmental opportunities for staff engineers. As a result, using engineering consultants to complete this work can result in state DOT staff having limited opportunity for professional development in these areas. For example, Texas DOT officials said a heavy reliance on engineering consultants could eventually result in DOT staff lacking the engineering and design experience needed for effective consultant contract oversight. Similarly, representatives from a California engineering firm said that in the past, state DOT staff have lost core competencies when relying too heavily on consultants.

  Additionally, officials from most selected state DOTs and representatives from some labor organizations told us engineering consultants may lack knowledge of the specific project considerations within the state and local context. In these situations, engineering consultants may require additional training or oversight from state DOTs, resulting in added costs. For example, Iowa DOT officials told us engineering consultants' lack of familiarity with the skills and equipment needed for certain projects could require the consultants to be trained by state DOT staff.

In addition to the challenges of conducting accurate cost comparisons, such analyses may not be useful for state DOTs in deciding whether to use consultants, because cost is not generally a primary factor in these decisions. As noted above, state DOTs reported in our survey that factors

[39]GAO-08-198.

[40]GAO-08-198.

related to the size and skills of their staff primarily drove their decisions to use engineering consultants.[41] State DOT officials in many selected states said they did not conduct cost comparisons because the findings of such comparisons would not be relevant to decisions about whether or not to use consultants. For example, California DOT officials said they do not conduct formal cost comparisons between engineering consultants and state DOT staff engineers because the decision to use a consultant is driven by project needs such as meeting workload or accessing specialty skills. Representatives from four engineering firms and three labor organizations also said there are cases in which project needs necessitate the use of engineering consultants by state DOTs. However, representatives from three labor and three state audit organizations said cost comparisons may provide transparent information to decision makers or the public.

FHWA does not collect or analyze data on the costs of state DOTs using engineering consultants compared to state DOT staff. FHWA officials told us FHWA does not require state DOTs to report whether federal-aid highway program funds will be used to pay or reimburse for expenses incurred by using consultants or state DOT staff. For example, a state DOT's request for reimbursement for the cost of engineering services, such as construction inspection activities, may not separate the costs of engineering consultants from the costs state DOT staff when both work on the same project. FHWA officials noted that this level of detail is not needed for FHWA to conduct its required oversight responsibilities, which include helping ensure state DOT expenditures on federal-aid highway construction projects comply with applicable federal statutes and regulations. Additionally, they noted that because state DOTs are statutorily permitted to use engineering consultants to the extent necessary or desirable, state DOTs' decisions to use consultants instead of their own employees to provide engineering and design-related services for a federal-aid highway construction project generally do not require FHWA approval.

[41]As stated earlier, when using federal aid to fund engineering consultant contracts, state DOTs must comply with FHWA's regulations implementing the Brooks Act, which prohibit state DOTs from using price or costs as a factor to evaluate, rank, and select engineering firms.

FHWA Oversees State DOTs' Use of Engineering Consultants through Policy Reviews and Risk Assessments

FHWA Focuses Its Oversight on Reviewing State DOTs' Engineering Consultant-Related Policies

FHWA primarily oversees state DOTs' procurement, management, and administration of engineering and design-related services by requiring and ensuring that state DOTs prepare and maintain written policies and procedures governing these activities.[42] These policies and procedures must address, as appropriate, 18 items listed in regulation.[43] FHWA's regulations require it to review the written policies and procedures to assess whether they comply with applicable federal and state requirements and, if so, approve them. Officials from all eight FHWA division offices in our selected states said they reviewed and approved their respective state DOT's written engineering consultant-related policies and procedures. These officials also said that, as required by regulation, they review these written policies and procedures practices on an as-needed basis, such as when the state DOT has to make changes to them due to the enactment of a new state law, to ensure they continue to meet applicable requirements.

In all of our eight selected states, we found that each state DOT had a set of written engineering consultant-related policies and procedures that generally addressed, as appropriate, the required 18 items regarding the procurement, management, and administration of engineering consultant contracts.[44] As an example, we found all selected state DOTs have written policies and procedures that address:

[42]FHWA is also required to periodically evaluate state DOT practices for estimating project costs, awarding contracts, and reducing costs. 23 U.S.C. § 106(g)(2).

[43]The 18 items are located in 23 C.F.R. § 172.5(c).

[44]We did not further assess whether the policies and procedures addressing the items complied with applicable federal and state requirements.

- **Procuring the services of engineering consultants.**[45] State DOT policies and procedures in all the selected states described how states will evaluate proposals and select the most qualified firms for negotiation of contract costs. For example, Connecticut DOT's policies and procedures provide that the state DOT must use selection panels made up of staff with applicable experience. These selection panels evaluate, interview, and select the most highly qualified firms using pre-established criteria such as the firm's capacity for timely project completion. In addition, state DOT officials from some selected states told us they invite their respective FHWA division office officials to attend as non-voting members in engineering consultant selection committees. FHWA division office officials explained that this approach helps ensure the state DOT follows applicable requirements.
- **Identifying and mitigating conflicts of interest.**[46] State DOT policies and procedures in all the selected states laid out various processes for both state DOTs and engineering consultants to follow to ensure that potential conflicts of interest are assessed, mitigated, and disclosed. For example, Utah DOT's policies and procedures require a conflict of interest committee within the department to review and address potential conflict concerns on a case-by-case basis.
- **Reviewing project costs and progress.**[47] State DOT policies and procedures in all the selected states described how the state DOTs would review and approve payments and invoices, and ensure the acceptability and progress of the engineering consultant's work. As an example, Texas DOT's policies and procedures require consultants to submit progress reports with each invoice. According to FHWA, these policies help to ensure engineering consultant costs are allowable in accordance with federal cost principles and the acceptability of the consultant's work.

[45]State DOTs must address how they will evaluate interests, qualifications, or proposals from prospective consultants, as well as how to rank and select them.

[46]State DOTs must address how they will prevent, identify, mitigate, and disclose conflicts of interest in compliance with federal regulations.

[47]State DOTs must address how they will ensure that the costs billed by consultants are allowable under federal cost principles and that the consultant's work is progressing and acceptable.

- **Monitoring engineering consultant performance.**[48] State DOT policies and procedures in all the selected states outlined how states would check engineering consultants' work against the terms, conditions, and specifications of the contract. Such policies provide FHWA with assurance that state DOTs have internal controls in place to oversee engineering consultants, according to FHWA officials from two division offices. In its policies and procedures, Louisiana DOT requires a licensed architect or engineer to visit project sites and document whether engineering consultants are performing work in accordance with contract terms.
- **Conducting performance evaluations and using them in future procurements.**[49] State DOT policies and procedures in all the selected states described how states would prepare engineering consultant performance evaluations when services were completed and how to use such data in future procurement decisions. For example, New Hampshire DOT's final evaluation document has a section to list issues or concerns with the constructability of the design plans. This final evaluation is submitted to the consultant selection committee to inform future decisions, and is made available to the engineering consultant. One of California DOT's written policies outlines that engineering consultant performance evaluations are used to determine not only whether the engineering consultant has performed well under a specific contract but also whether the consultant is a good fit for another contract in the future.

While FHWA oversees state DOTs' use of engineering consultants by ensuring that they prepare and maintain written policies and procedures, it relies on state DOTs to implement these policies and procedures, according to officials. FHWA officials noted this approach aligns with its general oversight framework for the federal-aid highway program, which is to help ensure state DOTs—which largely act as the administrators of federal-aid highway construction projects—comply with relevant statutes and regulations. FHWA headquarters and division office officials explained that they determine whether additional oversight or assistance is needed based on close observations of state DOT past performance and experience, and communication with the state DOT officials.

[48]State DOTs must address how they will monitor the consultants' work and its compliance with the terms, conditions, and specifications of the contract.

[49]State DOTs must address how they will prepare consultant performance evaluations after engineering work is completed and use these performance data in future procurements of similar engineering and design-related services.

To assist state DOTs with their oversight of engineering consultants, FHWA headquarters provides guidance and answers to frequently asked questions on its website. In addition, FHWA division office officials from all selected states said they regularly communicate and collaborate with officials from their respective state DOTs regarding the use of engineering consultants. For example, Iowa Division Office officials said they meet often with Iowa DOT staff regarding projects that have federally funded engineering consultant contracts. Further, all selected state DOTs we spoke with said they have a collaborative relationship with their respective FHWA division office officials and have received helpful engineering consultant-related guidance or training from them when needed. For example, Utah DOT officials said they communicate weekly with division office officials and have received training on contracting for engineering consultants every 2 to 3 years.

FHWA Annually Assesses State DOTs' Use of Engineering Consultants and Has Identified Few Priority Risks

FHWA—primarily through its division offices—assesses risks to state DOTs' use of engineering consultants as part of its annual oversight activities. In doing so, FHWA determines whether its oversight responsibilities should be adjusted or if additional oversight actions are needed. According to FHWA division office officials, these analyses are generally conducted as part of FHWA's annual program and risk assessment processes. The analyses may focus on topics such as risks resulting from the use of engineering consultants and state DOT capacity and resources to oversee engineering consultants. Officials also said that FHWA's Compliance Assessment Program (CAP) review is another tool that division offices can use to assess risks related to state DOTs' use of engineering consultants.

- **Program assessment.** Through the program assessment process, division offices evaluate the effectiveness of an entire state DOT program (e.g., design program), including identifying any risks to the performance of that program. According to FHWA, risks are threats or opportunities that can affect the state DOT's ability to meet its goals and objectives. To help evaluate state DOT performance related to its use of engineering consultants, division office officials told us they conduct interviews with state DOT staff and consultants, among other activities.
- **Risk assessment.** Division offices then each conduct an annual risk assessment, which analyzes new risks identified during the program assessment and throughout the year by division office staff and other sources, and revisit risks carried over from the prior year. In this assessment, staff evaluate the likelihood of the risk occurring and the extent to which the risk could affect program operations in a given

year. Division offices then use the results from their annual assessments to plan and execute strategies to respond to identified risks, balancing the costs and efforts of implementation against potential benefits derived.[50] In addition, division office officials rank the risks, designating the top 5 to 10 risks with the highest chance of occurring and greatest potential effects as priority risks for the year. Division offices then report this list—also known as a risk register—to FHWA headquarters, and it is used for agency-wide monitoring of risk response strategies.

Officials from three division offices in our selected states told us they analyze engineering consultant-related issues every year as a matter of routine practice in their risk assessment process. Officials from the remaining five division offices said they evaluate the likelihood and potential effects of engineering consultant-related risks if the program assessment process identifies such a risk. Division office officials from all selected states also said they evaluate state DOT capacity and resources to oversee engineering consultants in the division offices' risk assessment process. For example, in the North Carolina division office, officials said they consider their state DOT's staffing levels and experiences to help determine the likelihood that an identified risk related to the state DOT's use of engineering consultants could occur.

- **CAP reviews.** FHWA division offices can also assess state DOTs' compliance with relevant engineering consultant-related regulations through the headquarters-driven annual CAP review. The CAP review assesses compliance with certain key regulatory requirements on a sample of federal-aid highway construction projects across the states.[51] To inform the focus of a CAP review, FHWA headquarters uses information on the most important risks that division offices report in the risk register as a result of their risk assessment processes as well as other common issues trending across states. Division office officials can also add additional compliance questions to their CAP reviews to assess specific concerns they have identified in their own states.

Recent FHWA assessments and reviews in our selected states have found that state DOTs' use of engineering consultants generally does not

[50]Risk response strategies include avoiding the activity that gives rise to the risk, mitigating the risk by stopping the activity, investigating the risk to better understand potential effects, and accepting the risk, according to FHWA guidance.

[51]FHWA's Compliance Assessment Program assesses a statistically valid sample of projects from across the states each year, spanning a 3-year cycle.

pose a risk to their respective federal-aid highway programs relative to other issues. Specifically, the FHWA division offices within our selected states said they did not identify any priority risks related to state DOTs' procurement, administration, or oversight of engineering consultants in their annual assessments from fiscal years 2016 to 2021. Moreover, division office officials who identified non-priority risks related to the use of engineering consultants told us that state DOTs adequately addressed the risks as appropriate. Division office officials from all selected states told us that through their annual program and risk assessment processes, they each determined their respective state DOT had sufficient capacity and resources to oversee engineering consultants, as required by FHWA's regulations.

More broadly across all state DOTs, FHWA's most recent assessment of risks to the federal-aid highway program identified few priority risks related to state DOTs' use of engineering consultants. Specifically, in fiscal year 2021, FHWA determined seven out of 400 priority risks across all division offices were related to the use of engineering consultants, crossing a number of different categories such as contract administration, financial management, and payment issues. FHWA identified these risks in six states, and none of these were in our selected states. These risks included a risk to a specific state DOT related to its staff's contract cost negotiation skills, and a risk to a different state DOT arising from its review of environmental review documents prepared by engineering consultant firms. In each case for these identified priority risks, division offices developed specific plans to address the risk in that fiscal year, such as developing new training for the state DOT on contract negotiation.

In addition to FHWA division offices in our selected states, other division offices have also taken action to address non-priority risks related to the use of engineering consultants. Officials from four division offices explained that while a non-priority risk may not have the greatest likelihood of occurring, or have the greatest potential impact on a state DOT's program relative to priority risks, the issue may still be important to address if the office has the capacity to do so. One risk response division offices have taken is conducting a program review, in which officials further investigate a given risk to better understand its potential effects.

Since 2016, one division office in our selected states (California), along with four other division offices not in our selection, have further investigated a given risk related to state DOT use of engineering consultants by initiating such a review. For example, in 2020 the

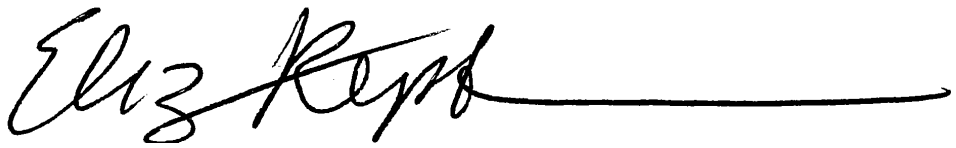
California Division Office investigated the state DOT's engineering consultant selection procedures based on contract trends division office staff had observed throughout the year. Though the office did not determine this issue was a priority risk, as a result of its investigation, the division office recommended that the state DOT improve documentation of its conflict of interest decisions, among other actions. In discussing this program review, California Division Office officials told us the state DOT resolved this issue. Specifically, officials outlined in their program review that the state DOT established a new procedure to ensure conflict of interest decisions are documented.

Agency Comments

We provided a draft of this product to the DOT for review and comment. DOT provided technical comments on the draft, which we have incorporated as appropriate.

We are sending copies of this report to the appropriate congressional committees, the Secretary of Transportation and other interested parties. In addition, the report is available at no charge on the GAO website at http://www.gao.gov.

If you or your staff have any questions about this report, please contact me at (202) 512-2384 or RepkoE@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. GAO staff who made key contributions to this report are listed in appendix II.



Elizabeth Repko
Director, Physical Infrastructure Issues

Appendix I: Survey of State Departments of Transportation on Their Use of Engineering Consultants

The purpose of this survey was to gather information on the extent to which state departments of transportation (state DOT) contract with private firms for engineering and design-related services, as defined by regulation, on federal-aid highway construction projects (FAHP projects), and the importance of various factors that influence these decisions.[1] The survey also gathered information on state DOTs' use of engineering consultants in management support roles. [2] To develop the survey questions, we reviewed a prior GAO report on this topic and other relevant literature, and interviewed key stakeholders.[3] We conducted five pre-tests of the survey instrument to ensure questions were understandable and comprehensive, answer choices were appropriate, and the survey was unbiased and not burdensome to officials. We pre-tested our survey by telephone with officials from five state DOTs, which we selected based on diversity in geographic location and number of federal-aid eligible lane-miles, among other factors. Based on the feedback we received from officials in the pre-tests, we revised the survey instrument as appropriate.

We sent web-based surveys via email to knowledgeable officials at state DOTs from the 50 states, Puerto Rico, and the District of Columbia.[4] We contacted officials at one state DOT who did not answer a question that we identified as key to our report, to verify their response. We administered this survey from June to October 2021.

We received responses from all 52 state DOTs, for a 100 percent response rate. The questions we asked in our survey and the aggregate results of the responses to the close-ended questions are shown below. Although originally a web-based survey, we present selected questions

[1]FHWA's regulations governing the procurement, management, and administration of engineering and design-related services are located in 23 C.F.R. Part 172. These regulations refer to firms that hold contracts with state DOTs to perform engineering and design-related services on federal-aid highway construction projects as consultants. For the purposes of this report, we refer to them as 'engineering consultants".

[2]FHWA's regulations provide that a management support role may include managing or overseeing a federal-aid highway construction project or the work of other consultants on behalf of the state DOT.

[3]In particular, we reviewed the survey instrument and results from GAO-08-198. See, *Federal-Aid Highways: Increased Reliance on Contractors Can Pose Oversight Challenges for Federal and State Officials*, GAO-08-198 (Washington, D.C.: Jan. 8, 2008).

[4]For the purposes of the federal-aid highway program, "state" refers to any of the 50 states, the District of Columbia, or Puerto Rico. 23 U.S.C. § 101(a)(28). In total, there are 52 state DOTs.

and corresponding answer choices with the same wording shown to respondents. We do not provide results for the open-ended questions.

Q1. In your state's most recently completed fiscal year, did your DOT contract with private firms for any engineering and design-related services for FAHP projects?

Response	Number of responses
Yes	52
No	0
Don't know	0

(If responded "yes" to Q1):

Q1a: In your state's most recently completed fiscal year, approximately what percent out of all engineering and design-related expenditures **for all phases** of your state's FAHP projects did your DOT contract out? As you respond, please consider both direct expenditures (e.g. wages) and indirect expenditures (e.g. overhead).

Response	Number of responses
1-19%	4
20-39%	6
40-59%	15
60-79%	17
80-99%	9
All (100%)	0

Q2. Over your state's last five completed fiscal years, did your DOT increase, decrease, or maintain about the same percentage of expenditures on contracting for engineering and design-related services on FAHP projects? As you respond, please consider both direct costs (e.g. wages) and indirect costs (e.g. overhead).

Response	Number of responses
Increased the percentage	27
Maintained about the same percentage	21
Decreased the percentage	3
Don't know	1

Q3. How important, if at all, were the following factors in your DOT's decision **to use** consultants to perform engineering and design-related services on FAHP projects over the last five completed fiscal years? (Check one response in each row.)

	Number of responses			
Response	**Very important**	**Moderately important**	**Of little or no importance**	**Not applicable**
Meeting state legislative mandates, other legal or departmental requirements, funding requirements, or policy initiatives	24	9	17	2
Insufficient number of in-house staff	41	10	0	0
Accessing required skills or equipment	17	28	7	0
Increasing speed of completion or meeting specific time frames	26	22	4	0
Obtaining cost savings	1	9	32	10
Identifying innovative approaches or new techniques	10	29	13	0
Belief that work would be of higher quality if performed by consultants	3	14	29	5
Maintaining flexibility or managing variations in department workload	28	20	3	0
Other reason(s) – Please specify below	2	3	1	29

(Written responses not included.)

Q4. How important, if at all, were the following factors in your DOT's decision **to use in-house staff** to perform engineering and design-related services on FAHP projects over the last five completed fiscal years? (Check one response in each row.)

	Number of responses			
Response	**Very important**	**Moderately important**	**Of little or no importance**	**Not applicable**
Meeting state legislative mandates, other legal or departmental requirements, funding requirements, or policy initiatives	21	14	15	2
Insufficient industry capacity in the private sector	3	5	36	8
Required skills or expertise are not available in the private sector	6	7	28	11
Increasing speed of completion or meeting specific time frames	12	21	18	1
Costs of consultants would be greater than using in-house staff	10	25	12	5
Need to develop and retain key skills and expertise in-house	36	14	2	0
Belief that work would be of higher quality if performed by in-house staff	4	18	25	4
Other reason(s) – Please specify below.	3	0	1	25

(Written responses not included.)

Q5. In your state's most recently completed fiscal year, did your DOT contract or maintain active contracts with consultants acting in **management support roles**?

Response	Number of responses
Yes	32
No	18
Don't know	1

(If responded "yes" to Q5):

Q5a. In your state's most recently completed fiscal year, approximately what percent out of all FAHP projects did your DOT use consultants in **management support roles**?

Response	Number of responses
1-19%	21
20-39%	6
40-59%	2
60-79%	3
80-99%	0
All (100%)	0

Appendix II: GAO Contact and Staff Acknowledgments

GAO Contact

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Staff Acknowledgments

In addition to the contact named above, Matt Voit (Assistant Director); Alexandra Rouse (Analyst-in-Charge); Adam Gomez; and Austin Lyke made key contributions to this report. Other staff who made important contributions were Amy Abramowitz, Brian Bothwell, Melanie Diemel, Gina Hoover, Tom James, Jon Melhus, Mary-Catherine P. Overcash, Daniel Paepke, Guisseli Reyes-Turnell, and Michelle Weathers.

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