# Staffing for Alternative Contracting Methods

## NCHRP Synthesis Report 518

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# Keston Institute for Public Policy DB Study

University of Southern California

- Conducted in 2007 to determine if the adoption of design-build would result in a reduction in the public agency engineering workforce.
- Findings based input from 41 state DOTs:
  - Implementing DB contracting does not shift public professional engineering jobs from state agencies to the private sector.
  - Utilizing DB contracting does not significantly reduce the use of the traditional DBB method – 95% of DOT projects delivered using DBB.
  - Implementing design-build requires *a more competent and experienced workforce.*

# Motivation for NCHRP 518: Staffing for ACMs

- State Departments of Transportation (DOT) have a professional and technical workforce crisis.
  - National infrastructure crisis has increased the availability of construction funding.
    - Many states have increased gas taxes
    - Private funding for public works has become a reality
    - Environmental permitting processes have been shortened
    - Enabling legislation at both the state and federal for ACM usage is generally in place.
  - Public agencies must compete with private industry for qualified personnel
    - Public salaries are not competitive
    - US engineering schools are not producing enough entry-level engineers
    - The baby boomers are retiring;
    - Mid-level professionals are leaving the public sector as the private sector gears up for the construction boom.

# Motivation for NCHRP 518: Staffing for ACMs

- ACM implementation results in:
  - Decreased periods for planning
  - Concurrent design and construction
  - Much larger project sizes
  - A higher than normal level of risk tolerance by agency personnel
  - Much higher capital funding burn rates
  - A requirement for the engineer to also understand the intricacies of the financing and how it will impact construction
- **Bottom-line:** More money to do more work faster with an already inadequate workforce that is shrinking.

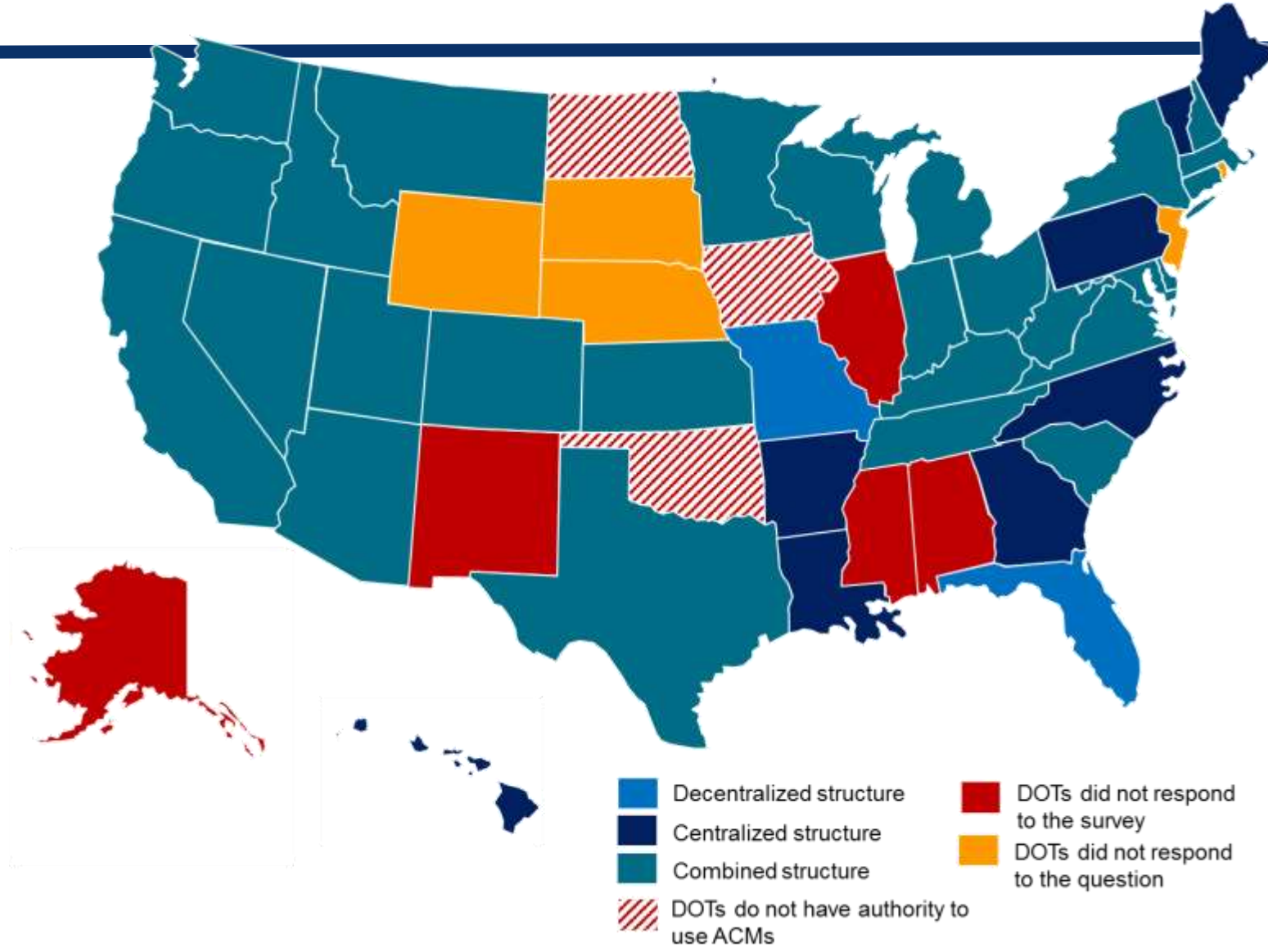
# NCHRP 518 Background

- Synthesis report benchmarks the state-of-the-practice.
- Data collection:
  - Survey of all state DOTs – 46 responded (92% rate)
  - Covered CM-at-Risk (CMGC), DB, and P3s
  - 43 respondents had used ACMs
  - 21 were judged to have “mature” ACM program >10 completed projects
  - 8 detailed case studies
    - California, Florida, Georgia, Minnesota
    - Missouri, North Carolina, Ohio, Virginia

# Key Findings - Organizational Structures

- Three types of organizational structures
  - Centralized structure;
  - Decentralized structure; and
  - Combined structure.
- There is no preferred/optimum structure used by state DOTs for implementing ACMs. Depends on:
  - Frequency of ACM projects
  - Geographic range for projects – Texas versus Rhode Island
  - Size of the agency – California versus Montana
  - Legislative constraints

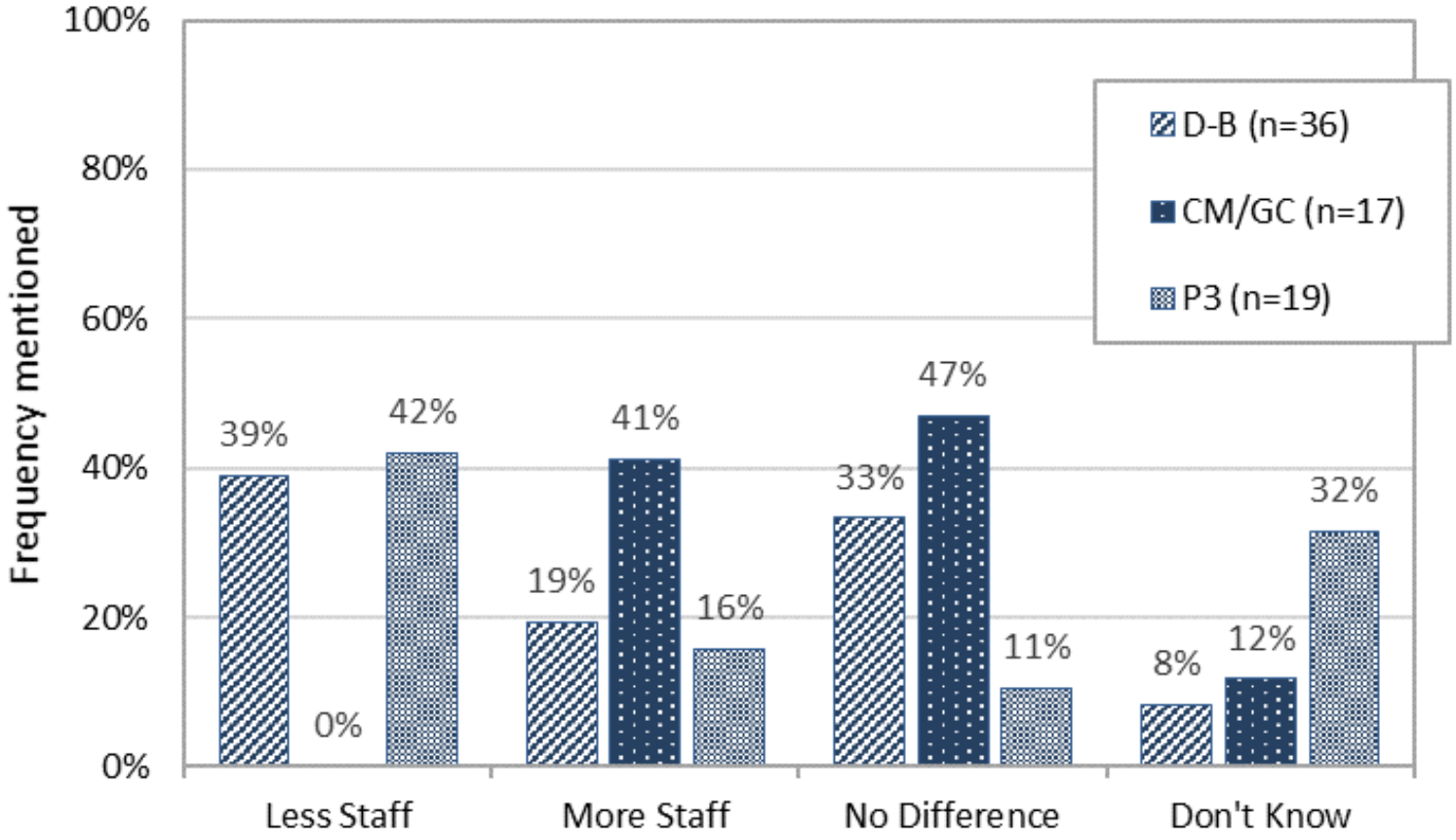
# ACM Organizational Structure Type



# Key Findings – Staffing Needs

- "The fast-paced and collaborative nature of DB projects requires *higher level management and decision-making skills*, which can accelerate the career development of DOT engineering staff by placing them in leadership positions earlier in their career trajectories." (Scott et al. 2016).
- Three approaches to ACM project staffing for DB and CMGC
  - Dedicated team – one project only
  - Dedicated project manager (+) with internal agency support
  - Dedicated project manager (+) with consultant support
- P3 requires multidisciplinary team including finance, legal, environmental, public relations, and technical as well as dedicated PM

# ACM vs. DBB Staff Requirements



# ACM STAFFING NEEDS ACROSS PROJECT DEVELOPMENT PHASES

| Phases | Central Office Agency Staff | District Office Agency Staff | Project Office Agency Staff | Consultant Staff |
|---|---|---|---|---|
| Scoping | 65.7% | 47.3% | 26.4% | 31.6% |
| Environment | 56.7% | 40.6% | 16.3% | 51.4% |
| Procurement | 92.0% | 28.9% | 28.9% | 34.2% |
| Design | 48.6% | 46.2% | 37.8% | 73.0% |
| Construction | 24.4% | 51.5% | 59.4% | 56.8% |
| Close-Out | 36.8% | 55.3% | 60.5% | 36.8% |

# Key Findings – Staff Skillsets

- Six knowledge domain and skill sets that are critical across all ACMs are:
  - Leadership and ability to coordinate other staff
  - Risk identification and analysis skills
  - Strong partnering and team-building skills
  - Knowledge of project delivery and procurement procedure
  - Ability to analyze constructability reviews and project phasing
  - Knowledge of construction contract administration

# Key Findings – Staff Skillsets

TOP 10 STAFFING SKILL SETS FOR D-B

| Rank | Knowledge and Skill Sets | Frequency n = 24 |
|---|---|---|
| 1 | Leadership and ability to coordinate other staff | 100% |
| 2 | Risk identification and analysis skills | 96% |
| 3 | Strong partnering and team-building skills | 83% |
| 4 | Knowledge of project delivery and procurement procedure | 75% |
| 5 | Knowledge of construction contract administration | 63% |
| 6 | Knowledge of highway materials and construction means and methods | 46% |
| 7 | Understanding of project management principles | 42% |
| 8 | Knowledge of quality assurance principles for ACMs | 38% |
| 9 | Ability to analyze constructability reviews and project phasing | 25% |
| 10 | Excellent written and oral communication skills | 25% |

TOP 10 STAFFING SKILL SETS FOR CM/GC

| Rank | Knowledge and Skill Sets | Frequency n = 13 |
|---|---|---|
| 1 | Leadership and ability to coordinate other staff | 100% |
| 2 | Risk identification and analysis skills | 100% |
| 3 | Strong partnering and team-building skills | 77% |
| 4 | Knowledge of construction contract administration | 46% |
| 5 | Understanding of project management principles | 38% |
| 6 | Knowledge of project delivery and procurement procedure | 38% |
| 7 | Ability to analyze constructability reviews and project phasing | 31% |
| 8 | Knowledge of change management | 23% |
| 9 | Strong background in the pre-construction process and planning | 23% |
| 10 | Excellent written and oral communication skills | 43% |

# Key Findings – Staff Skillsets

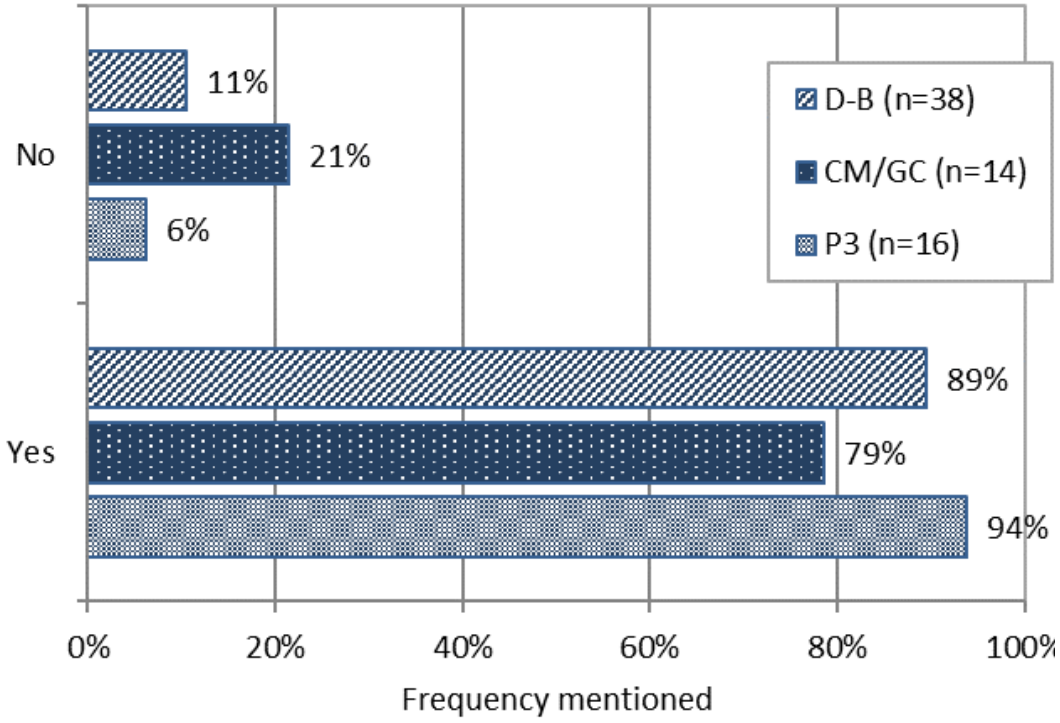
TOP 10 STAFFING SKILL SETS FOR P3

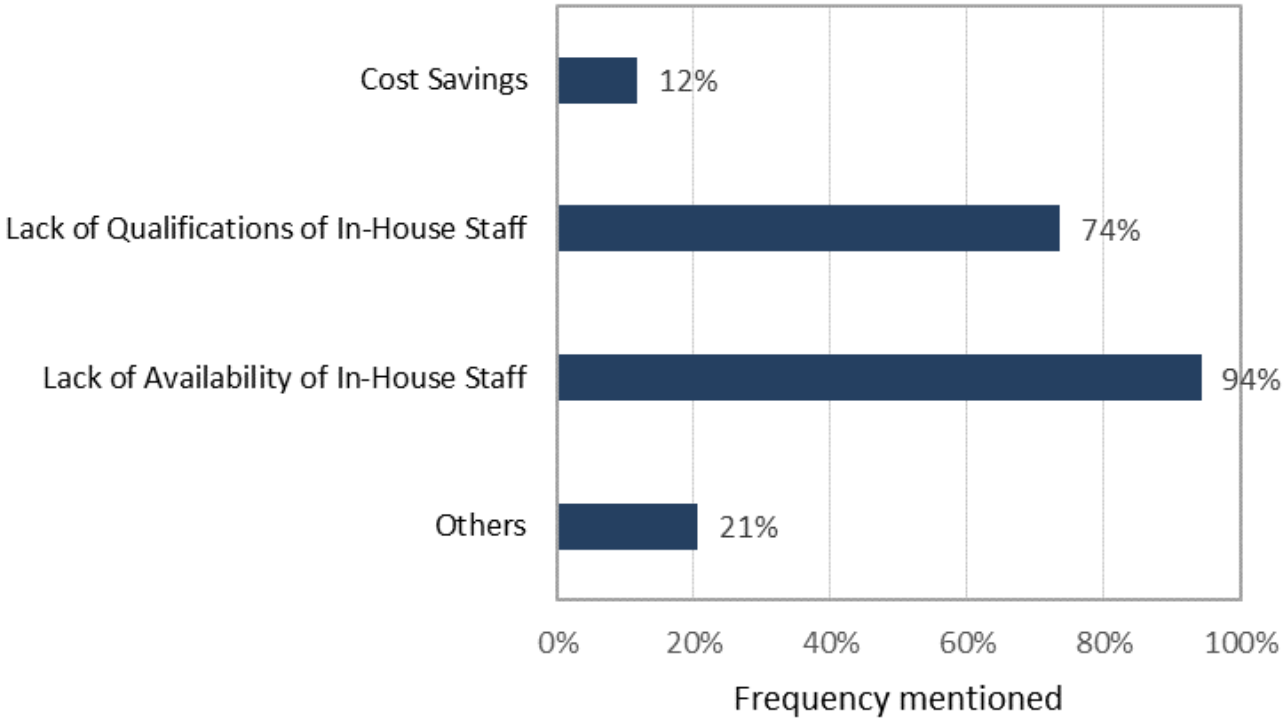
| Rank | Knowledge and Skill Sets | Frequency n = 10 |
|---|---|---|
| 1 | Leadership and ability to coordinate other staff | 100% |
| 2 | Risk identification and analysis skills | 90% |
| 3 | Knowledge of project delivery and procurement procedure | 80% |
| 4 | Knowledge of construction contract administration | 70% |
| 5 | Strong partnering and team-building skills | 70% |
| 6 | Knowledge of quality assurance principles for ACMs | 50% |
| 7 | Knowledge of finance, accounting and cost management | 40% |
| 8 | Ability to analyze constructability reviews and project phasing | 30% |
| 9 | Understanding of federal and state environmental approvals | 20% |
| 10 | Familiar with federal transportation project finance structuring | 20% |

# REQUIRED "SOFT" SKILLS FOR SUCCESSFUL ACM IMPLEMENTATION (N = 34)

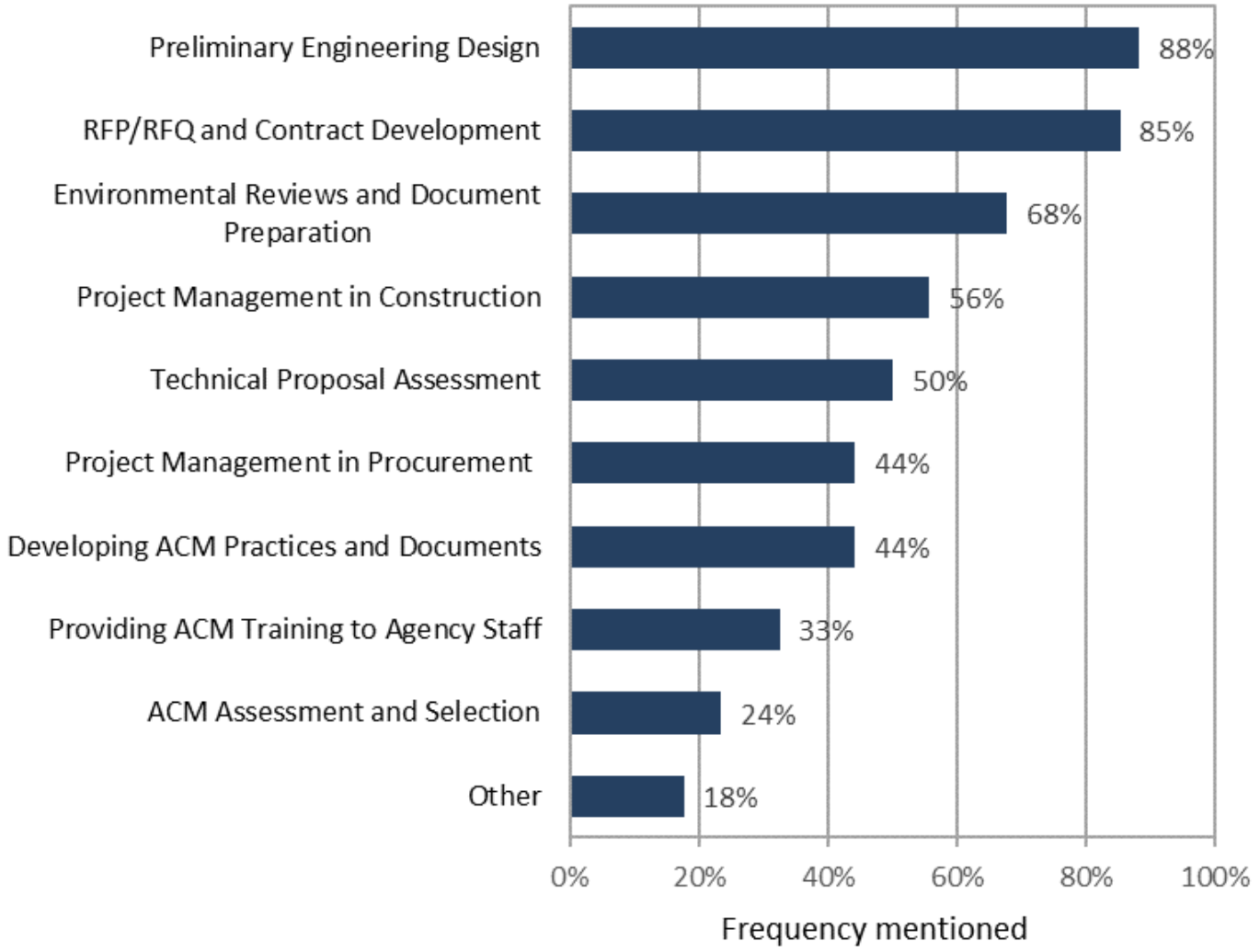
| "Soft" Skills | Scale Measure | | | | | Weighted Average | Rank |
|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | | |
| Strong commitment to successful outcomes | 0 | 0 | 0 | 12 | 22 | 4.6 | 1 |
| Accountability and trust | 0 | 0 | 0 | 13 | 21 | 4.6 | 1 |
| Innovative problem solving attitude | 0 | 1 | 1 | 14 | 18 | 4.4 | 2 |
| Flexibility and open to new concepts | 0 | 0 | 3 | 13 | 18 | 4.4 | 2 |
| Responsible and reflective | 0 | 2 | 9 | 14 | 9 | 3.9 | 3 |
| Diverse backgrounds | 2 | 6 | 16 | 7 | 3 | 3.1 | 4 |

# Key Findings – Outsourcing Amount and Reason



# Outsourced Activities in ACMs



# ACM Staffing Lessons Learned - DB

- Having staff with self-motivated and goal-oriented, less dependent on the DB process but more dependent on how to achieve primary goals of a project is important for DB.
- Additional staff time is required during the procurement phase (e.g., developing RFQ/RFP, contract documents, and evaluation and selection processes), which often requires dedicating specific staff for the submittals/proposals.
- It is challenging to find staff that have both a strong technical background and excel in the art of procurement documents. Not everyone is the right fit for DB.
- The rapid pace in DB can result in personnel "burnout."

# ACM Staffing Lessons Learned - DB

- The specific mindset for DB is not easily transferred between DBB and DB cultures.  Exceptional team players are required.
- Experienced project manager and construction resident engineer personnel are required and it can be problematic if experienced staff has left the agency.
- Staff needs to be able to work with Subject Matter Experts within the agency to not only get prompt responses to submittals, but foster relationships within the agency on the DB discipline that help open channels for innovation in regular programs and current / future DB programs.
- Training is important because specialized skill sets and innovative thinking has not frequently been taught in engineering programs or other related transportation professions.

# ACM Staffing Lessons Learned – CMR/CMGC

- Pre-construction phase staffing is key to success. Construction staff needs to take part in the pre-construction phase. Need staff that understand how contractors bid/price/ schedule jobs during the negotiation of GMP.
- While the number of staffing may remain the same, the number of working hours for each staff is typically higher due to the interactions with the CM.
- Need staff who understand bottom-up cost estimating for an effective cost reconciliation process.
- Need an excellent Project Manager who is able to manage the designer and contractor (e.g., holding the CMGC responsible for suggestions that are made throughout the design phase)
- Need staff with certain skill sets for CMGC including estimating to arrive at final construction cost.
- Additional staff time required for developing procurement and contract documents.

# ACM Staffing Lessons Learned – P3

- Need staff with the ability to manage consultants and understand project risk profile.
- Traditional agency relationships change when engaging the private partner at various stages of procurement and contract execution.
- P3 are highly expensive for industry to pursue, so the agency managers must be empowered to provide straight answers to proposers' ideas, without jeopardizing integrity of procurement, undermining of agency concerns, or creating a perception that the agency is reluctant to accept innovative ideas.
- Several state DOTs noted that most of staffing issues in DB would also apply to P3

# ACM Staffing Lessons Learned – Overall

- The key is to identify qualified staff. Experienced project personnel are needed for ACM projects.
- Having staff with flexible and responsive skill sets to the fast pace is essential for ACMs. Dedicated staff to facilitate the ACM process is critical.
- It can be a challenge to attract individuals to a high paced, intensive, and a unique work environment that ACMs introduce. In addition, the ACM program must be mature enough to ensure that there is always ample workload to keep these experienced and qualified staff interested.
- Training plays a pivotal role in the implementation of ACMs. Training programs that are specifically designed to articulate and reinforce the Department's current policies and procedures on ACMs are a success trait.

# Summary

- ACM staffing issues are complex
- The decision to deliver a project with an ACM means
  - Accelerated schedule
  - Reduced agency input during planning and/or design
  - Need for experienced agency project personnel
  - Increased ability to tolerate risk
- Procurement culture paradigm shift
  - Construction-centric project development and delivery process
  - Decision criteria change from minimize cost/time to maximize cost and schedule certainty
  - Increased trust in consultants and contractors

# Quotable Quotes on The Topic

- FHWA Administrator Victor Mendez, PE - 2010

  The FHWA launched the *Every Day Counts* (EDC) effort to encourage the implementation of innovative processes and procedures aimed at *shortening project delivery, enhancing the safety of our roadways, and protecting the environment*… it's imperative we pursue better, faster, and ***smarter ways*** *of doing business.*

- Connecticut Academy of Science and Engineering – ACM Study 2016

  Among the common characteristics of effective ACM structures are the need for a departmental champion, staff familiarity—though not necessarily expertise—with ACMs, and a culture of adaptability and flexibility. Agency-wide training opportunities and communications will be imperative for instilling such culture.

# Questions??