

M • E • A • S • U • R • I • N • G

the Benefits of Construction Partnering

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Public agencies and contractors frequently adopt construction partnering—defined as the process that creates an owner–contractor relationship focused on achieving mutually beneficial goals—on the basis of faith, hope, or perhaps a feeling that there is nothing to lose. To date, agencies and their prospective partners have had little information about actual project outcomes that would indicate the benefits of initiating a construction partnership. The information presented here is based on the results of more than 700 projects that were completed using a partnering approach. Project outcomes reflect the experience of officials in 46 state departments of transportation who answered a questionnaire distributed in August 1994. The information is significant for three reasons: evidence of tangible benefits to all parties using a partnering approach is provided; some of the measurement techniques currently in use are identified; and direction, assistance, and encouragement are made available to agencies, owners, contractors, and construction managers in implementing their own partnering measurement programs.

State and federal highway construction spending is expected to exceed \$300 billion during this decade. State departments of transportation share many goals for and problems with project delivery. Types of construction and construction end-products are similar among the states and are governed by many of the same construction standards and specifications. Public agencies are all regulated by public contracting codes that call for open procurement processes for construction contracting. The responsible bidder typically will be awarded a fixed-price contract; neither the agency nor contractor have much latitude to determine compatibility before the project begins.

Problems inherent in the public contracting process include traditionally adversarial contracts that shift risks to the contractor; regulations or policies prohibiting both parties from negotiating any contract provisions; the need for public accountability for all funds expended; bureaucratic pro-

cesses; the dependence on lowest price as the sole factor for evaluating competing contractors; and an aggressive claims environment under which all contract changes and project impacts must be addressed.

Under these circumstances, state DOTs seem to have exhibited great enthusiasm for partnering programs, which promise improved project delivery and a better working atmosphere for project personnel. Partnering is voluntary and requires no new contracts, specifications, funding, permanent personnel, or outside approvals.

The progressive adoption of partnering by state DOTs has provided an excellent study opportunity. The results of the research summarized in this article illustrate the extent to which DOTs have used partnering, their partnering measurement efforts, and the level of their satisfaction with partnering. The research was aimed at answering basic questions such as whether partnering really makes a measurable difference and whether it can meet its promising and desirable goals.

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MEASURING SUCCESS

Partnering itself is difficult to measure, but groups of partnered projects can be compared to similar projects in which partnering was not used. Although the people and project specifics vary, the effectiveness of partnering relationships in the aggregate may be indirectly measured by tracking specific characteristics and comparing them over time. Measurable characteristics might include cost, cost growth, and time taken for completion. Once these characteristics have been identified, a process to measure and compare them must be established. Some characteristics, such as cost, are easier to quantify than others, such as quality of work performance. Easily quantifiable characteristics are sometimes mistakenly given priority over more significant factors that are difficult to measure.

A partnering measurement program should be designed to meet the specific needs of each user. The general steps for establishing such a program are summarized in the next five sections.

Defining a Purpose

The first step in establishing a measurement program is to determine what purpose the measurements will serve. Measurements may be used to show that some new administrative program, such as partnering, has had an effect on the delivery of construction projects. Measurements may be used to show that the DOT is operating more efficiently than before, or that the taxpayers' money has been entrusted to responsible caretakers who allocate funds to cost-effective programs and departments. Perhaps the measurements will be used to evaluate personnel or service providers such as designers and contractors, or to assess a new construction technology. Each of these objectives could require different measurement methodologies and attributes.

What and How To Measure

A partial list of possible measurement attributes includes the following:

- Project cost and cost growth,
- Contingency budget and expenditures,
- Value engineering proposed and accepted,
- Project administration budget and expenditures,
 - Claims made and paid,
 - Claims administration legal budget and expenditures,
 - Planned and actual time of completion,
 - Interpersonal attitudes (many attributes),

- Safety incidents,
- Time and lives lost because of accidents, and
- Quality of performance (many attributes).

Decisions about which characteristics to measure should reflect the purpose of the measurement program and pragmatic considerations about data collection such as when the data can be collected (i.e., at project completion, after all claims have been made, after all claims have been resolved and paid, or at another point in time), the sources of data (i.e., project manager, accounting records, and legal records), and who actually collects the data (i.e., a clerk, a project manager, an accountant, or engineer for the DOT). The process of establishing a methodology for measuring a partnering program generally involves these types of decision, as well as decisions about how to protect the integrity of the data collection process.

Benchmarks

Measurements may be made by comparing the results of each project with historical averages. For example, Project A may have finished at 88 percent of the original project duration, compared to a 102 percent average for all projects measured. Measurements can compare aggregate project averages to previous groups; for example, fiscal year 1994 projects may be compared to those in the fiscal year 1991 (base year) to determine changes in the average number of days lost per project because of accidents. Measurements can also compare individual projects or project groups using ratios: cost of claims paid per \$1 million (contract value) work in place for fiscal year 1994 versus fiscal years 1988–1990 (base period).

All of these comparisons can be used to assess the effectiveness of a modified project delivery approach, such as partnering. No single prescribed approach would be correct in all circumstances.

Measurement and Compilation

The measurement process should be periodic and ongoing. Essential data may be collected first, with the scope of the measurement process gradually increasing. It is often far easier to collect data than to rigorously evaluate them. It is important that surveys, questionnaires, and interviews be administered with consistent directions to assist subjects in giving appropriate consideration to their answers.

Analysis

The best candidates to analyze the results of measurement and draw conclusions about the effectiveness of partnering are individuals who bring objectivity to the process. Often those closest to

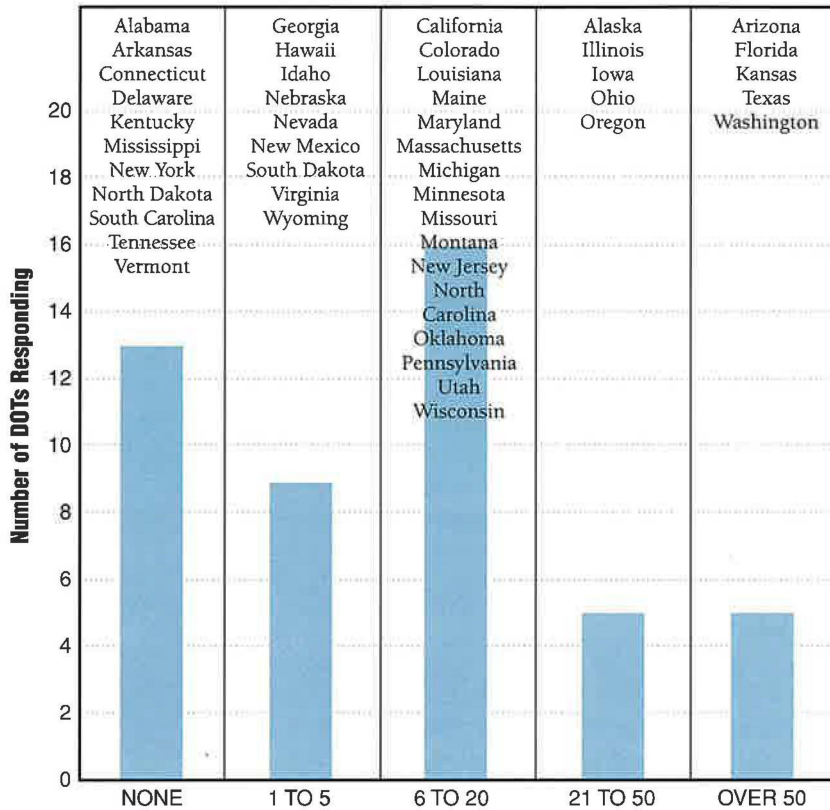


FIGURE 1
Projects completed using partnering.

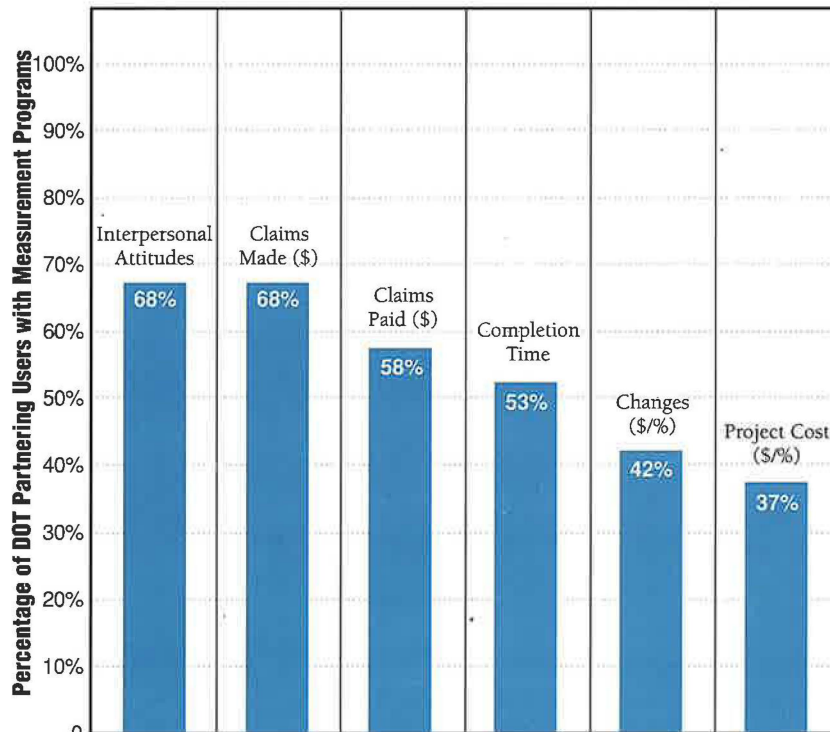


FIGURE 2
Attributes of partnering measured most frequently by DOTs.

the partnering program suffer from a “euphoric bias” that could give the most weight to positive attributes and overlook undesirable realities or dismiss contrary findings.

USE OF PARTNERING IN THE UNITED STATES

A total of 47 of 50 state DOTs responded to the research questionnaire. One of the respondents chose not to participate in the research program. The information provided by the respondents was based on the results of more than 700 construction projects completed using a partnering approach as of August 1994.

Extent and Measurement of Construction Partnering

Almost all of the respondents (96 percent) either have completed projects using partnering or were using a partnering approach at the time of the survey. Before 1990 the number would have been close to zero. DOTs most experienced with partnering—Arizona, Kansas, Washington state, Texas, and Florida—began to use this approach on a trial basis in the early 1990s. The rapid increase in use shows how aggressively partnering has been adopted by DOTs. Figure 1 shows the relative experience of the program participants, as well as the overall body of knowledge about construction partnering.

Measurement program methodology varies from state to state, but many focus on similar aspects (Figure 2). Claims made by contractors and interpersonal attitudes are the most frequently measured attributes, evaluated by 68 percent of the measurement programs. In Washington state, project teams evaluate interpersonal attitudes addressing the effectiveness of conflict resolution, personnel efficiency, and program satisfaction. Other attributes frequently measured include contractor claims paid (58 percent), project completion time (53 percent), changes (42 percent) and total project cost (37 percent). Because data collection varies, some attributes are represented in gross numbers (dollars, days, etc.), whereas others use ratios or percentages (comparison to original contract, comparison to baseline, or normalized).

The impact of partnering on project team performance is currently being measured by 37 percent of the DOTs that responded to the survey (Figure 3a). This represents slightly more than one-third of the total group of respondents, but nearly three-quarters of the projects completed with a partnering approach (Figure 3b). These statistics, augmented by supplemental investigation,

suggest that the longest-running programs have evolved over time to incorporate measurement and process improvement functions.

Improvements in Team Performance

Most partnering users (85 percent) stated that this process helped improve performance. The remaining 15 percent were unsure and had no measurement program to assist in their determination. All users employing measurement programs were convinced of partnering's effectiveness.

Most (95 percent) also reported one or more specific improvements attributed to the process (Figure 4). The most frequently cited improvement was better communication between the contractor and DOT, with 93 percent of the partnering users noting gains in this area. Other improvements frequently reported were better cooperation between contractors and DOTs (89 percent), better cooperation within DOTs (55 percent), improved communication within the DOTs (52 percent), fewer claims by contractors (48 percent) and fewer unresolved claims (39 percent).

These results were consistent when comparing DOT users with measurement programs to those without such programs. However, some interesting differences emerge for certain characteristics. Improvements in the quality of work and reduction of litigation costs were noted by all DOT users that measure these attributes, whereas only 19 percent of DOTs without measurement programs noted improvements in work quality and only 15 percent noted lower litigation costs. Similarly, 90 percent of those measuring timeliness of project completion found improvements, whereas only 13 percent without measurement programs observed gains (Figure 5).

The two groups demonstrated great differences among findings in other categories: reduced project costs (71 versus 4 percent), more value engineering proposals (67 versus 15 percent), fewer claims paid (64 versus 15 percent), fewer changes (75 versus 26 percent), and fewer claims made (85 versus 37 percent) (Figure 6). An apparent benefit of establishing a measurement program is not only that it confirms the more obvious and observable improvements, but also that it can identify gains in areas otherwise difficult to observe.

Level of Satisfaction

The majority of DOT partnering users (91 percent) indicated that they were satisfied. The 15 percent of these who indicated that they were totally satisfied represent experience with 410 projects, 58 percent of the entire group body of knowledge. Two of the most experienced and

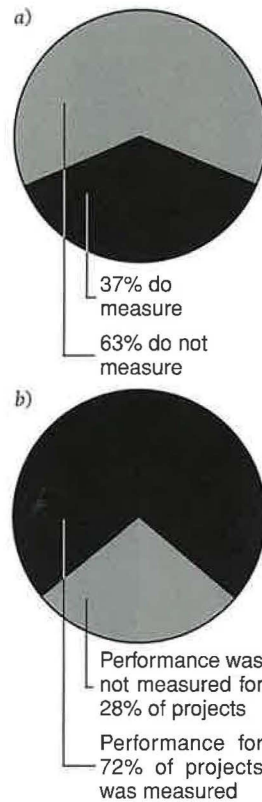


FIGURE 3
Percentage of DOTs that have measured partnering performance by a) program and b) project.

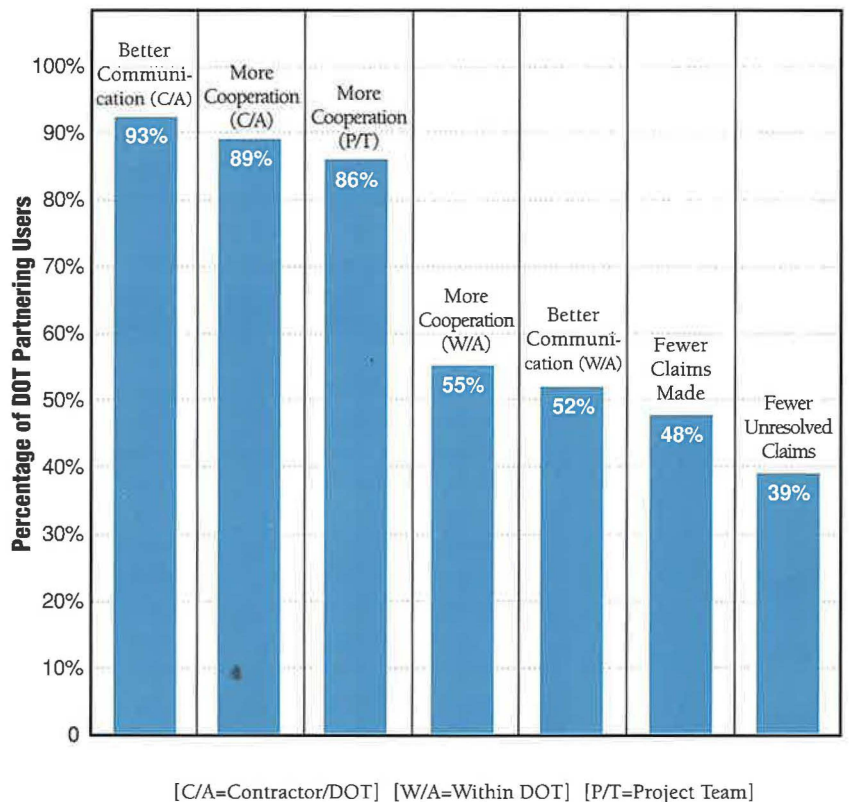


FIGURE 4
Improvements attributed to construction partnering.

FIGURE 5
Different results reported by DOTs that measure partnering and those that do not, among three frequently cited improvements.

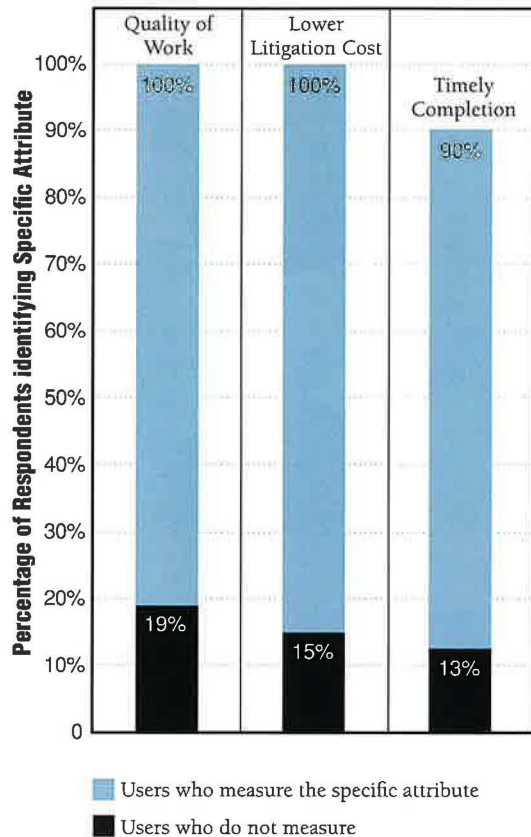
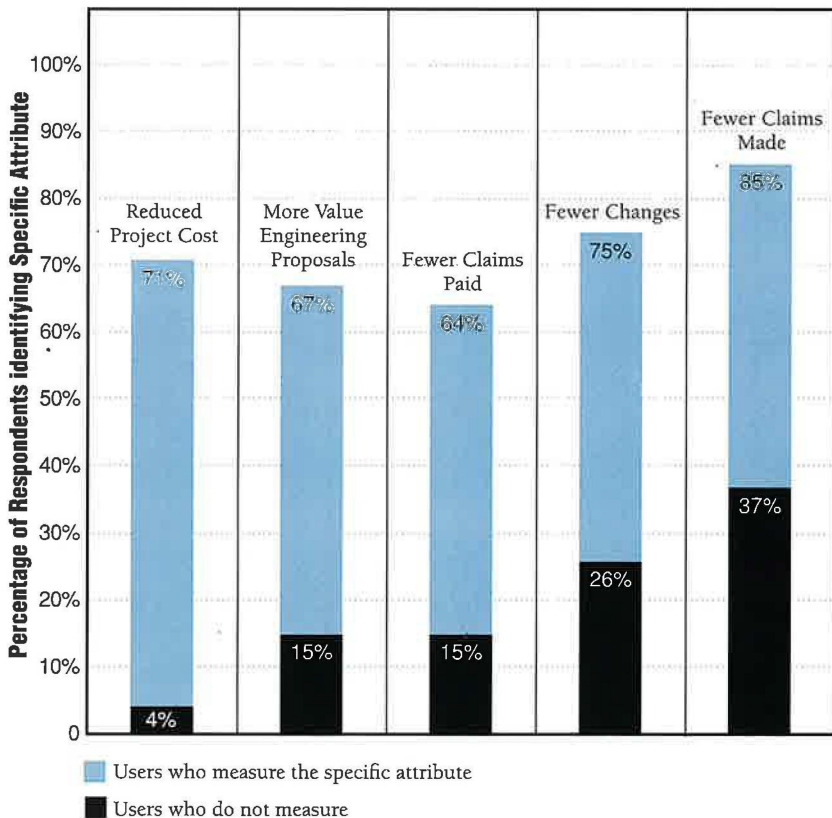


FIGURE 6
Different results reported by DOTs that measure partnering use and those that do not, among other improvements.



most measurement-oriented members, Arizona and Washington State, were among the totally satisfied respondents. None of the remaining 9 percent of respondents indicated dissatisfaction with construction partnering, only that they had new programs or no program.

Problems Encountered

Most users (74 percent) identified at least one problem encountered in their partnering efforts. The most commonly cited difficulty was measuring the specific benefits of partnering (42 percent). Both the respondents with measurement programs and those without named this as the most frequently occurring problem. Other frequent difficulties include contractor acceptance (21 percent), DOT employee acceptance (20 percent), and time involved in the partnering process (21 percent).

CONCLUSIONS

Although the research findings represent a small portion of construction projects in the United States since 1990, they are a significant portion of all state DOT construction over the same time period. Conclusions presented herein reflect the aggregate experience of the respondents as of September 1994, and may not be indicative of the experience of other groups.

Construction partnering is widely used among DOTs, and satisfaction with the partnering approach is high. Of the 96 percent of DOT respondents that have direct experience with construction partnering, 83 percent have established formal partnering programs. Ninety-one percent of the DOT respondents indicate satisfaction with the results from construction partnering. Nearly all DOTs responding to the questionnaire cited at least one area of improvement because of construction partnering. Improvements in communication and cooperation were the most frequently cited, but other areas of improvement—such as fewer claims made or paid, and fewer change orders to work programs—were also identified as significant.

The results of partnering projects and programs are measurable. More than one-third of DOT users—representing three-quarters of partnering projects—measure such results, and the percentage is increasing. Respondents that conduct routine measurements of construction partnering are able to identify much more extensive and specific benefits than those that do not measure their program results.