

# QUANTITATIVE ANALYSIS OF THE TxDOT PARTNERING PLUS PROGRAM



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An Interim Report  
Prepared by:

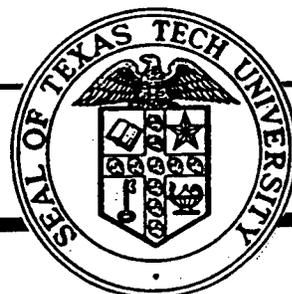
Douglas D. Gransberg, Ph.D., P.E.,  
Howard L. Reynolds , and  
Jack Boyd  
Department of Engineering Technology  
Texas Tech University  
Lubbock, TX 79409

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October 1997

Research Study No: 0-1729  
Report No. TX-97/0-1729-2R





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**Quantitative Analysis of the  
Texas Department of Transportation  
Partnering Plus Program**

by:

**Douglas D. Gransberg, Ph.D., P.E.  
Research Supervisor**

and

**Howard L. Reynolds and Jack Boyd  
Researchers**

**Report Number: TX-97/0-1729-2R  
Project Number: 0-1729**

**“Evaluating the Effectiveness of Current  
and Future Partnering Efforts”**

**Research Sponsor:  
Texas Department of Transportation**

**Texas Tech University  
Department of Engineering Technology  
Box 43107  
Lubbock, Texas 79409-3107**

**October 30, 1997**

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## **Implementation Statement**

At this point in the research no recommendation can be made as to the practical application of emerging conclusions. However, in a general sense, the findings thus far seem to indicate that the Department is indeed accruing benefits from its current Partnering Program and there is nothing to suggest that a change in the current program be made at this juncture. Once the research has progressed, a more detailed statement of implementation recommendations will be developed by the research team. In the meantime, the following discussion will suffice to define the future direction of implementing this projects findings for the benefit of the Department.

The major benefit anticipated by this project will be TxDOT's ability to objectively identify projects where partnering will be of the greatest benefit and to make an informed management decision to either formally or informally partner the contract. This will permit the Department to benchmark project partnering criteria and establish a policy regarding the use of partnering in future contracts. The study will provide a global approach to the subject and, as a result, will provide guidance to the Department's Senior Management Team on the future direction and expansion of partnering on contracts for construction as well as other required products and services.

The best method to convey the research findings to operational staff members will be through a partnering decision checklist which details the salient parameters which contribute to the decision of whether to formally or informally partner a given project. The checklist can be issued as a supplementary product of the Partnering Plus Program and become a part of the Continuous Improvement Office's Partnering Handbook.

## **Disclaimer**

The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of data presented herein. The contents do not necessarily reflect the official view or policies of the Texas Department of Transportation. This report does not constitute a standard, specification or regulation.

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Without their help, professional guidance, and advise, the work to date would have been much more difficult and time consuming.

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## Interim Report #2

### “Quantitative Evaluation of the TxDOT Partnering Plus Program”

Texas Department of Transportation Research Project 0-1729  
"Evaluate the Effectiveness of Current and Future Partnering Efforts."

By:

Douglas D. Gransberg, Ph.D., P.E.

Howard L. Reynolds

Jack Boyd

Department of Engineering Technology

Texas Tech University

Lubbock, Texas 79409-3107

### Project Abstract

This project's initial objective was to identify and attempt to quantify the benefits and impacts of partnering on TxDOT, and it originally consisted of six tasks which led to the development of a partnering benefits model whose intent was to aid TxDOT in deciding which projects to partner. In December 1996, a major partnering policy directive was issued which requires partnering on all projects. Therefore the thrust of this project was changed to evaluate the impact of past partnering efforts and develop a method to assist TxDOT field personnel to determine whether to formally or informally partner construction projects. Of the original six tasks, four have been completed. Surveys of TxDOT personnel, construction contractors, and external facilitators have been completed. The partnering cost per project has been determined. A project performance data base of 408 partnered and non-partnered projects has been built. The data in this database has been reduced and initial statistical analysis has been completed. In depth analysis is ongoing, and this analysis will provide the foundation to discriminate between those types projects which will benefit from formal partnering versus those which are best partnered informally. Another survey of TxDOT and contractors with regard to informal partnering remains to be completed and the results of the entire study needs to be synthesized into a partnering decision making model.

### Background

The Texas Department of Transportation Continuous Improvement Office launched the Partnering Plus Program in December 1996 (TxDOT, 1996). This program is the embodiment of the decision to implement partnering on a large scale throughout the state. In a nutshell, the new program created a policy which requires partnering to be used on all construction projects. There are two alternatives available.

- Formally partner the project utilizing a designated facilitator.
- Informally partner the project using project personnel to facilitate.

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As a part of the Partnering Plus Program, facilitators from inside TxDOT and its contractors were trained. Additionally, training for project personnel and others was conducted throughout Texas to ensure that informal partnering sessions conformed to the requirements thought to be necessary to ensure the maximum benefit from the exercise. As a result of this decision, the course of this research was shifted from attempting to create a system to determine whether or not to partner a project. The focus was moved to the creation of a method to assist the Department in identifying those projects which would benefit from the investment of time and money in formal partnering sessions. This shift was easily made. The data which had been collected formed a body of knowledge with regard to the performance of partnered projects in comparison to the performance of non-partnered projects. This statistical data has allowed the research team to identify those types of projects which marginally benefit from partnering as opposed to those which displayed significantly enhanced performance. Thus the shift can be made seamlessly without loss of previous effort.

Partnering in construction contracts has continued to gain in popularity throughout the United States. The term partnering evokes different meanings to different sectors of the engineering and construction industry. Among the designers and builders of privately financed projects, partnering is a strategic relationship that is developed for relatively long periods of time and for multiple projects. These strategic partnerships provide many advantages to their members. However, the main one is the development of a thorough understanding of the partners' motivations, trustworthiness, and means of communication. This understanding allows one partner to gauge the other partner's potential reactions to impending crises and encourages honest sharing of bad news in a timely manner which permits joint action to avert or minimize the damage of a particular crisis to the successful completion of the project in question. Private strategic partnerships have an advantage over their counterparts in the public sector in that private entities are relatively free of regulation on the form and substance of their internal operational activities and contractual relationships. Public agencies must answer to lawmakers, regulators, and the general public alike. So the freedom to develop longstanding, strategic partnerships with private organizations is greatly diminished if not eliminated altogether. As a result, agencies like the Texas Department of Transportation (TxDOT), have confined their partnering activities to single project, team-building seminars and have not yet attempted to establish longstanding strategic partnerships with entities in the private sector. An important feature of this project will be to examine partnering successes found in the private sector and search for means to adapt those procedures to TxDOT within the confines of applicable State law, regulation, and Department policies.

The literature search shows that the growth of partnering is directly related to the growth in claims and litigation regarding construction contracts throughout the nation (Kubal, 1994). In the late 1980s, the US Army Corps of Engineers (USACE) led the way for public agencies to begin using this new business practice as a means to avoid disputes and consequently reduce the ultimate cost of delivering public facilities. USACE's official program has largely been one of promoting the concept without any benchmark measurements or definitive performance measurement. The identification of quantitative measures of partnering benefits by public agencies has largely been avoided in favor of a less abstract assessment of qualitative benefits, and analyses of those few attempts to quantify this information is fraught with pitfalls. One of

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those pitfalls involves the collection, and more importantly, interpretation of statistics regarding partnering. In USACE, there was a tendency to credit partnering for project successes even when there was no tangible evidence of any improvement over the status quo (Gransberg and Ellicott, 1996). This was caused by the intense personal investment public project managers and contractors make during partnering sessions. There is no doubt that enhanced communication greatly improves a project's management/dispute resolution environment.

Most serious studies of the process have failed to identify significant benefits which can be directly attributed to partnering. The Arizona Department of Transportation (ADOT) has reported significant benefits from partnering using a study which found that partnered projects had 2% less cost growth than non-partnered projects (Chapin, 1994). But the method for computing these values seems to be quite arbitrary due to the way they seem to credit this 2% savings on all partnered projects contract price without regard to actual cost growth on each project. In fact, the ADOT partnering program benefits are currently undergoing an audit to determine if the methods used to compute reported benefits are properly grounded in a rigorous accounting system. This same problem is rather well illustrated by a study done at the University of Texas (Grajek, 1995) where the author found that "...partnering (on 65 TxDOT projects) is not having a statistically significant impact on cost change, change order cost or net change cost." The same study found that partnered projects finished an average of 13.73% ahead of schedule as compared to non-partnered projects which only finished 9.68% ahead of schedule. The author goes on to equate the value of early completion to the value of liquidated damages as a method to quantify the benefit of partnering. While this appears to show some impact, the fact that most projects finish ahead of the contract completion date indicates that the Department is being conservative in establishing those dates and the study is fundamentally flawed in assuming the value of finishing early (assuming that partnering is the reason for accomplishing this achievement) is equal to the cost of finishing late. While there is nothing fundamentally wrong with the TxDOT's policy for setting contract completion dates, it makes interpretation of actual performance data difficult with regard to schedule. A study conducted in 1994 of Ohio Department of Transportation (ODOT) projects cited many of the same difficulties in obtaining data (Chapin, 1994). This study based many of its recommendations on questionnaires distributed to ODOT and contractor field personnel. One of the study's prime recommendations is that only complex projects which exceed \$5 million be formally partnered.

USACE found that partnering is most valuable on projects with tight schedules, and techniques such as issue escalation and open communication tend to enhance the efficiency of critical decision making. This allows the contractor the maximum amount of time to react to scope changes and still retain satisfactory progress. Change order time extensions are much more important to a contractor on a project with a tight schedule than on one that has greater schedule flexibility (Kubal, 1994). Thus, the contractor will be more liable to formalize a dispute over a time extension on the former than on the latter (Kane, 1992). This fact further blurs the validity of the apparent schedule improvement on partnered TxDOT projects. The other problem with past studies involves the small relative sample size available to past researchers. This springs from the fact that these studies were initiated at times when the use of partnering was relatively new, and there were comparatively few projects completed to analyze. To avoid statistical

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insignificance, this study sampled over 200 partnered and 200 non-partnered projects over a five-year period of time. The inferences made from analysis of the reduced data should be definitive.

The above discussion is not meant to cast doubts on the validity of the partnering process, but rather to indicate the importance of understanding the dynamics of the process which produces the contract performance data. Studies done on USACE and Naval Facilities Command (NAVFAC) projects confined themselves to competitively bid, firm fixed price projects (Pina, 1993, Schmader, 1994, and Weston and Gibson, 1993). Since the date of those studies, Best Value selection has been implemented on a broad scale by USACE and to a limited degree by NAVFAC. Best Value selection removes the requirement to award to the low bidder and has changed the dynamic under which partnering was developed in the Federal government (Ellicott and Gransberg, 1996). This approach shows much promise.

### **Problem Statement and Study Approach**

In light of the above discussion, this study addresses the following problems.

*Analyze the costs and the benefits of partnering on TxDOT projects. Develop parameters and criteria to measure the effectiveness of partnering. Use these parameters and criteria to create a model by which future construction projects, design and procurement contracts, and other “nontraditional” contractual relationships can be evaluated to determine the appropriateness and potential benefit of using both formal partnering and informal partnering on a case by case basis.*

The research team is using a three-pronged, global approach which is responsive to the six tasks outlined in the problem statement to solve the problem. First, historical data from TxDOT projects and the literature was gathered. TxDOT project data is sorted. Now that collection and reduction is complete, this data is analyzed from three perspectives (government, contractor, and private business practice) to identify trends and significant differences. These will be used in the third portion to provide project-specific inputs to a method which will seek to provide a reliable estimate of a future project’s suitability for either formal partnering or informal partnering. To be successful, the model must have the ability to quantify certain qualitative benefits. Cost index number theory, fuzzy logic, and neural networks were investigated to achieve this purpose. Fuzzy logic had been successfully used by the Corps of Engineers to quantify qualitative data on potential Design-Build contractors (Paek, J.H., et al, 1992), and it was felt that this approach was very close to the required approach for partnering. It was found that while cost index number theory will work quite well in this situation, fuzzy logic requires the development of an expert system to be totally effective. Neural networks seemed to provide a promising mechanism for this solution. This was rejected as being too complex and abstract. As the focus to differentiate between formal and informal partnering has become the study’s objective, a simple, easy to understand approach has the highest probability of providing an implementable tool immediately for TxDOT project personnel.

Initially, the team hoped to be able to directly measure partnering related benefits based on project performance data by using formulas found in other states or public agencies and then

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modified to fit the TxDOT environment. But no such formulas were found, and a direct measurement was too complex and unusably abstract. A method will be developed to be able to recognize discreet parameters which give a clear indication of a project's potential to benefit from formal partnering and be able to compare this to other project candidates with output being a rank ordering among projects of partnering benefit potential.

## **Work Plan Progress**

The Work Plan roughly follows the six tasks listed in the research problem statement. The project is divided into six major tasks which encompass the subtasks shown and describe the additional subtasks which must be accomplished to adequately cover the research topic. This report will briefly recapitulate the task descriptions and describe the progress made to date on each. As this is the first year of a two year study, it should be noted that work is not scheduled to have begun on all of the tasks at this writing. In general, the study is proceeding on schedule. In fact, data collection and reduction appears to be somewhat ahead of schedule. The shift in focus to study a method to determine the type of partnering to be used on a given project has not significantly impacted the project milestones. The one point which has caused a bit of concern is the overwhelming response to the detailed partnering survey questionnaires. While this has given us more data than expected, it bodes well for developing findings with a high degree of statistical significance and the potential for producing the first definitive study on the subject of partnering. Additionally, it was found that some of the desired data points are not available in digital records. Having to collect data in widely dispersed sets of paper records on over 400 projects was determined to be unrealistic and the required data set was modified to maximize the use of those records which were readily available in computer searchable form.

**Task 1:** This task includes both the literature review and the tabulation of data from TxDOT's records. It consists of the following five subtasks:

Subtask 1A: Collect cost and benefit data to determine the total TxDOT investment to date in its partnering program.

In actuality, the data was not as readily available as hoped for by the research team. It was found that some of the data resided in the Office of Continuous Improvement, and we were able to gather that data. The remainder of the data, specifically the participant cost, is only available in the Districts. Additionally, the actual costs would be difficult to separate inside the basic accounting system. In discussion with the Project Director, it was decided to conduct a survey of all Area Engineers to determine the cost to participate in an average partnering session. The survey was completed and the results of this subtask are shown in Tables 1 and 2.

**Table 1. Estimated Partnering Office Salary Costs**

<u>Fiscal Year</u>	<u>Cost</u>
92 (September 91-August 92)	
1 x 20% x \$50,000	\$10,000
93 (September 92-August 93)	
1 x 20% x \$50,000	\$10,000
1 x \$30,000	\$30,000
1 x \$20,000	\$20,000
94 (September 93-August 94)	
1 x 20% x \$50,000	\$10,000
1 x \$40,000	\$40,000
1 x \$20,000	\$40,000
95 (September 94-August 95)	
1 x 20% x \$50,000	\$10,000
1 x \$40,000	\$40,000
1 x \$20,000	\$40,000
96 (September 95-August 96)	
1 x 20% x \$50,000	\$10,000
1 x 80% x \$40,000	\$32,000
1 x \$30,000	\$30,000
1 x \$20,000	\$20,000
97 (September 96-August 97)	
1 x 20% x \$50,000	\$10,000
1 x \$40,000	\$40,000
1 x \$30,000	\$30,000
total	\$422,000

**Table 2. TxDOT's Total Partnering Investment; 204 Partnered Projects**

<u>Item</u>	<u>Value</u>
Partnering Cost Reimbursed to Contractors	\$ 227,225.40
CIO Salaries	\$ 442,000.00
CIO Travel	\$ 37,128.00
District Salaries *	\$ 197,451.69
District Travel *	\$ 37,128.00
<b>Total Investment</b>	<b>\$ 940,933.09</b>
<b>Total Cost per Partnered Project</b>	<b>\$ 4,612.42</b>

\* Estimated by survey from Area Engineers.

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Subtask 1B: Collect project cost and schedule performance data on both partnered and non-partnered projects to determine parametric factors for inclusion in the partnering model.

The informal partnering session held in October 1996 was attended by members of the TxDOT Continuous Improvement Office. As a result, data of this nature was quickly located. As is often the case, some of the desired data was unavailable and unconstructable. This is specifically true for project information regarding schedule impact factors. Basically, the only data of this nature that we could find was the typical project start and completion dates as well as information on number of days of liquidated damages assessed against each project and the number of additional days allowed. Data collection on 204 partnered projects and 204 non-partnered projects is complete. Data reduction is also finished.

Subtask 1C: Sort cost data to identify trends and possible parameters for partnering model.

Work on this subtask is complete.

Subtask 1D: Analyze results and identify factors which promote accrued benefits.

This subtask will be done using standard statistical analysis techniques. Detailed statistical analysis is underway. The mean, standard deviation and variance has been computed for all data points. Additionally, projects were grouped by contract amount to give the researchers a feel for the variation of desired data points with regard to project size. Preliminary analysis is detailed in Appendix A: Quantitative Analysis of Project Performance.

Subtask 1E: Conduct literature review to ensure that the state-of-the-art is well defined and understood during the course of this research project.

Work on this subtask is basically complete. The only disappointment seems to be gathering Best Practices information from the experiences of the Texas Department of Criminal Justice (TDCJ). Contacts were made with this agency, and it seems that in spite of the huge level of partnering recently completed by TDCJ, no effort has been made to capture or institutionalize the lessons learned from this effort. The team was only able to obtain anecdotal information of which none would be appropriate for inclusion in this report. The details of the literature review were published in March 1997 in Interim Report #1.

**Task 2**: This task will explore opportunities to exploit partnering in “nontraditional” contracts and relationships within the Department and among its customers and stakeholders. With the exception of Subtask 2C, initial work on this task began in September 1997. Before commencement of work, the team reviewed the planned approach in light of information gained in the first year of the project. This task will consist of three subtasks. There are no results to report at this point in time.

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Subtask 2A: Inventory TxDOT procurement activities for the past fiscal year and identify types of contract actions which constitute a significant percentage of the fiscal year's budget.

Subtask 2B: Analyze the data and identify those contract actions which appear to have both a significant cost which would justify partnering costs and a greater than average potential for changes which would indicate that improved communication through partnering would accrue potential cost savings and other benefits to TxDOT.

Circulate a draft detailing those areas where partnering might pay dividends to the appropriate TxDOT staff points of responsibility and collect comments regarding the validity of the recommendations. Collate the comments and the recommendations and produce a report on the findings in this area.

Subtask 2C: As research and development contracts are an integral and substantial portion of the TxDOT budget, conduct an experiment in partnering "nontraditional" contracts by formally partnering this research contract.

An informal partnering session was held in Austin during October 1996. The session was well attended by appropriate members of the Department. Two of the three researchers were able to attend. The primary benefit of the session became the clarification of the requirements of this effort by TxDOT. The open channel of communication between the researchers and the Project Advisory Group greatly facilitated the initial efforts in data collection and the development of a Best Practices Survey which is directly responsive to the Project Director and the Departments need for specific information. The other important product of the session was a redesigned schedule of deliverables which will better serve the needs of the Project Director to provide information to Research Management Committee 1.

**Task 3**: The work associated with this task generally involves the development of survey questionnaires, their distribution, and an analysis of the results.

The focus is on discovering the parameters used by other agencies, both public and private, to measure the benefit and impact of partnering on their projects. The work is organized in three subtasks.

Subtask 3A: Review literature to find surveys of a similar nature which may have been used in previous studies.

The literature review uncovered four primary surveys on this subject. The most valuable was a survey done in conjunction with a Master's Thesis at the University of Texas on early partnering efforts of the Department. There was also a survey completed by the Ohio Department of Transportation. We found surveys done by the Corps of Engineers and the Naval Facilities Engineering Command as well. Information found in the literature was combined with information from this project's informal partnering session to form the basis of the surveys which were developed for subsequent subtasks.

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Subtask 3B: Prepare and distribute a survey which asks the surveyed population to define how they measure the benefits and impacts of partnering.

The content of the survey was coordinated with the data collection plan for Task 1 to ensure that the survey's results can be correlated with TxDOT historical data to aid in the identification of parameters to measure partnering's effect on contracting systems. A two phase approach was taken to distribute the surveys to public and private agencies. First, a preliminary survey was sent to all possible addressees and its results were used to target those organizations with the best information for the detailed survey. This permitted the team to filter out those agencies who had never used partnering and more importantly, those who had but would not be expected to respond to a detailed survey. It also helped us identify subject matter experts in each organization so that we could direct the detailed, second survey to the correct person who had the requisite information that we needed. There were twenty-six responses from state and other organizations. Many responses to partnering were positive ones. Of the responses received, approximately 96 percent of the organizations said that they have partnered before. About 88 percent indicated that partnering improved the project in some way. Out of those who indicated improvement, about 52 percent said that it increased communication.

Subtask 3C: Reduce the survey output and determine a "best practice" method of measuring benefit and impact.

We have been disappointed in the lack of response regarding details of other agencies' methods to quantify or benchmark their partnering effort. With the possible exception of maintaining records of claims and project completion data, there appears to be no effort underway in the nation to quantify this type of benefit. Contacts with other agencies have led to comments that this effort is "too nebulous and of little value." Only two states, Arizona and Kansas, provided evidence that they were measuring partnering benefits, but unfortunately neither of them were willing to share their method of measurement.

In fact, no reliable method for providing a metric to measure partnering benefits has been found. We hypothesize that partnering is really a change in business behavior rather than the introduction of a technical innovation such as A+B bidding. Because partnering has no relationship to the technical aspects of the project, it is difficult to find substantiated improvements in project performance through traditional measures. In fact, it can be argued that project performance success is more influenced by the quality of the design, the environment in which construction must take place, and the technical abilities of both the owner and the builder than on the quality of the relationship inherent to the contract. Most quantified partnering "benefits" seem to be computed by determining the historical cost of contract problems such as claims and then imputing that cost as a benefit accrued by a partnered project if it is completed without a significant contract problem. For example, if the historical cost of construction claims in an agency was \$100,000 per contract, then using this philosophy would impute a \$100,000 "savings" for every partnered project which is completed without a construction claim. The fallacy of this approach is that it neglects the fact that most non-partnered contracts are also

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completed without a claim and it is blind to the statistical skewing of contract claims cost by the result of one multimillion dollar claim on agency's total program.

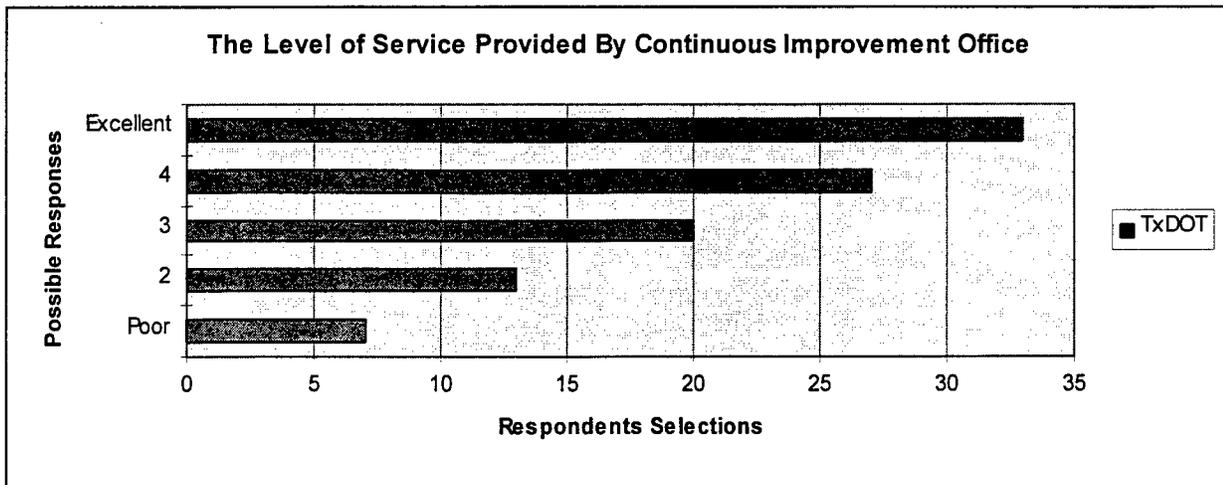
Another common attempt to quantify partnering benefit is to track agency supervision and administration costs on partnered projects and compare them to non-partnered projects. This method fails the common sense test because early in an agency's partnering program it tends to only partner large complex projects which, by nature, will have a lower than average supervision and administration cost per contract dollar than the average non-partnered project. It is concluded that there is no reliable medium in use to measure partnering benefits. Any attempt to do so, will have to come from the analysis of the data collected by this study.

### **Ancillary Tasking Resulting from Mini Project Partnering Session**

At the initial project mini partnering session, TxDOT requested that a questionnaire be developed and distributed to a sample of TxDOT field personnel. The purpose of the survey was to assess TxDOT field personnel feelings as to the progress of their partnering effort. The last such comparable measurement of TxDOT personnel was accomplished in January 1995 as part of a research project by a graduate student at the University of Texas (Grajek, 1995). That survey was reviewed. The same questions were repeated in the survey developed by the Texas Tech researchers, particularly those questions assessing attitude toward the various aspects of the TxDOT partnering effort. This approach allows TxDOT to use the Grajek report more or less as a baseline for comparison with the latest survey results.

A copy of the survey was developed by Texas Tech researchers and forwarded to a sample population of TxDOT field personnel, contractors, and external facilitators (Appendix B). A quasi-sampling approach was selected in which ten surveys were sent to every TxDOT District Engineer for random distribution to field personnel. Of the 250 TxDOT surveys distributed, 184 were completed and returned for a 74% response rate. Of 238 contractor surveys, 68 were returned and resulted in a response rate of 29%. 100% of the twelve external facilitator surveys were returned. Questions 20-22 assess attitudes regarding the overall TxDOT partnering process as it affects improvement to areas such as quality and safety. Summary responses to each question in the survey are also presented in Appendix B. Figure 1 illustrated the results of this survey with regard to their perceived relationship with CIO.

**Figure 1. Responses of TxDOT Field Personnel Regarding CIO**



**Task 4:** Due to the fact that no reliable metric for partnering could be found, work on this task can not be done. After discussions with the Project Director, it was decided to substitute a study of informal partnering which follows the same form and format as the survey of TxDOT field personnel and contractors in Task 3. Respondents will be asked to identify the criteria they currently use to select formal partnering over informal partnering. This data will be used to prepare a partnering check list which can be used for making this type of decision on future projects.

**Task 5:** The work associated with this task will concentrate on identifying and quantifying criteria to compare the performance of partnered projects to the performance of non-partnered projects.

A statistically significant sample size for both partnered and non-partnered projects was determined. With this number, projects were randomly selected from among the available pool of projects. Care was taken to ensure the statistical integrity of the process. Additionally, an equal number of projects in both groups were taken to prevent the skewing of data that was apparent in a previous study which used unequal sample sizes. Projects were grouped according to contract amount and unit measure size to permit trends between large and small projects to emerge and become apparent to the analyst. Standard statistical measurements, as previously described in the Work Plan, were used to provide a comparative analysis in the cost and schedule categories. This work is ongoing and the results to date are shown in Appendix A. Table 3 is a roll-up of the statistical data collected by this study and a comparison with two earlier studies on the subject where data was available.

**Table 3.** Comparison to Previous Results with This Study's Results.

MEAN	TxDOT 95 PT	TxDOT 96 PT	ODOT 94 PT	TxDOT 95 NP	TxDOT 96 NP	ODOT 94 NP
Number of Projects	54	204	20	107	204	123
Cost Change (%)	4.12	2.93	1.00	4.51	3.70	4.03
Change Order Cost (%)	3.67	0.18	0.99	4.19	0.37	0.03
Total Change Orders (#)	11.69	16.00	*	12.24	10.00	*
Duration Change (%)	-13.73	-4.70	*	-9.68	10.04	*
Liquid Damage Cost (%)	0.080	0.070	*	0.020	0.210	*
Claims Cost (%)	0.000	0.330	*	0.013	0.610	*
Award Price (\$)	4,050,425	4,925,201	2,966,150	4,502,484	10,669,634	3,383,195

**Note:** TxDOT 95 = Grajek, 1995; TxDOT 96 = This study; ODOT 94 = Chapin, 1994

This study's projects were sorted to match the format of the other two studies found in the literature search. This was done to find out if the trends discovered in the Grajek study continued, and with the Chapin study to see how TxDOT's performance compared to another state's DOT. Comparison of this study's findings with that of Chapin(1994) and Grajek(1995) are shown in Table 3. The other two studies' findings are supported by this study because the sample size was large enough to add statistical significance to the findings and the same trends appear in all three studies.

TxDOT has reduced the mean cost growth of partnered projects by over 25% since the Grajek study. This study has also shown a much greater difference between partnered project cost growth and non-partnered project cost growth. Grajek reported about a 7% difference in cost growth between partnered and non-partnered projects finding the partnered projects to be slightly more efficient than the non-partnered projects. This study finds a 70% difference in cost growth between partnered and non-partnered projects which is a much more significant finding. Other factors may have contributed to the difference such as better designs, scheduling techniques, and dispute resolution; however, partnering is the only major factor that is not the same between samples. The Chapin study of Ohio DOT projects reported a 75% difference in cost growth.

Also, the mean change order cost percentage was found to be much lower in this study than either of the other two studies. TxDOT did show an increase in the mean number of change orders. The mean number of change orders on non-partnered projects is almost double the amount found by Grajek, while partnered projects only showed a 33% increase. This shows that TxDOT field personnel seem to be more willing to write change orders and this could be the result of them being more willing to consider contractor-initiated change orders.

In looking at time growth, Grajek reported a decrease in construction time for both types of projects with the partnered projects outperforming the non-partnered projects by 22%. According to the Grajek study this was not a big enough difference to say that partnering had a definite impact. This study found a slight increase in mean construction time for both types of projects, but the partnered projects still only outperformed the non-partnered projects by 22%.

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In looking at the overall performance of partnered projects versus non-partnered projects, partnered projects out performed non-partnered projects in the following categories:

- Cost growth
- Time growth
- Mean change order cost
- Total number of claims
- Total amount of claims
- Total number of disputes
- Total amount of disputes

The only category that was contrary to this was in the total number of change orders. Although partnered projects had 38% more change orders, the total cost of those change orders was 67% less than non-partnered projects. Details are contained in Appendix A.

**Task 6:** This task will take the output from the preceding five tasks and use it to develop a method which will provide a means to decide whether to formally or informally partner upcoming projects. Work on this task is not scheduled to begin until the end of the second year of the study.

## **Emerging Conclusions**

While the study is far from being complete, emerging data allows the research team to draw the following initial conclusions with respect to the study topic.

1. Partnering has become an institution in TxDOT. Awareness of the Partnering Program and its goals is wide spread and pervasive. The Office of Continuous Improvement is recognized as the subject matter expert for the organization.
2. Partnering is used in most public engineering/construction agencies throughout the nation. It is an accepted business practice for both government and industry. It is generally recognized as a means to improve communications, reduce adversarial business practices, and create a good environment in which to conduct business. It is believed to reduce contract disputes, claims, and litigation. However, the literature contains little documentation of this perception.
3. Partnering has potential to improve contractual relationships beyond the so-called traditional engineering design and construction contracts. It has been used as a mechanism to improve internal communications and relationships within various types of organizations.

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4. The time and expense of the widespread use of formal partnering has led to the development of informal partnering practices to capture the best elements of the partnering movement without incurring the costs of a full blown partnering session. Informal partnering seems to be becoming the rule rather than the exception.

With respect to the quantitative analysis contained in Appendix A, significant trends have been identified and the following conclusions can be made.

1. Partnered projects outperformed non-partnered projects in virtually every category if they were awarded at a price above \$5 million.
2. Partnered projects have a slightly less cost growth when the entire population is considered.
3. Partnered projects have more change orders than non-partnered projects and this probably demonstrates an increased willingness by TxDOT field personnel to favorably consider contractor-initiated change requests.
4. Across the entire population the mean partnered project change order cost was roughly one half the average cost of the average non-partnered change order. Therefore, contractors are attempting to keep the cost of change orders down.
5. The idea that contractors are working to keep costs low is further reinforced by the trend which shows that partnering seems to create a desirable effect with regard to the number of projects with negative cost growth.
6. For the entire population, the average partnered project finished 4.7% earlier than originally planned and the average non-partnered finished 10.04% later than originally planned.
7. Partnered projects have a fewer number of liquidated damages (LD) days than non-partnered projects in all categories. So partnering seems to have a positive effect on projects with time problems by reducing the number of days that a project finishes late.
8. For the \$5 million to \$40 million range, there are no costs associated with disputes and claims on partnered projects.

With respect to the survey of perceptions by TxDOT and contractor personnel, the following emerging conclusions can be made.

1. The focus was to measure partnering experience and maturation levels in the formal partnering process. The general contractor question is also asked for partnering experience in non-TxDOT projects. While only 24% of the TxDOT respondents had participated in more

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than four partnered projects, the general contractor level was much higher: 43% for TxDOT and 53% for non-TxDOT partnered projects. However, the maturation level for both groups for two or more TxDOT partnered projects is nearly the same level (TxDOT=73% and General Contractor=81%). When compared to the Grajek baseline data of 1995 which showed about 50% experience level for two (2) or more partnered contracts for both groups, the maturation level for partnering experience has gained almost 30% for both groups.

2. 60% of TxDOT personnel and 82% of contractor personnel believe that partnering improves the quality of the final project. As the contractors are in a better position to see just how much quality is built in to the project, this is a significant finding.

Finally, integrating the quantitative and subjective analyses, yields two important findings.

1. Partnering appears to have a distinctly positive performance impact on projects which are greater than \$5 million. This statement is backed up by the survey of ODOT personnel and contractors who selected this level as the right level on which to invest the time and money to formally partner a project.
2. The presence of a partnering agreement seems to take the psychological pressure off the contractor as the TxDOT field people become more willing to grant contractor-initiated change orders and additional days. The contractors seem to react favorably to this by keeping the cost of change orders down and by completing earlier than anticipated. They also believe that they produce a better quality project as a result of the presence of a partnering agreement.



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## **Appendix A: Quantitative Analysis of Project Performance.**

### **INTRODUCTION**

In September of 1996, The Texas Department of Transportation (TxDOT), through their Continuous Improvement Office, awarded a research contract to Texas Tech University to identify and quantify the impacts and benefits of their partnering effort. The project was set up according to the following six tasks.

1. Gather historical data and analyze to identify the Department's current program investment and determine situations which maximize partnering benefits
2. Identify additional potential areas for partnering
3. Survey other public and private organizations to identify "best practice" methods for measuring benefit and impact of the partnering effort
4. Identify measurement criteria and develop a method to assess partnering benefits and impacts
5. Develop a means to compare partnered to non-partnered projects and accurately assess project performance which leads to the ultimate purpose of the project
6. Develop a model which will allow TxDOT's management team to assess an upcoming project's partnering potential and estimate the benefits and impacts of partnering to allow the Department to efficiently direct its resources to projects which have the highest potential for benefit from partnering

At this time, the project is at the end of the first year of a two year duration and the first three tasks above are complete. This purpose of this report is to document the collection and initial analysis of the data. The discoveries, conclusions and recommendations of this report are based on trends of the emerging data using parametric statistical analysis techniques. The last three tasks will be started in the second year of the contract and will entail more involved methods of sophisticated statistical analysis such as non-parametric data models and Pearson series factor analysis.

### **Data Collection and Reduction**

In order to complete the tasks listed above, the researchers were required to interact with several departments within TxDOT. These include the Continuous Improvement Office (CIO), Construction and Maintenance Division (CMD), Division of Construction and Contract Administration (CCA), and the Information Systems Division (ISD). An informal partnering session was held in October of 1996 between TxDOT and Texas Tech University, and the meeting included members from each department within

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TxDOT and two of the three members of the research team. The level of cooperation the research team received indicated that the informal partnering session was a success.

The data collection effort started with the identification of 204 completed partnered projects, then proceeded to an equal number of non-partnered projects from a time period that did not overlap the date ranges of the partnered projects. The research team thought that if the control group of non-partnered projects was selected from the same time period as the partnered projects, many of them may have been previously rejected as bad candidates for partnering and would bias the results. The control group of 204 non-partnered projects was selected from a list of 255 projects that actually started before partnering was an option. The Partnering Section of the CIO provided the list of partnered projects while the non-partnered list came from the CCA.

The data fields requested by the research team were matched with the corresponding data routinely collected by CIS. Although some of the partnered project data were readily available in the current CIS database, most of the data had to be restored from tape archives. The representatives from CIS sent the files containing all of the data to the research team via e-mail as attachments. These database files from TxDOT's mainframe computer then had to be reformatted from a fixed-width column format to a crosstab spreadsheet format for tabulation and analysis. This was accomplished using Microsoft Visual Basic 4.0 programming language and Microsoft Excel 7.0.

The research team found that not all of the requested data fields were available from the CIS reports. These data fields such as claims and dispute costs, the names of partnering session participants, and travel costs for partnering sessions were located in the files of CIO, CMD, and each individual District office. This fact presented the most difficult task yet to the research team because it was also found that they all had different record keeping systems and most of the data resides in paper files. Although these records were compiled to the satisfaction of each individual department, they were not in the same format as the data supplied by CIS. For instance, the claims and disputes data were kept using Lotus Approach, a database program, and indexed by Claim Number or Dispute Number. The only links to the main database, the Project Number or CSJ Control Number, were input in the description field of each claim or dispute. In other words, the data from each different department could not be imported reliably with Microsoft Access, a database program, but had to be hand sorted and then input to ensure integrity of the data.

Some of the records gathered from the Partnering Section, such as the participant data, had to be photocopied from the paper files, scanned into a MSWord document, and formatted onto a spreadsheet in MExcel. Only then could the information be sorted because the field used as an index has to be an exact match between spreadsheets. Although most of the records contain index fields such as the Project Number or CSJ control number, inconsistencies between the Partnering Section's input and CIS input increased the time to gather and reduce the data considerably.

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All change order data is kept in two different databases. The CCA tracks change orders as well as CIS. It was found that these two databases did not match exactly. So the CIS data was chosen as the sole source. It should be noted that certain types of change orders do not have a direct effect on the partnering effort. For example, the change orders paying for on the job training (OJT) of contractor employees were all removed from the analysis. The individual files in each District are needed to develop a true performance index for the two types of projects.

In order to assess the total TxDOT investment in the partnering effort, several assumptions and estimates had to be made. The exact amounts cannot be determined because of the nature of TxDOT's cost tracking system. According to CCA, the partnering effort was never set up as an action item requiring cost codes; therefore, no accounting was made of costs attributed only to partnering.

All of the above data is now combined into one single database indexed to any of three data fields: the research team's ID number, TxDOT's project number, and CSJ control number. This database contains data from 408 completed projects worth \$2.1 billion, which is three times as many projects as any of the other studies found in the literature search. In this form, the research team has computerized access to any or all of the pertinent data fields for comparison with findings of the two other studies, and then for a later detailed analysis using state-of-the-art statistical methods.

## **DATA ANALYSIS**

Analysis of the data collected permitted the calculation of thirteen separate project performance parameters. Each of these parameters mathematically describes some performance measure, which can be compared between partnered and non-partnered projects. The intent of this effort is to identify trends, which will help develop a method for partnering decision-making. A detailed discussion of the parameters follows:

### **Cost Growth**

Cost growth is a standard measure of project performance. In essence, cost growth is defined as the change in contract amount with respect to the original contract amount.

$$\text{Cost Growth} = \frac{\text{Final Contract Amount} - \text{Original Contract Amount}}{\text{Original Contract Amount}} \dots \dots \dots [A-1]$$

This number can then be converted to a percentage of growth over original contract amount. The comparison of this parameter between partnered and non-partnered projects should permit the determination of whether partnering has any impact on subsequent cost growth within a project. A partnering proponent would hypothesize that the enhanced relationship between the owner and the contractor would encourage the settlement of change orders, which might arise and minimize their final cost to the owner. The other side would argue that because owner personnel are expected to avoid claims, they would

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tend to agree to higher change order costs rather than risk an unsettled change order turning into a dispute; therefore, this parameter would be higher for partnered projects.

### **Average Cost per Change Order**

Average cost per change order (AC/CO) is merely the arithmetic average of the actual changes on each project. This parameter allows the researcher to develop an idea of the order of magnitude of changes that occur on typical projects. This parameter is described by the following equation.

$$AC/CO = \frac{\text{Final Contract Amount} - \text{Original Contract Amount}}{\text{Number of Change Orders}} \dots\dots\dots[A-2]$$

This parameter is important because it allows an order of magnitude to be assigned to the question of change orders. Again, proponents of partnering would expect this number to be lower on partnered projects than on non-partnered projects. The argument is that the improved relationship between contractor and owner would encourage settlements of change orders to be lower than if the relationship was adversarial. Again, the opposite could also be argued using the same theory as that espoused on cost growth.

### **Average Percent Increase per Change Order**

Average percent increase per change order (A%/CO) is a measure of incremental cost growth. A large average percent increase per change order would indicate that cost growth occurs as a step function and provides a means of assessing the quality of the contract documents. A contract with no change orders would be the perfect situation and have no cost growth. The larger the average percent increase per change order the higher the probability that some errors of design were contained in the project. This would indicate that regardless of the quality of the relationship due to partnering a flawed design will require change orders and encourage cost growth. This parameter is described by the following equation.

$$A\%/CO = \frac{\text{Cost Growth (\%)}}{\text{Number of Change Orders}} \dots\dots\dots[A-3]$$

### **Average Total Change Orders per Project**

Average total change orders per project are merely the arithmetic total of the number of change orders per project. This ratio further defines the impact of original contract quality on project performance. This parameter quantifies the number of times the owner and the contractor had to reach an agreement. Additionally, it provides an indicator of original contract quality. A flawed contract has a large number of change orders as compared to a perfect one, which has none. It is common knowledge that many change orders are the result of contractor requests to make the job better or to allow a variance, which benefits both contractor and owner. This parameter can also be used to judge the

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impact of partnering on project performance. A higher number of change orders per partnered project than per non-partnered project indicates a greater willingness on the part of the owner's field personnel to entertain contractor-initiated changes. Taking this with respect to average percent increase per change order would show whether the contractors are "returning the favor" by keeping the cost of change orders to a minimum.

### **Time Growth**

Time growth (TG) is the change in time with respect to the original contract completion date. Time growth is generally a result of changes in scope of the project. Time growth can be either positive (when the project is completed later than the original completion date) or negative (when the project is completed earlier than the original completion). In TxDOT contracts, time growth is a function of allowable working days. These contracts typically have a given number of days associated with the project. Things such as poor weather require field personnel to determine whether or not to charge a working day to the contract period. This system promotes the accurate interpretation of project time performance by making it unnecessary to cut out time growth due to circumstances beyond the contractor's control.

$$TG = \frac{\text{Days Charged} - (\text{Total Days Allowed} + \text{Additional Days Granted})}{\text{Total Days Allowed} + \text{Additional Days Granted}} \dots \dots \dots [A-4]$$

### **Average Percentage of Additional Days Granted**

The average percentage of additional days (AD%) granted is an indicator of the owner's representative's willingness to reduce time pressure on the contractor. Often in construction contracts, a contractor will ask for additional time without additional compensation. This factor was included to test the hypothesis that TxDOT field personnel have become more lenient with regard to granting time since the advent of partnering. This and an allegation that field personnel are averse to imposing liquidated damages were picked up during interviews with TxDOT employees and can easily be tested statistically. It should be noted that both allegations are not necessarily bad if they are true. Pressure due to imminent liquidated damages and other time related impacts are generally associated with poor quality workmanship. Therefore, if partnering has changed the Department's approach to managing construction time to a kinder, gentler general policy, it would be expected that overall quality of final projects would increase as well. This parameter can be computed using the following equation.

$$AD\% = \frac{\text{Additional Days Granted}}{\text{Total Days Allowed}} \dots \dots \dots [A-5]$$

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### **Average Liquidated Damages as a Percent of Total Cost**

Average liquidated damages (LDs) as a percent of total cost (ALD) is included as a means to measure the impact of partnering on those projects which have some problems as indicated by the imposition of liquidated damages. When new performance enhancing programs are introduced, focus tends to be on those projects which go well. If a program is to become totally institutionalized, it must also produce positive results in those projects that have problems. Measuring LDs on those projects, which finish late, is an objective metric with which to compare partnered projects to non-partnered projects. Ideally, proponents of partnering would expect to see a lower percentage of LDs on partnered projects arguing that partnering would encourage TxDOT personnel to work with the contractor on time related problems thus decreasing the total amount of LDs assessed. This parameter can be calculated with the following formula.

$$\text{ALD} = \frac{\text{Liquidated Damages Cost}}{\text{Total Contract Cost}} \dots\dots\dots[\text{A-6}]$$

### **Average Liquidated Damages Days as a Percentage of Total Time**

Average liquidated damages days as a percentage of total time (LDD) is a metric designed to measure the effect of LD days on the overall contract period. Again, comparing this parameter between the two types of projects should give us the ability to quantify the impact of partnering on project performance.

$$\text{LDD} = \frac{\text{Number of Days of LDs}}{\text{Total Days Allowed} + \text{Additional Days Granted}} \dots\dots\dots[\text{A-7}]$$

### **Percent of Projects with Liquidated Damages**

The percentage of projects with LDs (%LD) is a direct measure of the concerns expressed by TxDOT field personnel with regard to the willingness to assess LDs. Additionally, it provides an indicator of contractor ability to prosecute the projects as they were originally planned and bid. A difference in this indicator between partnered and non-partnered projects will provide a means to explain the value of partnering on projects which do not finish as expected.

$$\%LD = \frac{\text{Number of Projects with LDs}}{\text{Total Number of Projects}} \dots\dots\dots[\text{A-8}]$$

### **Percentage of Projects with Deducts**

A deduct is defined as a change order which reduces the contract amount. This parameter was developed to provide a measure of contractor willingness to keep total project costs as low as possible. Generally, contractors are reluctant to agree to deductive change orders because they throw off the balance achieved by spreading overhead and profit

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margin across bid items and possibly put a contractor in the position of not being able to recover his mark-ups. Thus, the percentage of projects with deducts is a good indicator of the success of the partnering charter. This parameter is calculated by dividing the number of projects which had negative cost growth by the total number of projects.

### **Claims Cost as a Percentage of Total Cost**

Claims are requests by contractors for compensation for work performed which the contractor believes is outside the scope of the contract. Generally, claims begin as contractor requests for a change order and become claims when the owner rejects the change order request. Negotiations ensue and if a settlement is reached, the contract is increased by the amount of the settlement. For purposes of this study, claims are defined as contract disputes which are settled above District Level. The purpose of instituting partnering is to avoid claims cost. (CC) Theoretically, a partnered contract should have no claims. Partnered projects typically develop an issue escalation ladder to deal with disagreements and attempt to keep them from becoming claims. Therefore, analysis of project performance in relation to this indicator is a key point.

$$CC = \frac{\text{Total Cost of Claims}}{\text{Original Contract Cost}} \dots\dots\dots[A-9]$$

### **Dispute Cost as a Percentage of Total Cost**

Disputes, for purposes of this study, are claims that are settled at or below District level. Again, the establishment and use of an issue escalation system in a partnered project would lead one to believe that partnered projects should have a significantly lower level of disputes than non-partnered projects. This is also an important parameter because it speaks directly to the most highly touted benefit of partnering, dispute resolution.

$$DC = \frac{\text{Total Cost of Disputes}}{\text{Original Contract Cost}} \dots\dots\dots[A-10]$$

### **Award Price**

Award price is merely the original contract amount for each project and provides a method to separate and discriminate between projects based on their relative financial size. This parameter is important because the size of a project may influence the amount of benefit it can actually accrue from partnering. For example, a small project that has a \$20,000 change order will experience a larger percentage of cost growth than a large project with the same size change order. Thus it is important to look at similar sized projects as measured by award price to accurately assess the impact of partnering on the TxDOT construction program.

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## ANALYSIS OF STATISTICS

Table A-1 shows a breakdown of the above discussed parameters for the 204 partnered projects and 204 non-partnered projects. The projects are broken into four groups based on award price. The award price groups are listed below.

- \$1 million or less
- \$1 million to \$5 million
- \$5 million to \$15 million
- Greater than \$15 million

These groupings were selected after discussions with the Project Director and represent a typical ordering of project size in use in TxDOT. The total sample population of projects was equal, but it can be seen that when the projects are grouped according to size that the significant grouping for partnered projects was in the \$1 million to \$5 million range, and the significant grouping for non-partnered projects was in the \$1 million or less range. Interestingly, taking the two groups together yields virtually equal populations of partnered and non-partnered projects. Thus, as shown in Table A-2, there are equal groups of projects less than \$5 million and projects greater than \$5 million which enhances the value of the inferences that can be made from the statistics. The individual dynamic found in large and small projects is germane when the shift in this study's focus to develop a method to assist the Department in determining which projects to formally partner is considered. The intuitive solution is to spend the time and resources required to formally partner those projects which are large and complex. Analyzing this data should provide the answer to that question.

**Table A-1. Statistical Breakdown of Project Parameters by Award Price Range**

Parameter	Award Price Range		Award Price Range	
	\$0-\$1 M		\$1M-\$5M	
	PT	NP	PT	NP
Number of Projects	35	100	110	46
Award Price	667,572	429,912	2,643,916	2,413,961
Cost Growth as % of Total Cost	12.47	-0.81	4.64	3.63
Number of Change Orders	8	2	12	7
Avg Cost Growth per Change Order	10,366	-2,324	10,511	12,850
Avg % Cost Growth per Change Order	1.55	-0.54	0.40	0.53
% of Projects with Deducts	4.41	24.02	12.75	7.84
Time Growth as % of Total Contract Days	2.84	-24.92	-3.16	15.76
% Additional Days Granted	20.25	4.71	7.90	17.86
% of Projects with LD's	1.47	6.86	10.29	4.41
LD % of Total Contract Days	1.58	1.99	1.51	3.15
LD Cost as % of Total Cost	0.21	0.09	0.11	0.25
Claims Cost (%) of Total Cost	12.93	5.46	0.11	0.15
Disputes Cost % of Total Cost	0.00	11.81	0.13	2.03
Parameter	Award Price Range		Award Price Range	
	\$5M-\$15M		\$15M-\$40M	
	PT	NP	PT	NP
Number of Projects	45	35	14	23
Award Price	8,557,678	8,552,594	22,240,253	24,281,065
Cost Growth as % of Total Cost	2.99	6.04	0.52	2.81
Number of Change Orders	23	21	45	38
Avg Cost Growth per Change Order	11,337	24,446	2,571	18,122
Avg % Cost Growth per Change Order	0.13	0.29	0.01	0.07
% of Projects with Deducts	4.90	2.45	0.49	1.47
Time Growth as % of Total Contract Days	-6.33	12.91	-8.64	23.71
% Additional Days Granted	6.63	11.72	8.99	13.80
% of Projects with LD's	1.96	6.37	0.00	5.88
LD % of Total Contract Days	0.91	4.64	0.00	10.21
LD Cost as % of Total Cost	0.07	0.29	0.00	0.64
Claims Cost (%) of Total Cost	0.00	1.07	0.00	0.08
Disputes Cost % of Total Cost	0.00	0.71	0.00	0.00

**Table A-2. Statistical Breakdown of Project Parameters by Award Price Range and Total Population**

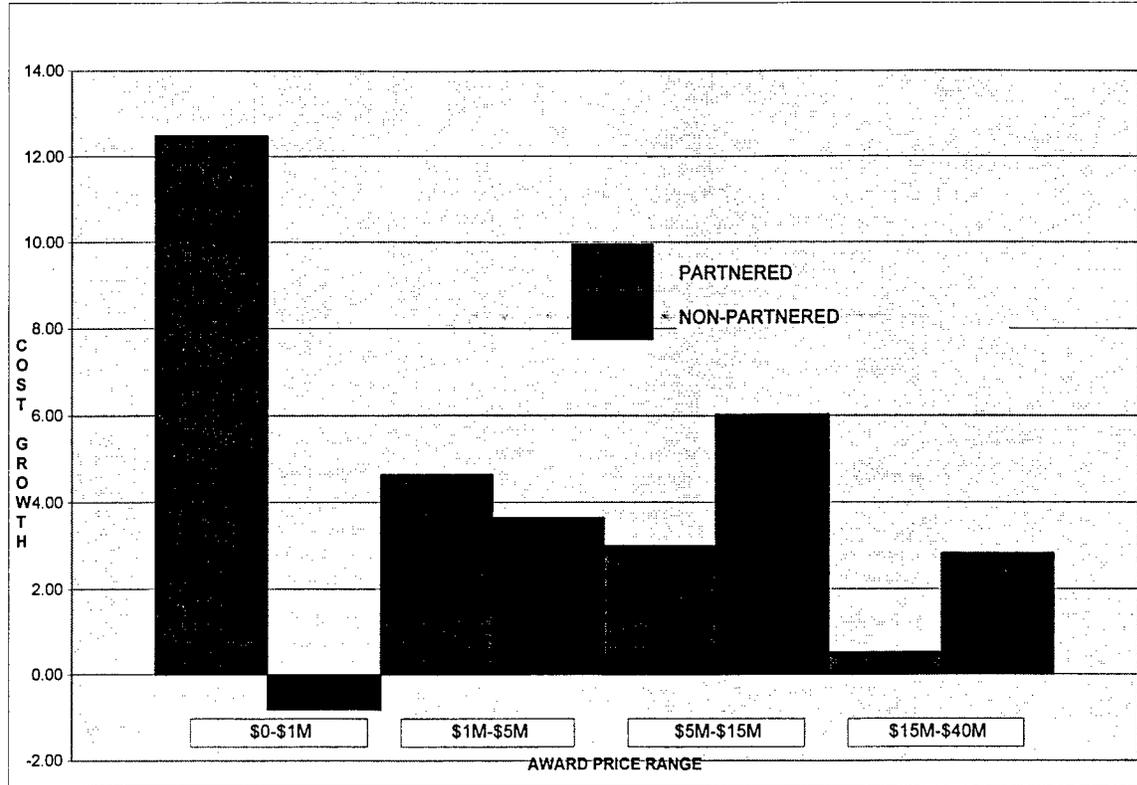
Award Price Range	\$0-\$5M		\$5M-\$40M		\$0-\$40M	
	PT	NP	PT	NP	PT	NP
Project Parameter						
Number of Projects	145	146	59	58	204	204
Award Price	\$3,311,488	\$2,843,873	\$30,797,931	\$32,833,658	\$4,925,201	\$4,959,994
Cost Growth as % of Total Cost	5.22	10.05	1.87	3.94	2.93	3.70
Number of Change Orders	20	9	68	59	16	10
Avg Cost Growth per Change Order	\$20,876	\$10,526	\$13,907	\$42,568	\$9,019	\$18,352
Avg % Cost Growth per Change Order	1.95	-0.01	0.14	0.36	0.18	0.37
% of Projects with Deducts	17.16	31.86	5.39	3.92	23.53	36.27
Time Growth as % of Total Contract Days	-0.32	-9.16	-14.97	36.62	-4.70	10.04
% Additional Days Granted	28.15	22.57	15.62	25.52	8.32	12.49
% of Projects with LDs	11.76	11.27	1.96	12.25	21.08	23.53
LD % of Total Contract Days	3.09	5.14	0.91	14.85	5.04	14.56
LD Cost as % of Total Cost	0.32	0.34	0.07	0.93	0.07	0.21
Claims Cost % of Total Cost	13.04	5.61	0.00	1.15	0.33	0.61
Disputes Cost % of Total Cost	0.13	13.84	0.00	0.71	0.04	0.93

### Partnering's Impact on Cost Growth

This parameter is the classic metric for project performance. Looking at Figure A-1, non-partnered projects outperformed partnered projects in the two lower award price ranges. The opposite was true in the two higher price ranges. This is an interesting result. It appears that the change in adversary relationships makes the owner's field personnel more willing to accept contractor-initiated change order requests. This would show that there is a higher percentage of contract value in less costly projects than in the larger projects. When the entire population is considered, partnered projects have a slightly less cost growth. This leads to the conclusion that implementing partnering generally

improves cost growth performance with the greatest impact being felt in projects which are greater than \$5 million.

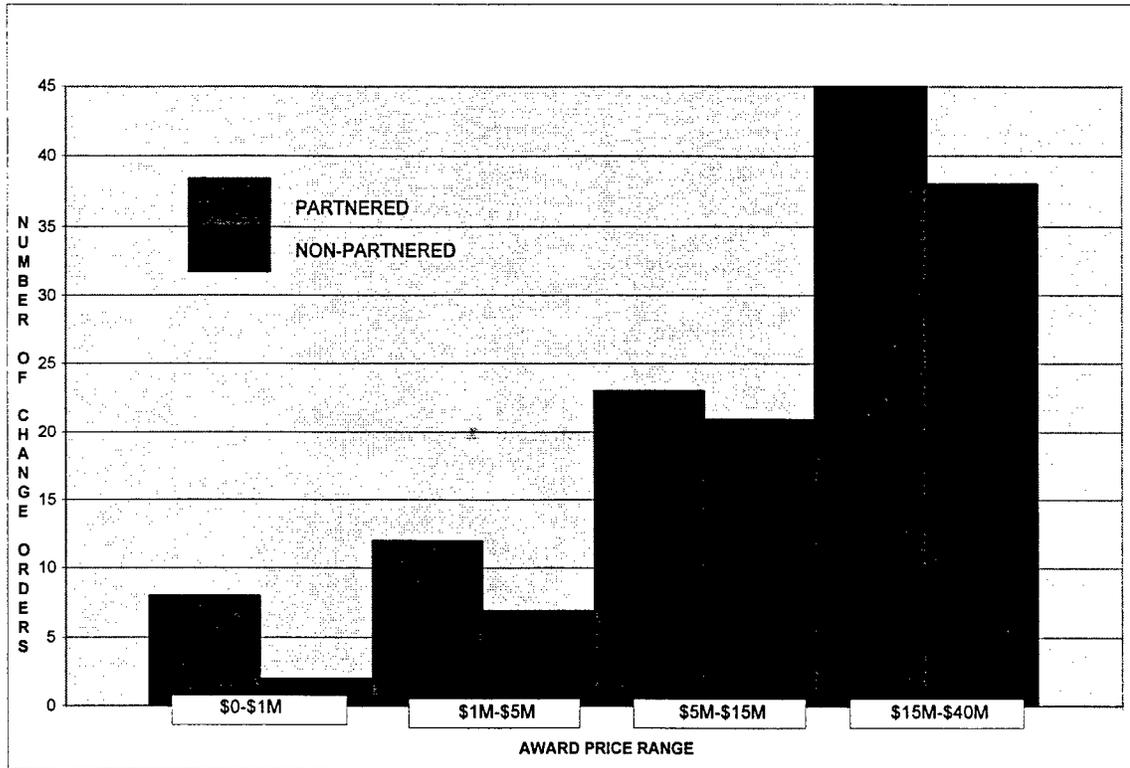
**Figure A-1. Cost Growth**



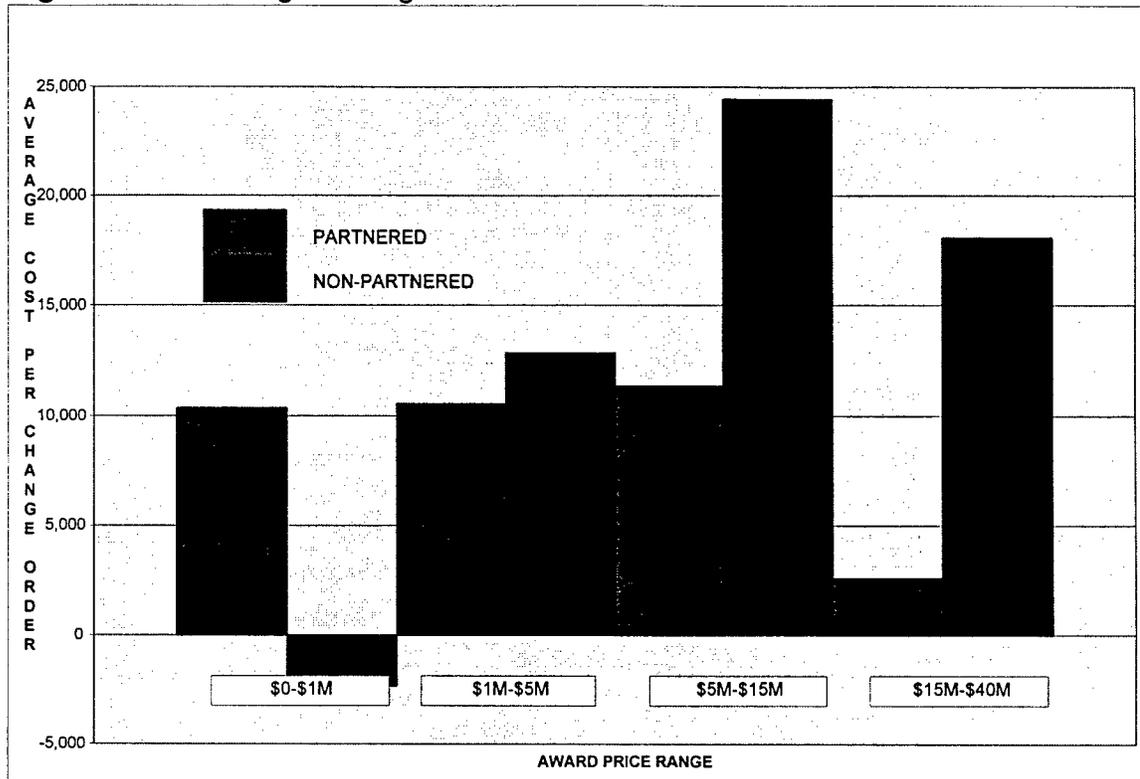
**Partnering’s Impact on Change Orders**

Change orders are the major source of cost growth. There were three parameters developed to evaluate partnering’s effect on project change orders. The first concern that needs to be looked at is the feeling by field personnel that partnering makes the owner’s representative more likely to accept contractor-initiated change requests. Figure A-2 shows that partnered projects have more change orders than non-partnered projects. This would seem to confirm that suspicion. It should be noted that the researchers have no way of differentiating between contractor-initiated and other types of change orders. Next, we need to test the idea that the contractors “return the favor” by keeping change order costs down. Table A-2 indicates that across the entire population mean partnered project change cost was roughly one half the average cost of the average non-partnered change order. Figure A-3 shows that this parameter was less for partnered projects in three out of the four project size groupings.

**Figure A-2. Number of Change Orders**

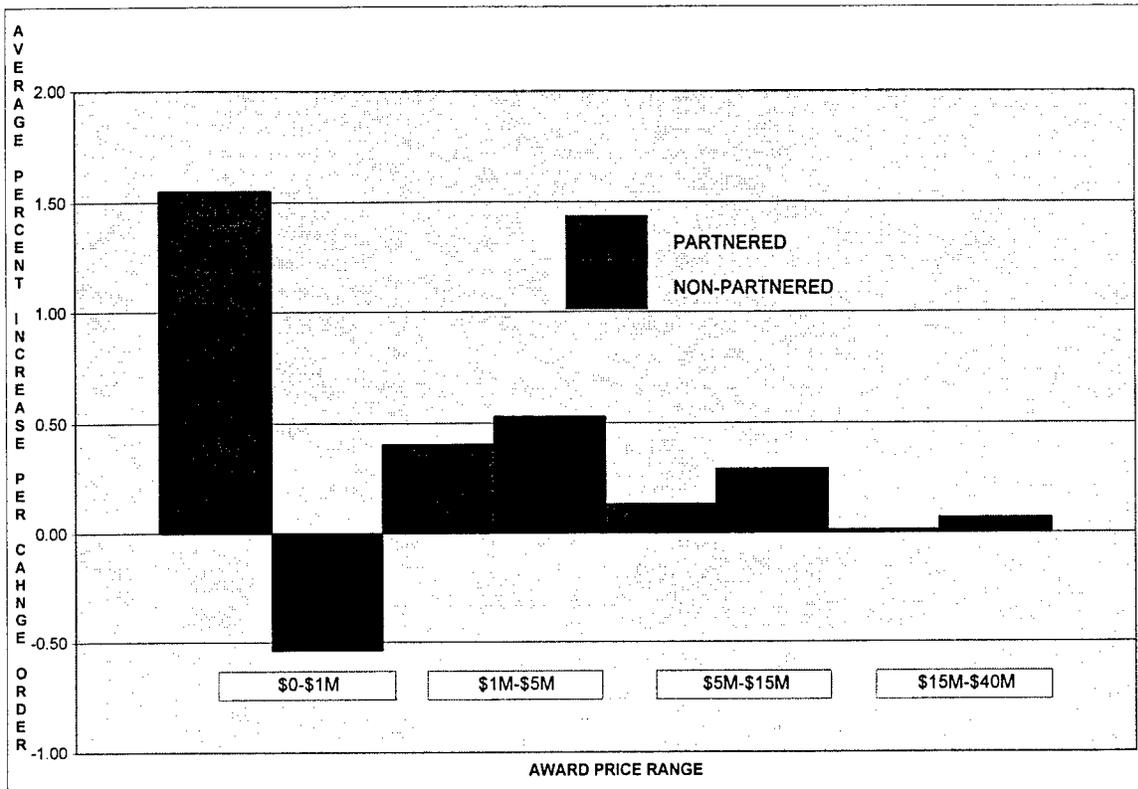


**Figure A-3. Average Change order Cost**



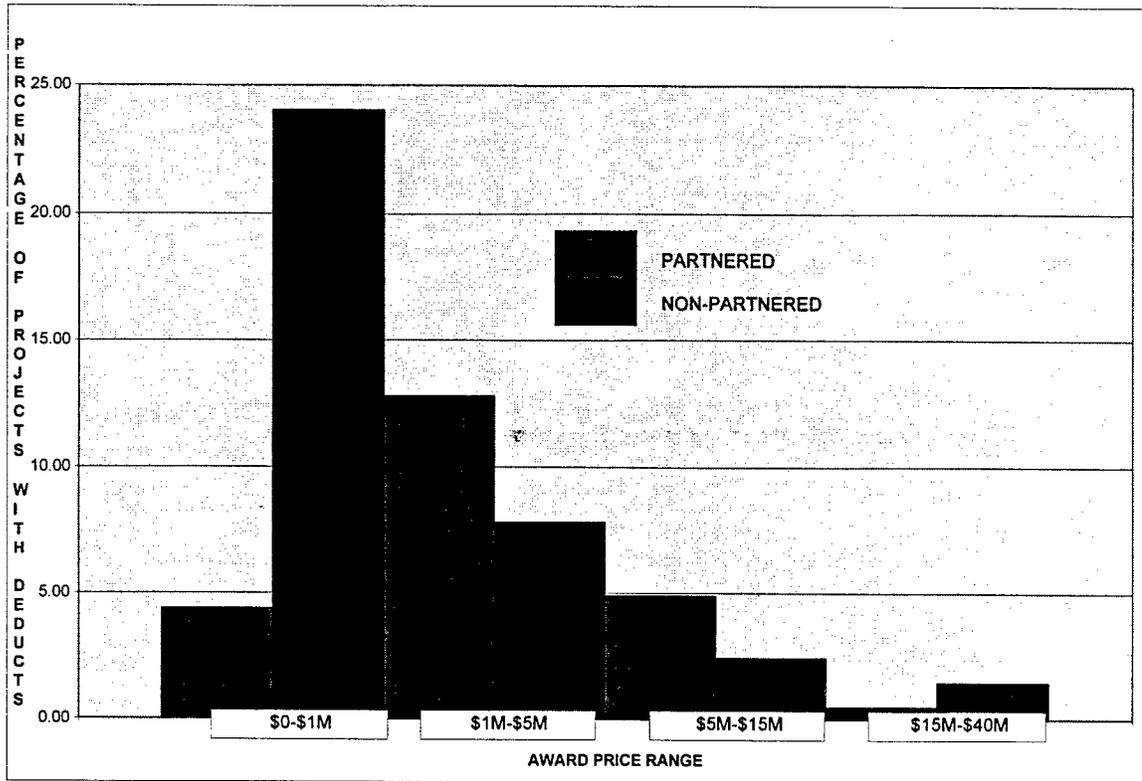
When viewed in figure A-4 as a percentage of contact amount, the amount of each partnered change order is less than non-partnered change orders but the orders of magnitude are roughly the same for the top three groupings. The smallest projects stand out as an anomaly. Non-partnered change order values ended up as a net deduct while partnered change order cost was roughly the same per change order as in the larger projects. Perhaps, this is confirmation that implementing partnering creates an environment where TxDOT field personnel are more inclined to go along with contractor-initiated change requests.

**Figure A-4. Average Change Order Cost as a Percentage of Contract Amount**



If we measure contractor willingness to minimize overall project costs by looking at the percentage of projects with negative cost growth, ignoring the small projects, we find from Figure A-5 that for partnered projects in the \$1 million to \$15 million range, the percentage of deducts is roughly twice that in non-partnered projects. This trend reverses itself in the largest projects. However, when you consider that the population of partnered projects in the middle range is 155 compared to only 14 in the highest range, you can dismiss that reversal as statistically insignificant. Therefore, we can conclude that partnering seems to create a desirable effect with regard to deducts.

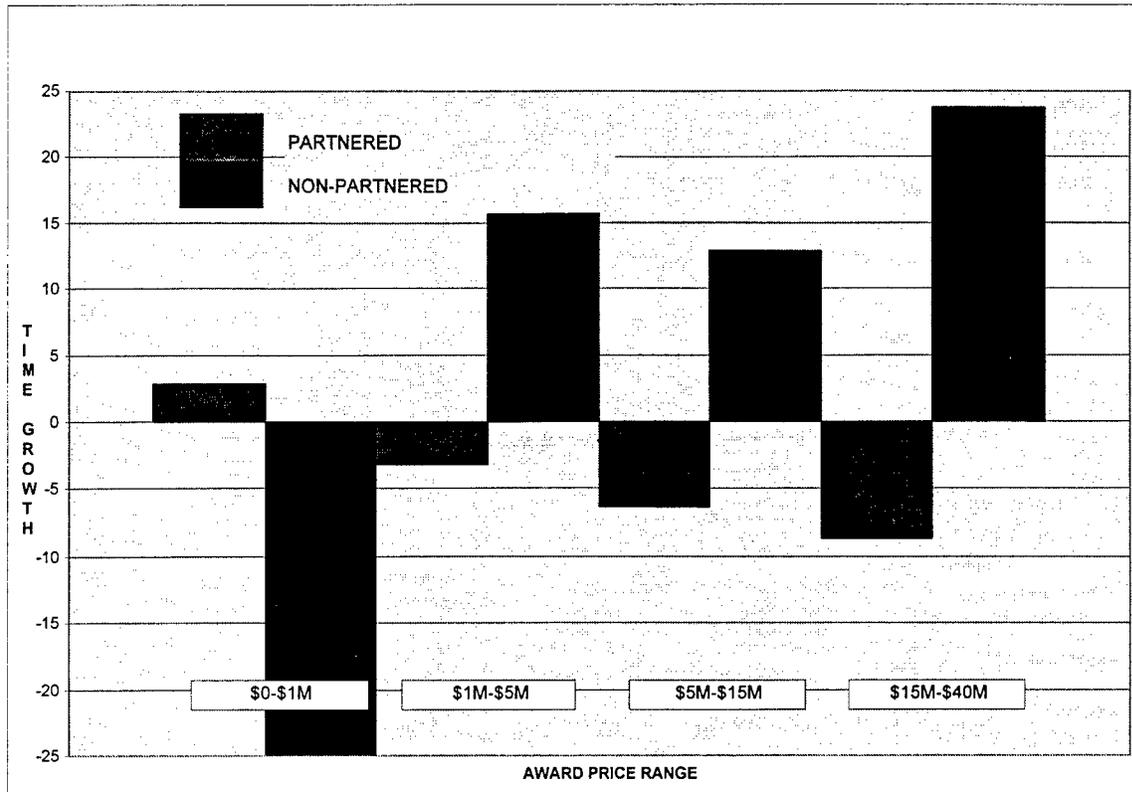
**Figure A-5. Percent of Projects with Negative Cost Growth**



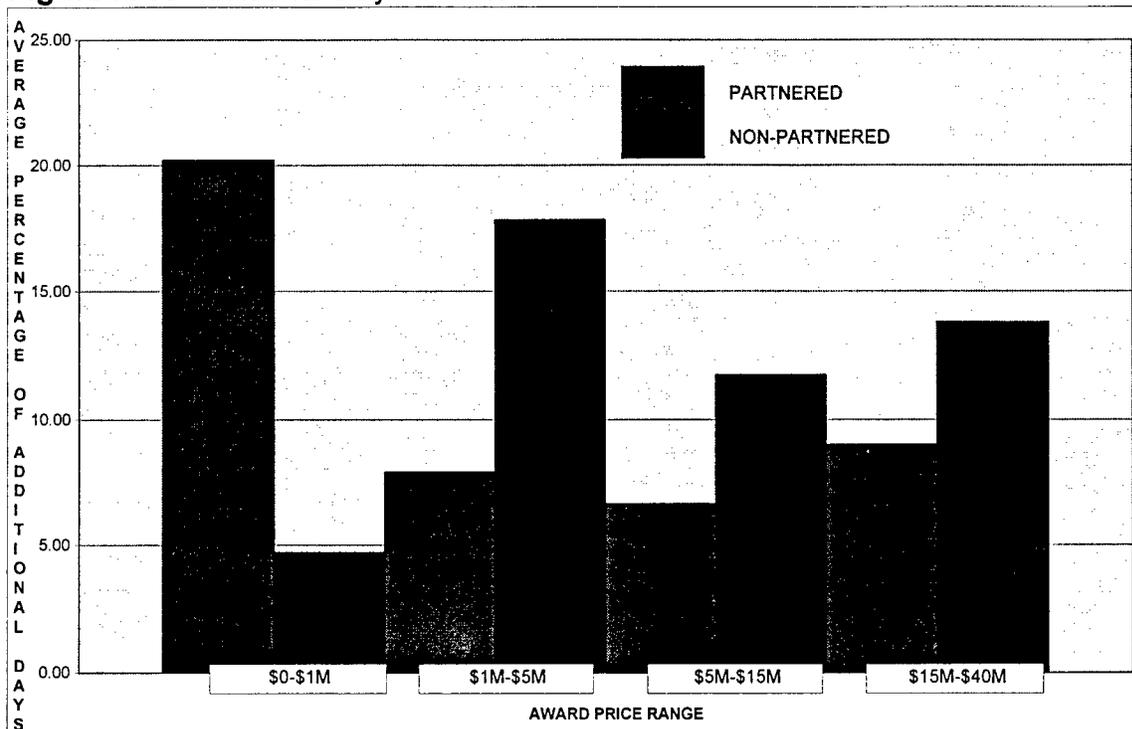
### Time Growth

The other objective measure of project performance is time growth. We have two parameters which are designed to provide trend information with regard to partnering. The first is mean percentage time growth. Figure A-16 shows the most vivid difference in the entire study. For the three largest size project groups, time growth was negative in partnered projects and positive in non-partnered projects. For the entire population, the average partnered project finished 4.7% earlier than originally planned and the average non-partnered finished 10.04% later than originally planned. The trend is reversed for the smallest projects, but again, the size of the partnered population makes it difficult to infer significance to that statistic. That is not the case for non-partnered projects with a population of 100 and a time growth of -25%. This result might be explained by the administrative process used to set contract completion criteria being too conservative. In other words, actual contractor performance consistently exceeds the expectations of those who establish contract completion criteria.

**Figure A-6. Time Growth**



**Figure A-7. Additional Days Granted**



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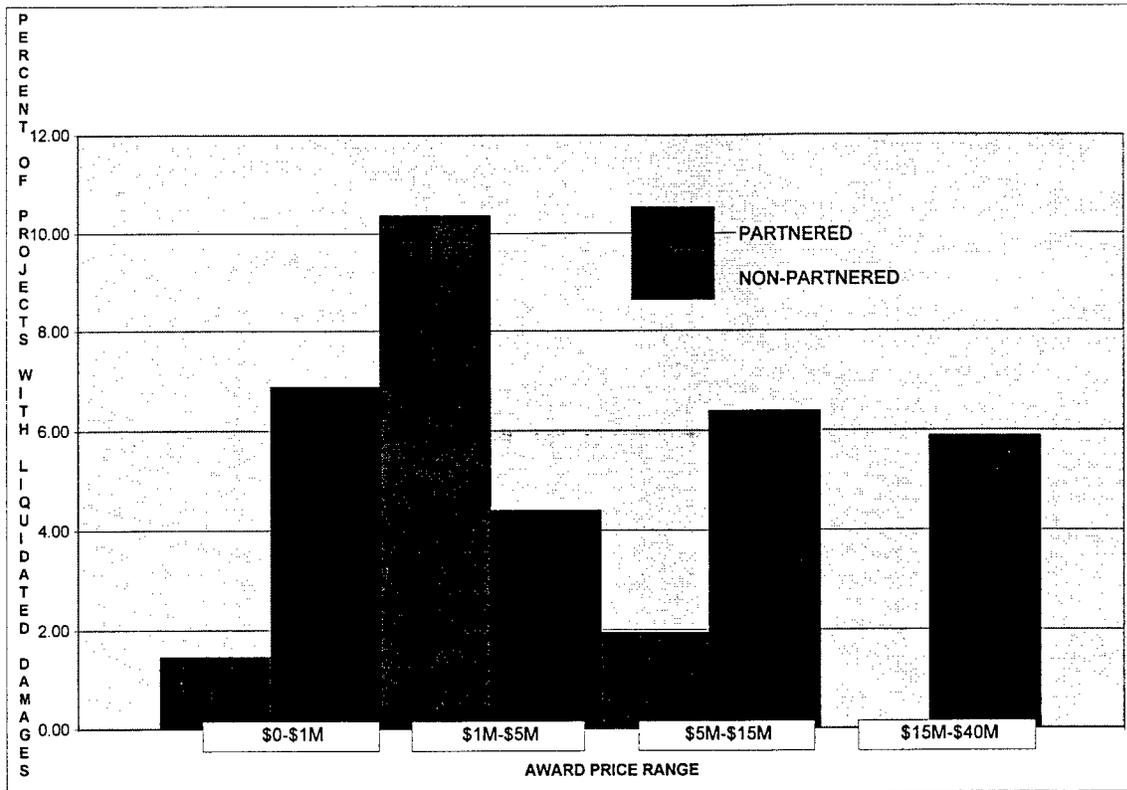
The second metric is the number of additional days granted expressed as a percentage of total days allowed. The parameter was meant to test the owner's willingness to grant time extensions as a result of a partnering relationship. Figure A-7 shows that only in the smallest projects does this parameter show a distinct willingness on the part of TxDOT personnel to grant additional days on partnered projects. The reverse is true for projects over \$1 million. This finding is consistent with time growth and indicates that although number of change orders is up in partnered projects, the impact is minimized on performance

### **Partnering's Impact of Liquidated Damages**

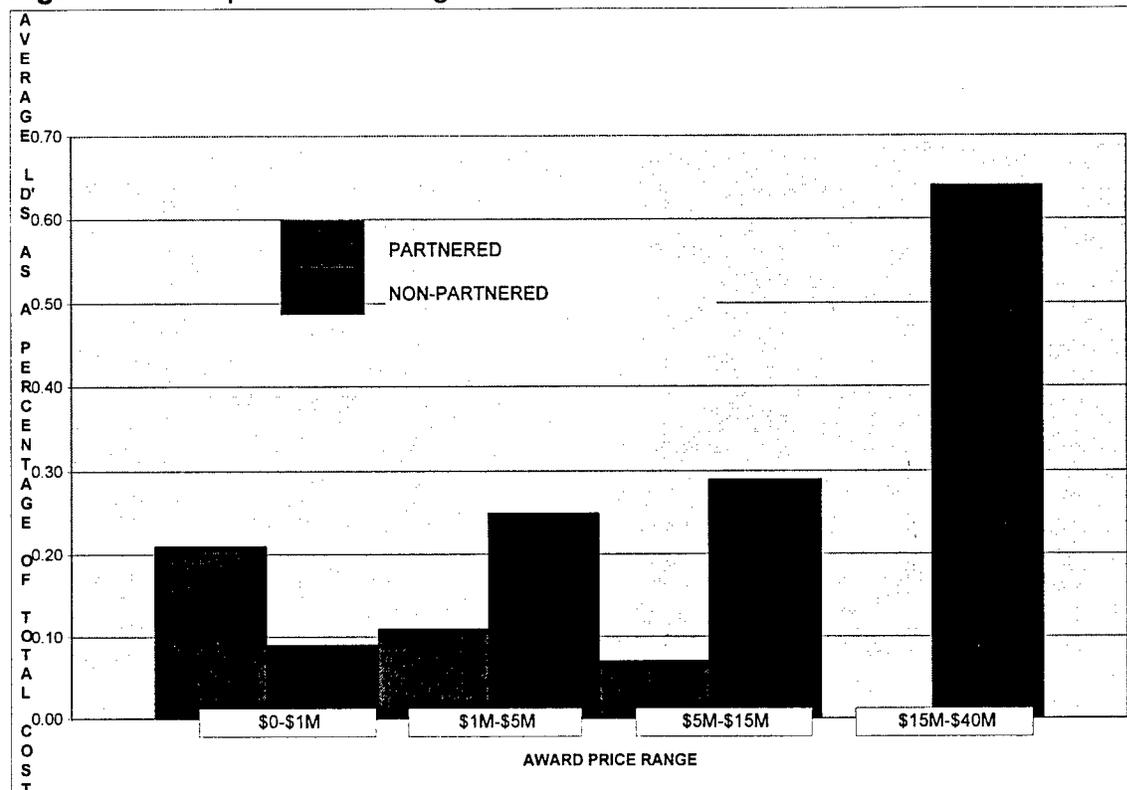
This analysis may be the acid test for partnering. It is easy to grant accolades for innovative approaches that were tried on projects that went well. The real test of a partnering relationship comes from those projects which do not proceed according to plan. The data showed that there were liquidated damages assessed on partnered projects. That means that some partnered projects finished late in spite of the investment in team building and relationships. Figure A-18 shows that the percentage of partnered projects with LDs is less than non-partnered projects with LDs in all categories except the \$1 million to \$5 million range. This is notable in that that range contained over half the partnered projects and in that range there were over twice as many late partnered projects as non-partnered projects. However, if we redistribute the award price ranges as shown in Table A-2, one can see that for partnered projects greater than \$5 million only 2% have LD's compared to over 12% on non-partnered projects in the same category. Whereas, for those under \$5 million the two types of projects are roughly equal. The \$5 million break point seems to have some significance. A quick look down Table A-2 shows that partnered projects above \$5 million outperform non-partnered projects in virtually every parameter.

Figure A-9 shows the impact of LDs with respect to the total project cost. In this case, while the \$1 million to \$5 million range had the largest percentage of partnered projects with LDs, the cost impact of those LDs was not as great as on the non-partnered projects which had a cost impact which was twice as great as the other. For the lowest cost group of projects, LD cost impact was greater than non-partnered and this can probably be explained by the fact that several days of LDs will constitute a proportionately larger percentage of a small contract than a large contract. Finally, when we look only at LDs in terms of time in Figure A-20, we can see that partnered projects had a fewer number of LD days than non-partnered projects in all categories. We can draw the conclusion that partnering does indeed work on projects with time problems by reducing the number of days that a project finishes late.

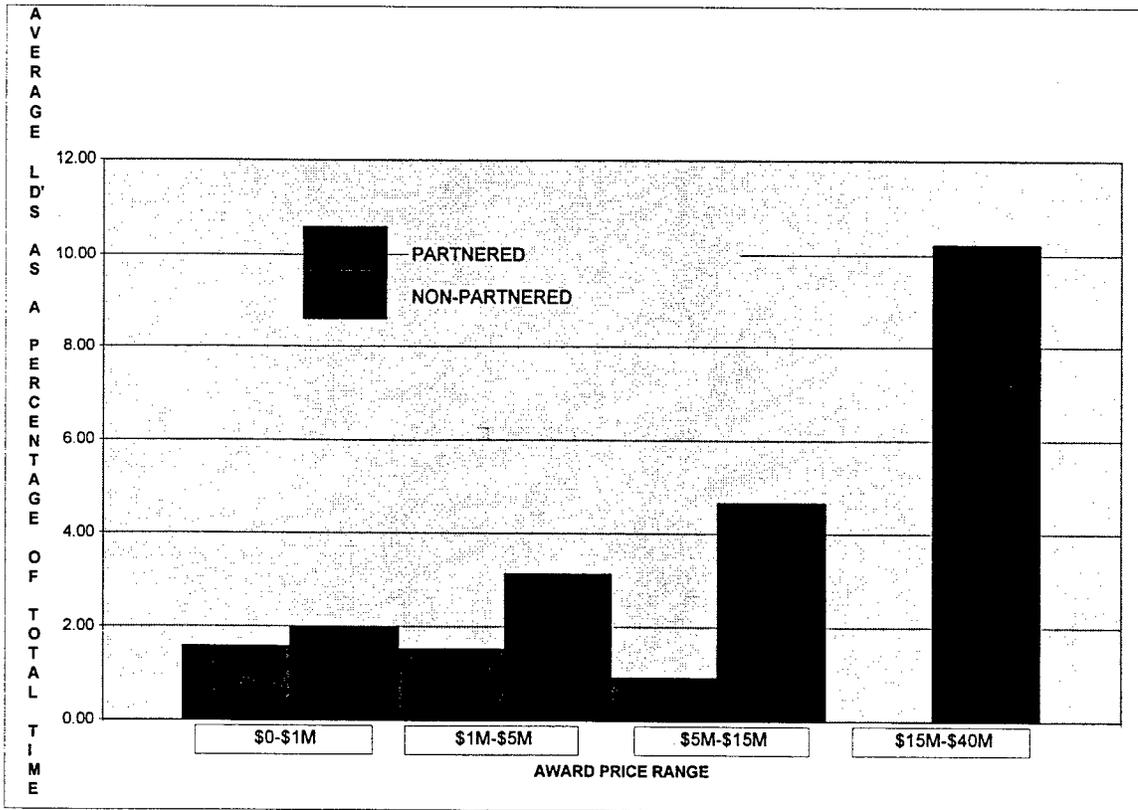
**Figure A-8. Percent of Projects with Liquidated Damages**



**Figure A-9. Liquidated Damages as a Percent of Total Cost**



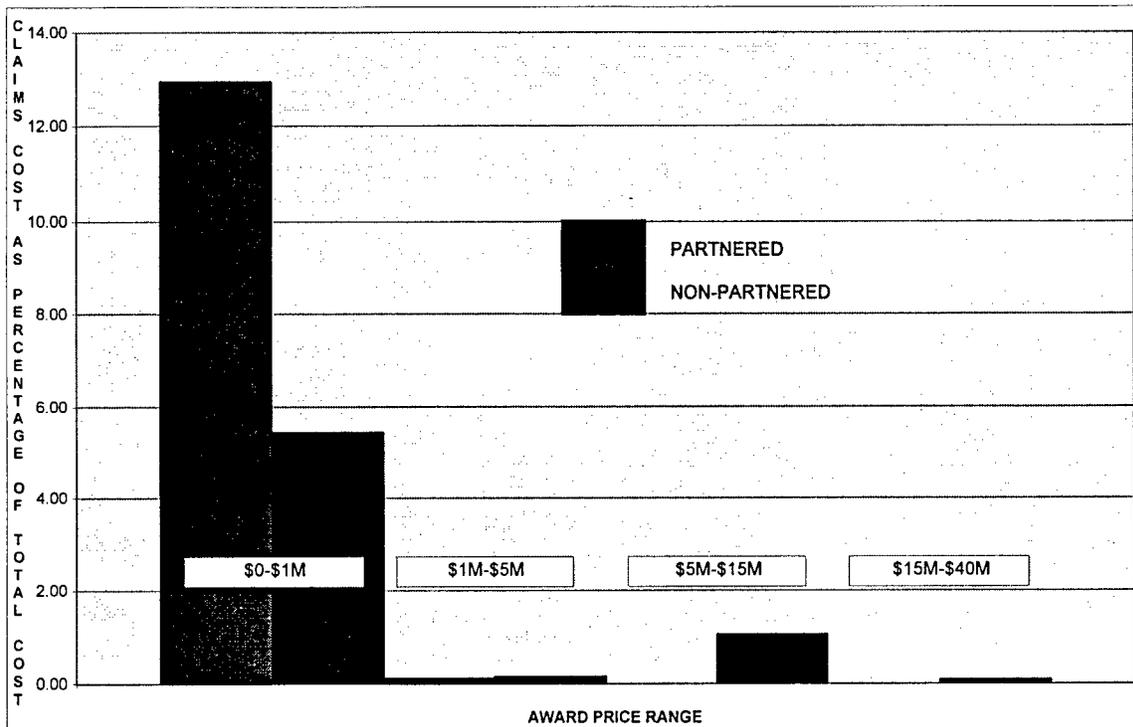
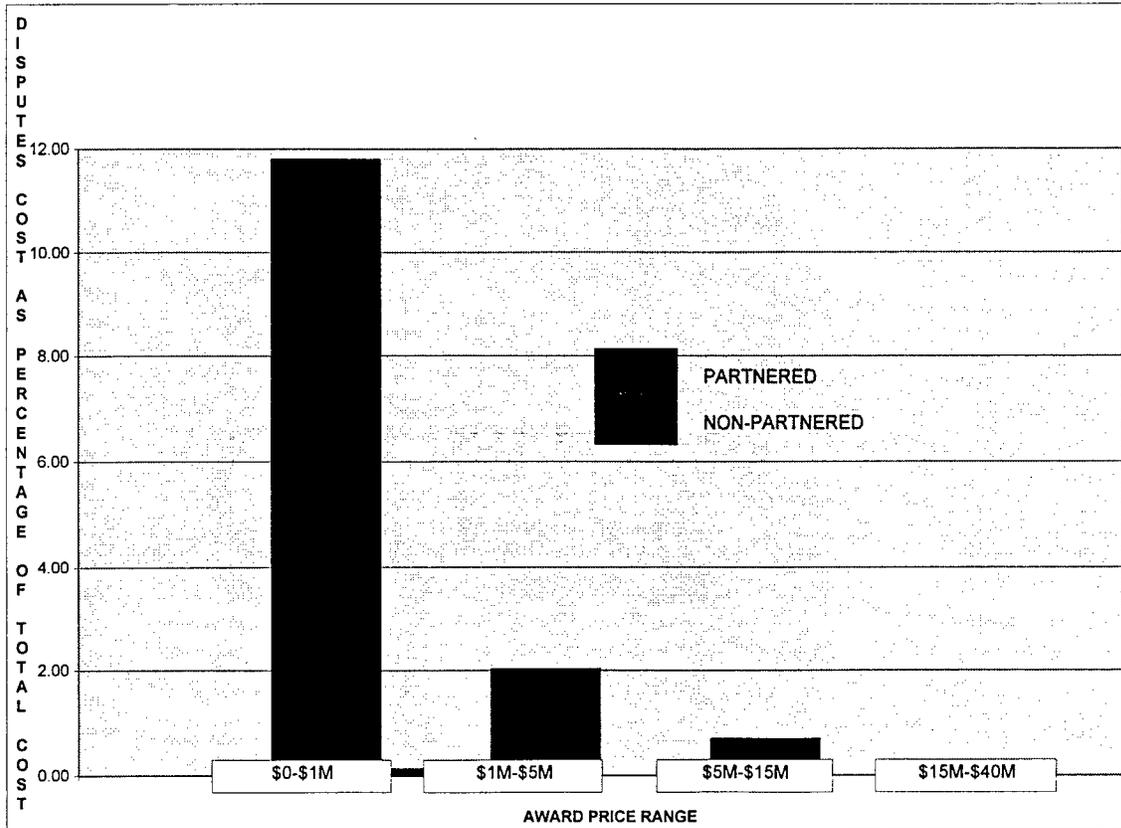
**Figure A-10. Liquidated Damages as a Percent of Total Time**



### Partnering's Impact of Disputes and Claims

Remembering that disputes are issues which are settled at District-level or below and that claims are issues that are settled above the District, studying the potential impact of partnering on these two parameters is extremely important. Figures A-11 and A-12 show that partnering seems to virtually eliminate the cost allocated to disputes and has the same effect on claims for projects greater than \$1 million. The only significant costs that remain in these two parameters are for claims on projects which are less than \$1 million. When we look at Table A-2, once again we see that for the \$5 million to \$40 million range, there are virtually no costs associated with disputes and claims on partnered projects. The total percentage of dispute and claims costs on non-partnered projects is relatively low. Whereas if we look to the lower half of the projects, we find that there are significant dispute and claims costs associated with both types of projects. This disparity is hard to explain. Perhaps, the magnitude of the issues encountered on the large projects was small enough in relation to the size of the project that both sides found it easier to settle these issues on the job site. On the other hand, an issue which might get lost in the financial noise of a large project may be large enough in relation to the size of the contract on a smaller project that it must be escalated to receive final settlement.

Figure A-11. Disputes Cost



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## CONCLUSIONS

The above discussion springs from the preliminary statistical analysis of the data collected for this project. Basically, we have only calculated means, standard deviations, and variances for the selected parameters. This was done to identify trends and lead us to those places where additional analysis with more complex methods will likely provide definitive information. This analysis will take place during the second year of the project and will be reported in the final report. As can be seen from the above discussion, significant trends have been identified and some emerging conclusions can be made.

- Partnered projects outperformed non-partnered projects in virtually every category if they were awarded at a price above \$5 million.
- Partnered projects have slightly less cost growth when the entire population is considered.
- Partnered projects have more change orders than non-partnered projects and this probably demonstrates an increased willingness by TxDOT field personnel to favorably consider contractor-initiated change requests.
- Across the entire population mean partnered project change order cost was roughly one half the average cost of the average non-partnered change order. Therefore, contractors are attempting to keep the cost of change orders down.
- The above conclusions are further reinforced by the trend which shows that partnering seems to create a desirable effect with regard to deducts.
- For the entire population, the average partnered project finished 4.7% earlier than originally planned and the average non-partnered finished 10.04% later than originally planned.
- Partnered projects have a fewer number of LD days than non-partnered projects in all categories. Thus, partnering seems to have a positive effect on projects with time problems by reducing the number of days that a project finishes late.
- For the \$5 million to \$40 million range, there are no costs associated with disputes and claims on partnered projects.

To be able to make these statements definitively, we will need to look closely at the distributions of the raw data and be able to statistically explain the variation therein. However, with these trends seeming to be so well defined at stage of the study, it would be expected that the in-depth statistical analysis will probably confirm and add credence to the emerging conclusions just stated.

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## **APPENDIX B: Subjective Analysis of TxDOT and General Contractor Partnering Questionnaire Data**

At the initial project mini partnering session, TxDOT requested that a questionnaire be developed and distributed to a sample of TxDOT field personnel. The purpose of the survey was to assess TxDOT field personnel feelings as to the progress of the TxDOT partnering effort. The last such comparable measurement of TxDOT personnel was accomplished in January 1995 as part of a research project by a graduate student at the University of Texas (Grajek, 1995). That survey was reviewed and where appropriate the same questions were repeated in the survey developed by the Texas Tech researchers, particularly, those questions assessing attitude toward the various aspects of the TxDOT partnering effort. This approach allows TxDOT to use the Grajek report more or less as a baseline for comparison with the latest survey results. A quasi-sampling approach was selected in which 10 surveys were sent to every TxDOT district engineer for random distribution to field personnel. Of the 250 surveys distributed, 184 were completed and returned for a 74% response rate.

A similar although not entirely identical survey was also developed and submitted to a sample of general contractors who have completed TxDOT construction projects. A list of contractors was extracted from the TxDOT Directory of Pre-qualified Contractors. Of the 238 surveys mailed to contractors, 68 were completed for a 29% response rate, considerably less than the response rate for the internal TxDOT survey. The researchers believe that the responses received are distinctive and very similar to the general contractor population as a whole.

In assessing partnering attitudes of both the TxDOT and General Contractor personnel, Question 1's focus in both surveys was to measure experience or maturation levels in the formal partnering process. The general contractor question also asked for partnering experience in non-TxDOT projects. While only 24% of the TxDOT respondents had participated in more than four partnered projects, the general contractor level was much higher: 43% for TxDOT and 53% for non-TxDOT partnered projects. However, the maturation level for both groups for two or more TxDOT partnered projects is nearly the same level (TxDOT=73% and General Contractor=81%). When compared to the Grajek baseline data of 1995 which showed about 50% experience level for two or more partnered contracts for both groups, the maturation level for partnering experience has gained almost 30% for both groups.

Question 3 asked respondents from both groups to evaluate the components of the formal partnering process. The table below summarizes the responses of both groups plus the Grajek baseline data. Only the responses categorized as extremely beneficial are shown in the table. For the TxDOT questionnaire and the Grajek baseline, this is summing the responses under levels 4 & 5. For the General Contractor questionnaire, this is summing responses under levels 5 & 6.

<b>Table B-1. Extremely Beneficial Responses Under Levels 4-5 or 5-6 (As Percentage of All Respondents)</b>				
Formal Partnering Components	TxDOT	General Contractor	Grajek Baseline Study	
			TxDOT	G.C.
Introductions	45%	50%	51%	67%
Joint Value Exercises	37%	28%	45%	65%
Mutual Goals	55%	61%	62%	81%
Perception of Other Organizations	46%	49%	NA	NA
Role Reversals	42%	46%	46%	60%
Mission Statement	39%	37%	51%	62%
Video Tapes	22%	11%	31%	30%
Personality Profiles	30%	21%	50%	55%
Issue Resolution	75%	55%	58%	73%
Setting Up Evaluation System	42%	46%	42%	49%
Relaxed Environment	74%	50%	75%	89%

From Table B-1, several comparisons merit comment. In the “joint value” component, the TxDOT responses from the latest survey versus the baseline study indicate a few percentage point changes while a considerable reduction from the baseline to current exists for the general contractor responses. Possibly, this is due to the greater experience level of the general contractors in partnered projects completed.

Another component that experience significant change (decrease) from the baseline study is the “personality profiles.” Again, this decrease in benefit can be tied to the experience level gained by both groups from 1995 to present.

One other component experiencing significant change from the baseline study is the “issue resolution.” While 73% of the general contractors in the baseline study thought the component extremely beneficial, that percentage dropped to 55% in the current study. The opposite effect occurred for the TxDOT responses. The baseline study indicates 58% found this component extremely beneficial compared to 75% for the current study. A possible explanation is again tied to maturation levels. Perhaps the general contractors take this benefit as a given tied to partnering while TxDOT is gaining the depth of partnering experience which now shows issue resolution at the field level a direct output of partnering.

Question 4 was asked in order to determine which of the partnering tools were being used effectively. Table B-2 summarizes combined responses (some of the time and all of the time) from both groups and also compares these responses to the baseline study.

Table B-2. Combined Responses for "some of the time" and "all of the time"				
Formal Partnering Tools	TxDOT	General Contractor	Grajek Baseline Study	
			TxDOT	G.C.
Mission Statement	53%	66%	45%	50%
Personality Profile	32%	53%	38%	38%
Issue Escalation/Resolution	77%	83%	61%	64%
Problem Solving	70%	87%	66%	71%
Evaluation System	33%	47%	42%	49%

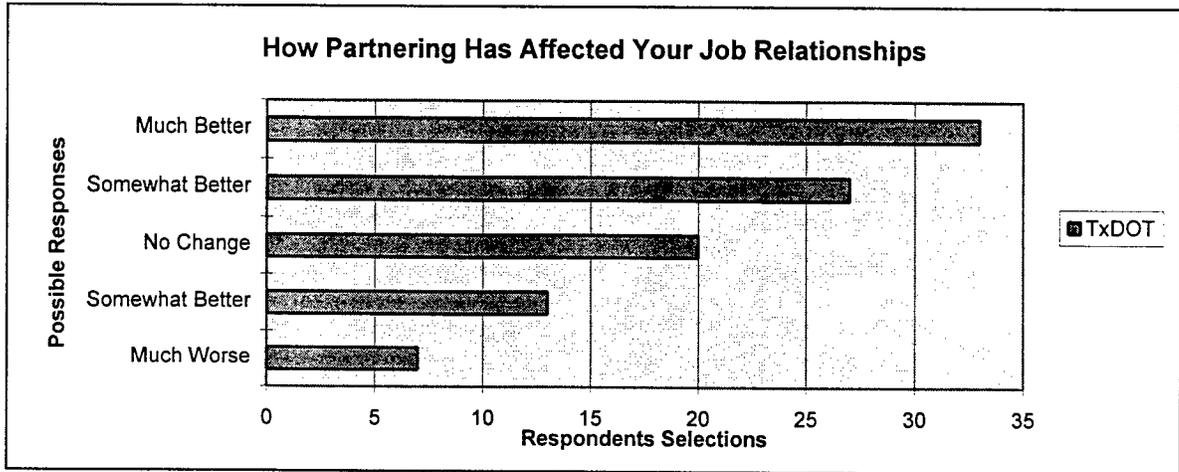
The components experience significant change from the baseline study are issue escalation/resolution and problem solving. The would be expected as the experience or maturation levels of all participants increases from using partnering.

Question 6 asked the respondents to rate how partnering may or may not affected their working relationships. Only TxDOT, General Contractors, and Sub-contractors are summarized in Table B-3.

Table B-3. Combined Responses for "somewhat better" and "much better"				
Affected Working Relationships	TxDOT	General Contractor	Grajek Baseline Study	
			TxDOT	G.C.
TxDOT	-	67%		86%
General Contractors	71%	-	67%	-
Sub-contractors	37%	42%	46%	46%

The lower trend continues for the sub-contractors and may indicate as concluded in the baseline study that the partnering process still may not be filtering down. The 19% decrease in the G.C.'s percentage as affecting their working relationship with TxDOT may be tied again to their increased experience level. The distribution of responses can be seen in Figure B-1.

**Figure B-1. TxDOT Responses Regarding Job Relationships**



Question 14 on the General Contractor questionnaire and Question 17 on the TxDOT questionnaire asked the respondents to rank-order the subjective measures of the partnering process with “1” be the highest ranking. Table B-4 summarizes the results, and compares them to the baseline study (Question 13).

**Table B-4. Benefits of Partnering Responses**

Partnering Benefit	TxDOT	General Contractor	Grajek Baseline Study	
			TxDOT	G.C.
Better Communication	1	1	1	1
Better Teamwork	3	4	2	2
Increased Trust	5	5	3	3
Stronger Relationships	7	6	4	4
TxDOT Satisfaction	2	2	5	5
Contractor Satisfaction	6	3	6	6
Public Satisfaction	4	5	7	7

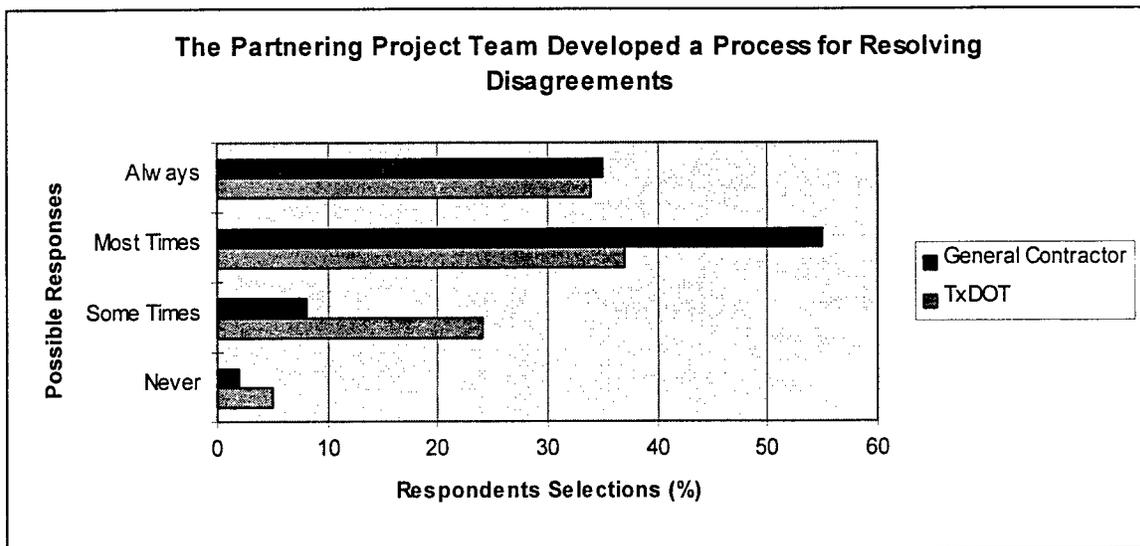
Important changes to note that occurred from the baseline study are in public satisfaction, TxDOT satisfaction, and stronger relations. Again, perhaps the increased maturation levels of all participants have effected these rearrangements in benefit importance. Certainly the contractors see a greater benefit to TxDOT’s satisfaction than TxDOT perceives to theirs.

Question 15 on the General Contractor questionnaire and Question 18 on the TxDOT questionnaire asked the respondents to rate the project team’s developing a process for resolving disagreements. Table B-5 summarizes the responses. The baseline study did not have this question in its survey.

Response	TxDOT	General Contractor
always	34%	35%
most times	37%	55%
some times	24%	8%
never	5%	2%

It appears from the data that the general contractors perhaps have a greater expectation for the resolution of disagreements as can be seen in Figure B-2.

**Figure B-2. Partnering's Impact on Resolving Disagreements**

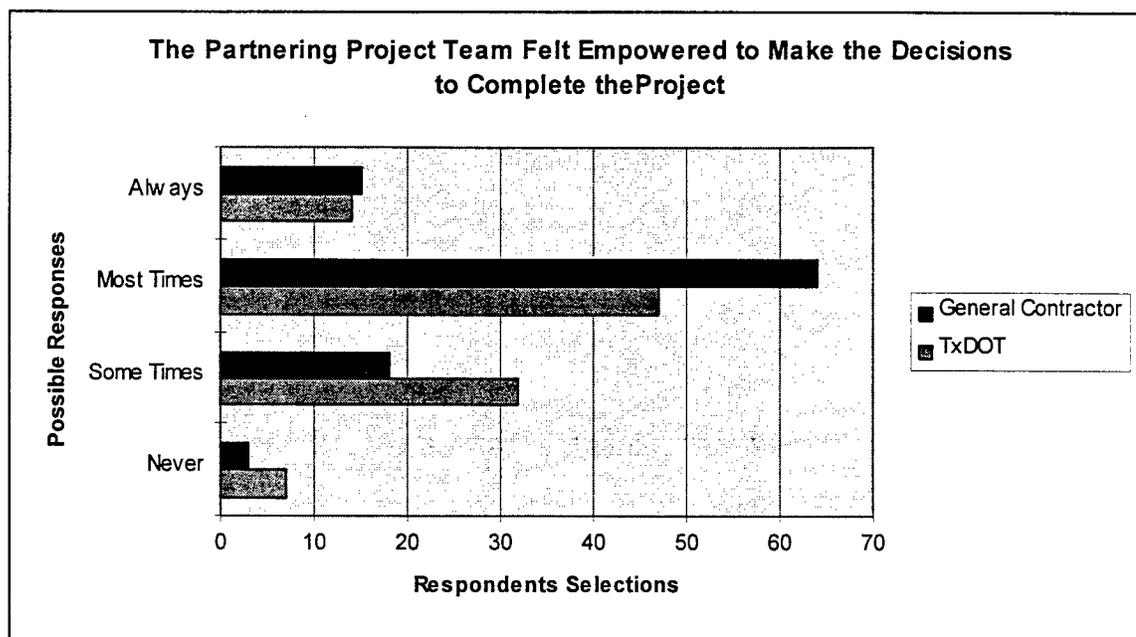


Question 16 on the General Contractor questionnaire and Question 18 on the TxDOT questionnaire asked the respondents to rate the project team's attitude that it was empowered to make the decisions it needed to make to complete the project. The baseline study did not have this question in its survey. The results are shown in Table B-6.

Response	TxDOT	General Contractor
always	14%	15%
most times	47%	64%
some times	32%	18%
never	7%	3%

It appears from the data shown in Figure B-3 that the general contractors perceive a greater authority to make decisions. This difference could be attributable to the organization structure both operate from. The general contractor appears to be more decentralized to "field" decision making authority than TxDOT.

**Figure B-3. Partnering's Impact on Decision-making Empowerment**



Question 17 on the General Contractor questionnaire and Question 20 on the TxDOT questionnaire asked the respondents to rate partnering as it affects TxDOT, the general contractor, and the public. The baseline study did not have this question in its survey. Only the last two responses which can be categorized as “extremely beneficial” are summarized in Table B-7.

Response	TxDOT	General Contractor
extremely beneficial	46%	39%

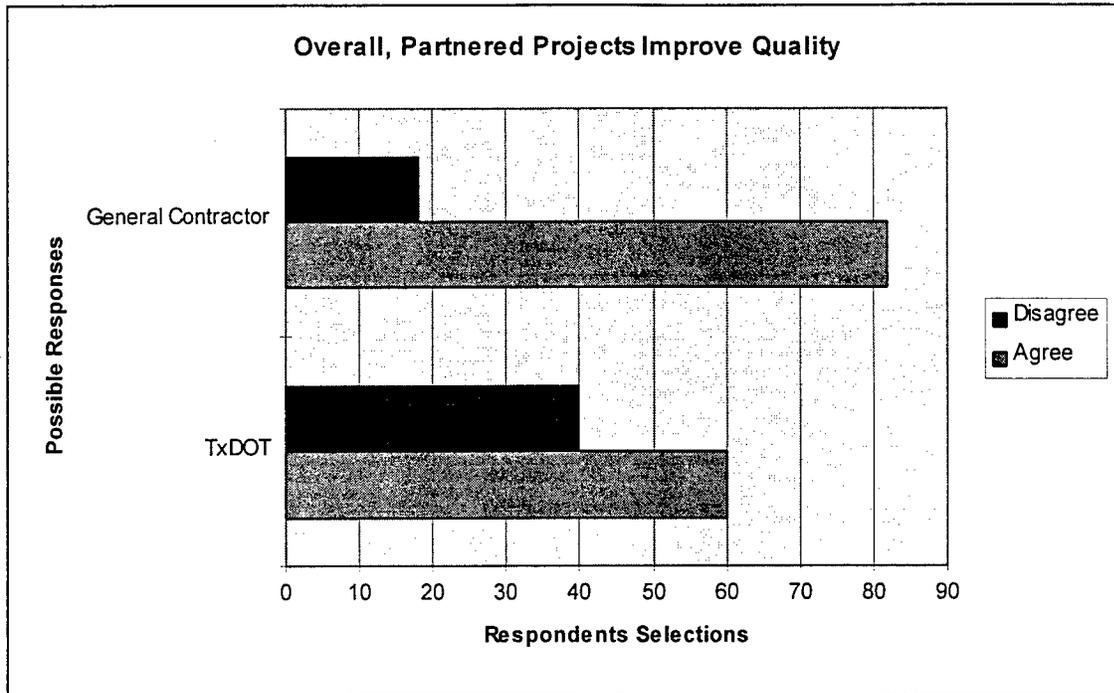
Over one-third of both groups see the partnering program as extremely beneficial to all vested parties.

Question 18 on the General Contractor questionnaire and Question 21 on the TxDOT questionnaire asked the respondents to rate partnering as it affects quality. The baseline study did not have this question in its survey. Table B-8 illustrates the responses to this important question.

Response	TxDOT	General Contractor
agree	60%	82%
disagree	40%	18%

A 22% difference between TxDOT and the General Contractors shown in Figure B-4 as to their responses on “agreeing that partnering improves quality” may warrant further analysis to ascertain why the significant difference in perception.

**Figure B-4. Partnering’s Perceived Impact on Job Quality**

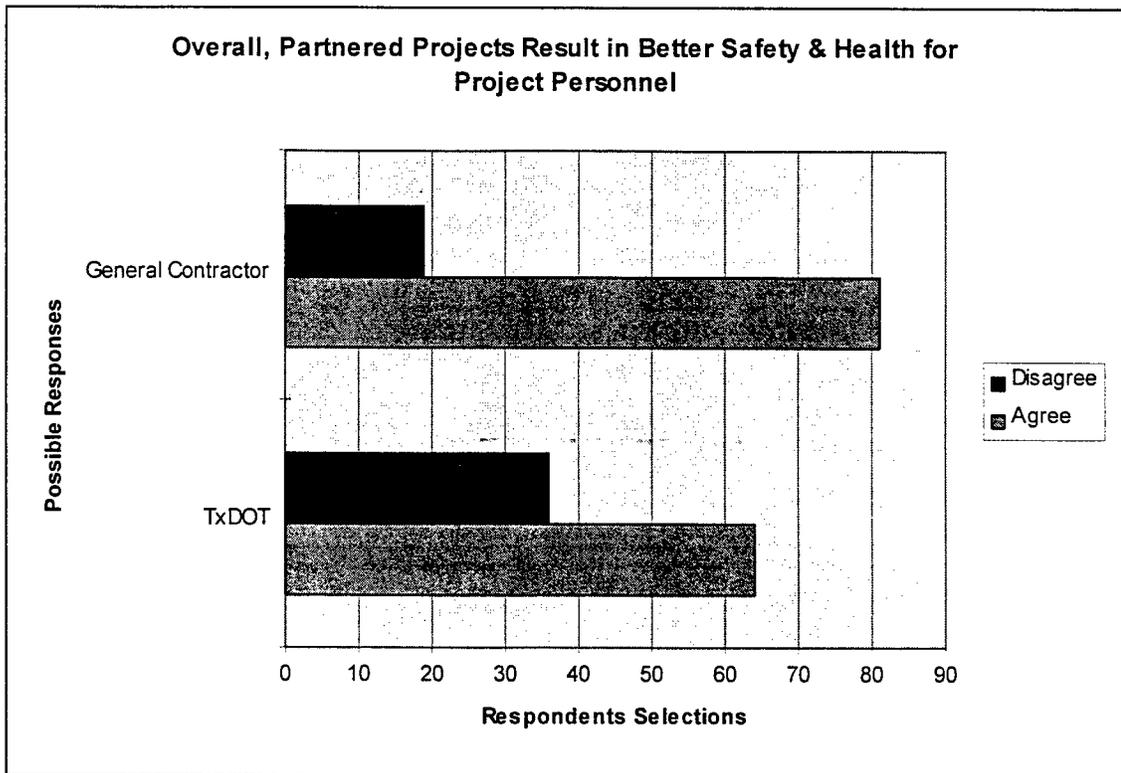


Question 19 on the General Contractor questionnaire and Question 22 on the TxDOT questionnaire asked the respondents to rate partnering as it affects safety and health. The baseline study did not have this question in its survey. The results are shown in Table B-9.

Response	TxDOT	General Contractor
agree	64%	81%
disagree	36%	19%

A 17% difference seen in Figure B-5 between TxDOT and the General Contractors as to their responses on “agreeing that partnering improves safety and health” may warrant further analysis to ascertain why the significant difference in perception.

**Figure B-5. Partnering's Perceived Impact on Safety**



**TAB A to Appendix B: TxDOT Field Questionnaire**

Please darkened with pencil or pen the circle next to your selected response.

1. How many times have you participated in TxDOT partnered projects?

- 1             2             3             4             more than 4

2. Please indicate your TxDOT role in a partnered project. (Check the most appropriate/frequent role)

- Inspector                       Chief Inspector                       Project Engineer  
 Assist. Area Engineer  Area Engineer                       Dir. Of Construction  
 Assist. Dist. Engineer  District Engineer                       Designer  
 Other (please specify) \_\_\_\_\_

3. Which parts of the *initial facilitated partnering workshop* do you find to be most beneficial. If you are not familiar with a particular item as a part of the workshop(s) you have attended, leave the item blank.

Not Beneficial					Extremely Beneficial
1	2	3	4		5

- a. Introductions:  
 1             2             3             4             5
- b. Joint Value Exercises:  
 1             2             3             4             5
- c. Mutual Goals:  
 1             2             3             4             5
- d. Perception of the Other Organization:  
 1             2             3             4             5
- e. Role Reversals (putting yourself in the contractor's shoes):  
 1             2             3             4             5
- f. Mission Statement (or Charter) with measurable goals and objectives:  
 1             2             3             4             5
- g. Video Tape(s) on partnering:  
 1             2             3             4             5
- h. Personality Profile:  
 1             2             3             4             5
- i. Issue Resolution:  
 1             2             3             4             5
- j. Setting up Evaluation System:  
 1             2             3             4             5

- 
- k. Getting to Know Project Team in a Relaxed Environment:  
O 1 O 2 O 3 O 4 O 5

4. Which of the following partnering tools have you used in partnered projects?

1. Never 2. Occasionally 3. Some of the time 4. All of the time

- a. Mission statement with measurable goals and objectives  
O 1. O 2. O 3. O 4.
- b. Personality profiles  
O 1. O 2. O 3. O 4.
- c. Conflict resolution/issue escalation (agreeing to disagree and escalate)  
O 1. O 2. O 3. O 4.
- d. Problem solving  
O 1. O 2. O 3. O 4.
- e. Evaluating or monitoring system (periodic report cards)  
O 1. O 2. O 3. O 4.

5. If you have not used the partnering tools, please indicate the reason(s)

- O Not enough time  
O Disinterest among team members  
O Too complicated  
O Too much paper work involved  
O Forgot to use them  
O Other: please specify \_\_\_\_\_

6. How do you think partnering has affected your job relationships? (please only answer those questions that apply)

1. Much Worse 2.. Somewhat Worse 3. No Change 4. Somewhat Better 5. Much Better

- a. Relationship with Contractor  
O 1 O 2 O 3 O 4 O 5
- b. Relationship with Subcontractors  
O 1 O 2 O 3 O 4 O 5
- c. Relationship with Suppliers  
O 1 O 2 O 3 O 4 O 5
- d. Relationship with Fellow TxDOT Project Team Members  
O 1 O 2 O 3 O 4 O 5
- e. Relationship with TxDOT Divisions/Special Offices (Austin)  
O 1 O 2 O 3 O 4 O 5

7. Did you participate in a follow-up partnering workshop(s)?

- O Yes O No



- Previous Experience of contractor
- Previous experience of both TxDOT and contractor personnel
- Project period less than \_\_\_\_\_ weeks
- Urban project
- Rural project
- Other \_\_\_\_\_
- Other \_\_\_\_\_
- Other \_\_\_\_\_
- Other \_\_\_\_\_

16. In your experience with partnered projects, which of the objective criteria below represents the best measurable yardsticks in which to access the benefits of partnering? You may mark as many as you feel are germane. If you mark more than one, please rank order your responses 1,2,3,... with "1" being the best choice and so on.

- |  | RANK ORDER |
|--|------------|
| <input type="radio"/> Value engineering dollars generated  | _____      |
| <input type="radio"/> Cost growth due to change orders     | _____      |
| <input type="radio"/> Number of change orders              | _____      |
| <input type="radio"/> Time extensions due to change orders | _____      |
| <input type="radio"/> Liquidated Damage Costs              | _____      |
| <input type="radio"/> Number of claims                     | _____      |
| <input type="radio"/> Claims cost                          | _____      |
| <input type="radio"/> Users' cost of construction          | _____      |
| <input type="radio"/> Administrative costs                 | _____      |
| <input type="radio"/> Time to resolve escalated issues     | _____      |
| <input type="radio"/> Other _____                          | _____      |
| <input type="radio"/> Other _____                          | _____      |

17. Please rank order the subjective partnering measurements using 1,2,3 and so on with 1 being the most important benefit of partnering.

- |   | RANK ORDER |
|---|------------|
| <input type="radio"/> Better communication    | _____      |
| <input type="radio"/> Increased trust         | _____      |
| <input type="radio"/> TxDOT satisfaction      | _____      |
| <input type="radio"/> Contractor satisfaction | _____      |
| <input type="radio"/> Better teamwork         | _____      |
| <input type="radio"/> Stronger Relationships  | _____      |
| <input type="radio"/> Public satisfaction     | _____      |

18. In my experience with partnered projects, the project team developed a process for resolving disagreements.

- Always       Most times       Some times       Never

19. In my experience with partnered projects, the project team felt that it was empowered to make the decisions it needed to make to complete the project.

- Always       Most times       Some times       Never

20. Overall, I believe that the TxDOT partner program as it affects TxDOT, the contractors, and the general public has been

- |                         |                         |                         |                         |                         |
|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Not Beneficial          |                         |                         |                         | Extremely Beneficial    |
| <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 |

21. Overall, I believe that partnered projects improve quality.

---

Agree       Disagree

22. Overall, I believe that partnered projects result in better safety and health for project personnel.

Agree       Disagree

This completes the questionnaire. TxDOT and the Research Team at Texas Tech University sincerely appreciate your taking time from your very busy work schedule to provide this vital input. Please return the questionnaire in the provided franked envelop. Again, your questionnaire will be treated confidentially.

Mail to:

**TAB B to Appendix B: Summary of TxDOT Field Questionnaire Results**

Please darkened with pencil or pen the circle next to your selected response.

1. How many times have you participated in TxDOT partnered projects?

	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> more than 4
Responses:	23%	19%	23%	10%	24%

2. Please indicate your TxDOT role in a partnered project. (Check the most appropriate/frequent role)

- Inspector
- Chief Inspector
- Project Engineer
- Assist. Area Engineer
- Area Engineer
- Dir. Of Construction
- Assist. Dist. Engineer
- District Engineer
- Designer
- Other (please specify) \_\_\_\_\_

Project Engineer 11	Labor 1
Chief Inspector 38	Laboratory Supervisor 3
Construction Record Keeper 10	District Construction Auditor 2
Area Engineer 41	Director of Operations 1
Inspector 18	Construction Manager 2
Project Manager 7	Assistant District Engineer 4
Assistant Area Engineer 16	Engineering Specialist II 1
Director of Construction 8	Director of Transportation & Auditor 1
District Laboratory Engineer 1	Assistant Director 1
District Construction Engineer 1	Public Information Officer 2
Designer 5	Traffic Control 1
District Materials Engineer 2	R.O.W. Utility Agent 1

3. Which parts of the *initial facilitated partnering workshop* do you find to be most beneficial. If you are not familiar with a particular item as a part of the workshop(s) you have attended, leave the item blank.

	Not Beneficial				Extremely Beneficial
	1	2	3	4	5
a. Introductions:	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Responses:	19%	7%	29%	28%	17%

b. Joint Value Exercises:	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
Responses:	5%	25%	33%	31%	6%

c. Mutual Goals:	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5
------------------	-------------------------	-------------------------	-------------------------	-------------------------	-------------------------

Responses:	4%	9%	31%	38%
	17%			

d. Perception of the Other Organization:

O 1                      O 2                      O 3                      O 4                      O 5

Responses:	8%	13%	33%	32%
	14%			

e. Role Reversals (putting yourself in the contractor's shoes):

O 1                      O 2                      O 3                      O 4                      O 5

Responses:	13%	15%	31%	28%
	14%			

f. Mission Statement (or Charter) with measurable goals and objectives:

O 1                      O 2                      O 3                      O 4                      O 5

Responses:	12%	20%	28%	26%
	13%			

g. Video Tape(s) on partnering:

O 1                      O 2                      O 3                      O 4                      O 5

Responses:	21%	33%	24%	19%	3%
------------	-----	-----	-----	-----	----

h. Personality Profile:

O 1                      O 2                      O 3                      O 4                      O 5

Responses:	22%	24%	24%	20%
	10%			

i. Issue Resolution:

O 1                      O 2                      O 3                      O 4                      O 5

Responses:	4%	3%	18%	45%
	30%			

j. Setting up Evaluation System:

O 1                      O 2                      O 3                      O 4                      O 5

Responses:	10%	15%	32%	32%
	10%			

k. Getting to Know Project Team in a Relaxed Environment:

O 1                      O 2                      O 3                      O 4                      O 5

Responses:	2%	7%	18%	37%
	37%			

4. Which of the following partnering tools have you used in partnered projects?

1. Never            2. Occasionally            3. Some of the time            4. All of the time

a. Mission statement with measurable goals and objectives

	O 1	O 2	O 3	O 4
Responses:	22%	25%	27%	
	26%			

b. Personality profiles

	O1	O 2	O 3	O 4
Responses:	39%	29%	25%	7%

c. Conflict resolution/issue escalation (agreeing to disagree and escalate)

	O 1	O 2	O 3	O 4
Responses:	6%	17%	31%	
	46%			

d. Problem solving

	O 1	O 2	O 3	O 4
Responses:	9%	21%	36%	
	34%			

e. Evaluating or monitoring system (periodic report cards)

	O 1	O 2	O 3	O 4
Responses:	39%	28%	26%	7%

5. If you have not used the partnering tools, please indicate the reason(s)

Not enough time

Responses:
18%

Disinterest among team members

Responses:
56%

Too complicated

Responses:
2%

Too much paper work involved

Responses:
8%

Forgot to use them

Responses:
16%

Other: please specify \_\_\_\_\_

Responses: 0%
---------------

6. How do you think partnering has affected your job relationships? (please only answer those questions that apply)

1. Much Worse    2.. Somewhat Worse    3. No Change    4. Somewhat Better    5. Much Better

a. Relationship with Contractor

1    2    3    4    5

Responses:	1%	2%	27%	53%	18%
------------	----	----	-----	-----	-----

b. Relationship with Subcontractors

1    2    3    4    5

Responses:	1%	1%	62%	30%	7%
------------	----	----	-----	-----	----

c. Relationship with Suppliers

1    2    3    4    5

Responses:	2%	1%	83%	11%	4%
------------	----	----	-----	-----	----

d. Relationship with Fellow TxDOT Project Team Members

1    2    3    4    5

Responses:	1%	1%	50%	34%	14%
------------	----	----	-----	-----	-----

e. Relationship with TxDOT Divisions/Special Offices (Austin)

1    2    3    4    5

Responses:	3%	3%	71%	18%	6%
------------	----	----	-----	-----	----

7. Did you participate in a follow-up partnering workshop(s)?

Yes    No

Responses:	37%	63%
------------	-----	-----

8. Did you find the follow-up workshop(s) beneficial?

Not Beneficial

1    2    3    4    5

Extremely Beneficial

Responses:	24%	8%	21%	38%	10%
------------	-----	----	-----	-----	-----

9. Did you participate in a close-out partnering workshop(s)?

Yes    No

Responses:	20%	80%
------------	-----	-----

10. Did you find the close-out partnering workshop(s) beneficial?

Not Beneficial

1    2    3    4    5

Extremely Beneficial

Responses:	36%	5%	18%	30%
	11%			

11. What level of service do you feel you are receiving from The TxDOT Continuous Improvement Office?

	Poor O 1	O 2	O 3	O 4	Excellent O 5
Responses:	10%	19%	42%	23%	5%

12. The level of services provided to you by the Continuous Improvement Office have been

	Poor O 1	O 2	O 3	O 4	Excellent O 5
Responses:	12%	15%	42%	27%	4%

13. The Continuous Improvement Office needs to improve support in the following area(s). Please list in the space provided.

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_

Responses:

- Help with follow ups. Do report cards.
- More participation from higher levels of management.
- Longer time with these work shops.
- The CI office works hard to provide the tools they have to offer, however I'm not sure these tools are effective in
- Partnering was of little use, due to lack of interest on everyone's part.
- TxDOT inter team support.
- We need to play the game by the rules, don't back off at the expense to TxDOT.
- They've never been involved that I know of.
- Training.
- To follow up on all partnering workshops.
- Perhaps more knowledge in TxDOT Projects.
- Work under the condition and with the contractor.
- Contact A.E. with advance and follow up checks.
- Partnering is a waste of time and money and has not been used on my project. The only way this could work is f to make the contractor abide by all partnering rules, goals, and objectives.
- Need to "back-off" of partnering.
- Response to questions.
- Problem solving Resolution.
- Evaluate mission goals statements mid-way through project.
- Insist on close-out partnering workshops.
- Assess TxDOT and Contractors attitudes during project.
- Understand construction and design.
- Focus on job and not personalities.
- Don't dictate to the Districts.
- Don't implement CI issues simply for sake of trying to justify existence.

- Don't take position that status quo is always bad.
- Communication between district and area offices.
- Communication between district design and area design.
- Directors and top level personnel need to listen to employees.
- Send out a list of suggestions made so we can monitor changes.
- Returning phone calls.
- Some body in office for assistance.
- Just emphasize open-communication.
- Letting offices know who and what they are, and what kind of service they provide.
- Communication.
- Get TxDOT personnel to understand that partnering doesn't mean to throw the plans and specs out the window when
- Contractors to understand partnering is a two way street, not get, get, get, all the time. They need to give some also.
- Cost of living, and promotions.
- Rule out out-of-town partnering sessions.
- Inspectors training.
- Training (In house between TxDOT Sections ) how to partner.
- Management communication.
- Heighten employee morale.
- No communication.
- Allow district to have input in setting up meetings.
- The CI office speaks with large bureaucratic catch-phrases while the real work is done by local teams.
- Organize and coordinate all partnering activities.
- Make all arrangements.
- Don't know of anything yet but as we get into partnering, plus I feel the partnering office may be able to supply materi
- Provide more training at the dist. level.
- Screening of facilitators, for qualification.
- Spearhead the implementation of their designed programs. Inform all levels of their design.
- Resolution of differences.
- They lack experience and knowledge in what real pressures exist between the Department and the contractor. These project progress. The effects of these pressures cannot be masked by partnering.
- Follow up visits to individual employees, not group meetings.
- When you make rules , enforce them.
- Let employees give honest opinions without repercussions.
- Need more than initial meeting only.
- Where are they? I had no contact with them.
- I really don't know what they do. It appears they hand down edicts without knowing what really goes on In the field.
- Provide information about partnering location, and lodging by mail in timely manner rather than a rushed fax.
- Less paper pushing and more "out in the field" "real world" solutions.
- Quit making blanket rules for the state wide. Each part of the state has regional differences and needs. Let us use s We already know the contractors.
- Need to provide module information for informal partnering workshops.
- What are they here for?
- Developing environment that enforces policies that are published as a rule. Not to find reasons not to follow policies standards and specifications.

14. Who should attend partnering workshops: (Check as many as apply for the initial partnering workshops)

- |                                 |                                      |
|---------------------------------|--------------------------------------|
| <input type="radio"/> FHWA      | <input type="radio"/> Area Engineer  |
| <input type="radio"/> Inspector | <input type="radio"/> Superintendent |

- Foreman
- Material Suppliers
- Local Public officials
- Project Manager (TxDOT, Contractor)
- CEO/Upper Management of Contractor
- TxDOT Division Support  
i.e. Mat. & Tests, C&M, Design
- District Construction Engineer
- Construction Records Keeper
- Other (please specify: \_\_\_\_\_)
- Estimators
- Utilities
- Continuous Improvement Office Personnel
- District Engineer
- Subcontractors
- Executive Director
- Designer of Plans
- City Entities
- DPS

Response Rank-Ordered:	
Rank	Job Title
173	Area Engineer
169	Project Manager(TXDOT, Contractor) 169
167	Superintendent
154	Foreman
143	Subcontractors
140	District Construction Engineer
133	Construction Record Keeper
120	CEO/Upper Management of Contractor
117	Inspector
99	Designer of Plans
80	Utilities
64	Materials Suppliers
59	District Engineer
55	FHWA
55	City Entities
49	Local Public Office
48	Estimators
39	TxDOT Division Support
39	Construction Improvement Office Personnel
38	DPS
4	Executive Director

15. An *informal* partnering project is defined as one in which a non-facilitated meeting between TxDOT and contractor representatives occurs. What criteria do you recommend for warranting the use of an informal partnered project instead of a formal partnered project? (For blank spaces provide your estimate)

Contract values less than \_\_\_\_\_ dollars

Response Average: \$1,000,000

Previous partnering experience of TxDOT personnel

Response: 47%

Previous Experience of contractor

Response: 46%

Previous experience of both TxDOT and contractor personnel

Response: 68%

Project period less than \_\_\_\_\_ weeks

Response Average: 30 Weeks

Urban project

Response: 11%

Rural project

Response: 22%

Other

Response:

- Any project where one party is trying to improve relations.
- TxDOT area office and contractor have been through a partnered project together previously.
- When TxDOT personnel and Contractors have already worked well together.
- # of parties involved potential area of conflict problems with utilities possible.
- Past relationship of parties involved.
- Complexity considering individual elements.
- Complexity considering the relationship of elements.
- Dependant upon complexity of project.
- No utilities.
- Not a complicated project.
- No major utility adjustments.
- Simple construction project (urban/rural).
- Maintenance contracts.
- Project complexity, standard vs special designs, unique construction sequences.
- New contractor in area.
- Complexity of project (lack of).
- Projects in low profile areas.
- Combine partnering with pre construction conference on small project.
- Type of contractor, i.e. ACP ovlys, shoulder project, seal coat, rehab FM's.
- Vary based on complexity.
- TxDOT and contractor have partnered before.
- Specific scope of work, e.g. thin overlays, seal coat projects, traffic signal jobs, ect.
- Complexity.
- Seal coat or hot mix projects.

Now technical projects that don't have major anticipated problems.
Projects involving one item of work (mowing, signing, tree-trimming, level-up, seal coating, pavement markers, etc.).
How many times have contractors and TxDOT worked together.
Previous partnering between TxDOT and same contractor.
Project simplicity (number of items).
A job that has already been done on different roads.
Overlay, illumination, signals.
Simple straight forward project.
No time for formal.
Exist. relationships between TxDOT/contractor.
Depends upon complexity of project.
Mutual agreement between area eng. and contractor.
Non-complex projects.
Minor utility adjustments, simple TCP, few stake holders.
Mutual agreement between TxDOT and contractor.
Roadway overlay projects.
Simple, repeat work with same contractor.
This method is much preferred (informal partnering) by myself. Let's just have a 1-day pre-construction meeting.
Contractor with other project under you.
A workshop should be held for every partnering project regardless how many one has made! Every project is different, people employment changes,
managers, etc. This is very important.
Complex projects.
Already get along with contractor.
If a project must be partnered, this is the way to do it.
Small amount of subcontractors.
One contractor only.
Signal projects.
Off system county bridges.
Preventive maintenance projects.
Mutual agreement between TxDOT and contractor.

16. In your experience with partnered projects, which of the objective criteria below represents the best measurable yardsticks in which to access the benefits of partnering? You may mark as many as you feel are germane. If you mark more than one, please rank order your responses 1,2,3,... with "1" being the best choice and so on.

	RANK ORDER
<input type="radio"/> Value engineering dollars generated	5
<input type="radio"/> Cost growth due to change orders	4
<input type="radio"/> Number of change orders	6
<input type="radio"/> Time extensions due to change orders	9
<input type="radio"/> Liquidated Damage Costs	7
<input type="radio"/> Number of claims	2
<input type="radio"/> Claims cost	3
<input type="radio"/> Users' cost of construction	8
<input type="radio"/> Administrative costs	9
<input type="radio"/> Time to resolve escalated issues	1
<input type="radio"/> Other _____	_____
<input type="radio"/> Other _____	_____

17. Please rank order the subjective partnering measurements using 1,2,3 and so on with 1 being the most important benefit of partnering.

	RANK ORDER
<input type="radio"/> Better communication	1
<input type="radio"/> Increased trust	3
<input type="radio"/> TxDOT satisfaction	5
<input type="radio"/> Contractor satisfaction	7
<input type="radio"/> Better teamwork	2
<input type="radio"/> Stronger Relationships	6
<input type="radio"/> Public satisfaction	4

18. In my experience with partnered projects, the project team developed a process for resolving disagreements.

	<input type="radio"/> Always	<input type="radio"/> Most times	<input type="radio"/> Some times	<input type="radio"/> Never
Response:	34%	37%	24%	5%

19. In my experience with partnered projects, the project team felt that is was empowered to make the decisions it needed to make to complete the project.

	<input type="radio"/> Always	<input type="radio"/> Most times	<input type="radio"/> Some times	<input type="radio"/> Never
Response:	14%	47%	32%	7%

---

20. Overall, I believe that the TxDOT partner program as it affects TxDOT, the contractors, and the general public has been

	Not Beneficial				Extremely Beneficial
	O 1	O 2	O 3	O 4	O 5
Response:	9%	14%	31%	33%	13%

21. Overall, I believe that partnered projects improve quality.

	O Agree	O Disagree
Response:	60%	40%

22. Overall, I believe that partnered projects result in better safety and health for project personnel.

	O Agree	O Disagree
Response:	64%	36%

This completes the questionnaire. TxDOT and the Research Team at Texas Tech University sincerely appreciate your taking time from your very busy work schedule to provide this vital input. Please return the questionnaire in the provided franked envelop. Again, your questionnaire will be treated confidentially.

Mail to:

## TAB C to Appendix B: TxDOT/General Contractor Partnering Questionnaire

Please darkened with pencil or pen the circle next to your selected response.

1. How many times have you participated in partnered projects?

- |       |    |                         |                         |                         |                         |                                   |
|-------|----|-------------------------|-------------------------|-------------------------|-------------------------|-----------------------------------|
| TxDOT | a. | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> more than 4 |
| Other | b. | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> more than 4 |

2. Please indicate your General Contractor role in a partnered project. (Check the most appropriate/frequent role)

- |  |                                      |                                      |
|--|--------------------------------------|--------------------------------------|
| <input type="radio"/> Project Manager              | <input type="radio"/> Superintendent | <input type="radio"/> Forman         |
| <input type="radio"/> Safety Officer               | <input type="radio"/> C.E.O.         | <input type="radio"/> Field Engineer |
| <input type="radio"/> Other (please specify) _____ |                                      |                                      |

3. Which parts of the *initial facilitated partnering workshop* do you find to be most beneficial. If you are not familiar with a particular item as a part of the workshop(s) you have attended, leave the item blank.

Not Beneficial					Extremely Beneficial
1	2	3	4	5	6

- |   |                         |                         |                         |                         |                         |                         |
|---|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| a. Introductions:   | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 | <input type="radio"/> 6 |
| b. Joint Value Exercises:   | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 | <input type="radio"/> 6 |
| c. Mutual Goals:  | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 | <input type="radio"/> 6 |
| d. Perception of the Other Organization:                                | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 | <input type="radio"/> 6 |
| e. Role Reversals (putting yourself in the contractor's shoes):         | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 | <input type="radio"/> 6 |
| f. Mission Statement (or Charter) with measurable goals and objectives: | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 | <input type="radio"/> 6 |
| g. Video Tape(s) on partnering:   | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 | <input type="radio"/> 6 |
| h. Personality Profile:   | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 | <input type="radio"/> 6 |
| i. Issue Resolution:  | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 | <input type="radio"/> 6 |
| j. Setting up Evaluation System:  | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 | <input type="radio"/> 6 |
| k. Getting to Know Project Team in a Relaxed Environment:               | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 | <input type="radio"/> 6 |

4. Which of the following partnering tools have you used in partnered projects?

- |          |                 |                     |                    |
|----------|-----------------|---------------------|--------------------|
| 1. Never | 2. Occasionally | 3. Some of the time | 4. All of the time |
|----------|-----------------|---------------------|--------------------|

a. Mission statement with measurable goals and objectives

1.  2.  3.  4.

b. Personality profiles

1.  2.  3.  4.

c. Conflict resolution/issue escalation (agreeing to disagree and escalate)

1.  2.  3.  4.

d. Problem solving

1.  2.  3.  4.

e. Evaluating or monitoring system (periodic report cards)

1.  2.  3.  4.

5. If you have not used the partnering tools, please indicate the reason(s)

- Not enough time
- Disinterest among team members
- Too complicated
- Too much paper work involved
- Forgot to use them
- Other: please specify \_\_\_\_\_

6. How do you think partnering has affected your job relationships? (please only answer those questions that apply)

- |               |                   |              |                    |                |
|---------------|-------------------|--------------|--------------------|----------------|
| 1. Much Worse | 2. Somewhat Worse | 3. No Change | 4. Somewhat Better | 5. Much Better |
|---------------|-------------------|--------------|--------------------|----------------|

a. Relationship with

- |          |                         |                         |                         |                         |                         |
|----------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 1) TxDOT | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 |
| 2) Other | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 |

b. Relationship with Subcontractors

- |          |                         |                         |                         |                         |                         |
|----------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 1) TxDOT | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 |
| 2) Other | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 |

c. Relationship with Architects

- |          |                         |                         |                         |                         |                         |
|----------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 1) TxDOT | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 |
| 2) Other | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 |

d. Relationship with Fellow Project Team Members

- |          |                         |                         |                         |                         |                         |
|----------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 1) TxDOT | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 |
| 2) Other | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 |

e. Relationship with owners

- |                  |                         |                         |                         |                         |                         |
|------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| 1) TxDOT(Austin) | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 |
| 2) Other         | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 |

7. Did you participate in a follow-up partnering workshop(s)?

- |       |                           |                          |
|-------|---------------------------|--------------------------|
| TxDOT | <input type="radio"/> Yes | <input type="radio"/> No |
| Other | <input type="radio"/> Yes | <input type="radio"/> No |

8. Did you find the follow-up workshop(s) beneficial?

- |       |                         |                         |                         |                         |                         |                         |  |
|-------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--|
|       | Not Beneficial          |                         |                         |                         | Extremely Beneficial    |                         |  |
| TxDOT | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 | <input type="radio"/> 6 |  |
| Other | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 | <input type="radio"/> 6 |  |

9. Did you participate in a close-out partnering workshop(s)?

- |       |                           |                          |
|-------|---------------------------|--------------------------|
| TxDOT | <input type="radio"/> Yes | <input type="radio"/> No |
| Other | <input type="radio"/> Yes | <input type="radio"/> No |

10. Did you find the close-out partnering workshop(s) beneficial?

- |       |                         |                         |                         |                         |                         |                         |  |
|-------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|--|
|       | Not Beneficial          |                         |                         |                         | Extremely Beneficial    |                         |  |
| TxDOT | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 | <input type="radio"/> 6 |  |
| Other | <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 | <input type="radio"/> 6 |  |

11. Who should attend partnering workshops: (Check as many as apply for the initial partnering workshops)

- |   |   |
|---|---|
| <input type="radio"/> FHWA                                | <input type="radio"/> Area Engineer                           |
| <input type="radio"/> Inspector                           | <input type="radio"/> Superintendent                          |
| <input type="radio"/> Foreman                             | <input type="radio"/> Estimators                              |
| <input type="radio"/> Material Suppliers                  | <input type="radio"/> Utilities                               |
| <input type="radio"/> Local Public officials              | <input type="radio"/> Continuous Improvement Office Personnel |
| <input type="radio"/> Project Manager (TxDOT, Contractor) | <input type="radio"/> District Engineer                       |
| <input type="radio"/> CEO/Upper Management of Contractor  | <input type="radio"/> Subcontractors                          |
| <input type="radio"/> TxDOT Division Support              | <input type="radio"/> Executive Director                      |
| i.e. Mat. & Tests, C&M, Design                            | <input type="radio"/> Designer of Plans                       |
| <input type="radio"/> District Construction Engineer      | <input type="radio"/> City Entities                           |
| <input type="radio"/> Construction Records Keeper         | <input type="radio"/> DPS                                     |
| <input type="radio"/> Other (please specify: _____)       |   |

12. An *informal* partnering project is defined as one in which a non-facilitated meeting between Owner and contractor representatives occurs. What criteria do you recommend for warranting the use of an informal partnered project instead of a formal partnered project? (For blank spaces provide your estimate)

- Contract values less than \_\_\_\_\_ dollars
- Previous partnering experience of owner personnel
- Previous experience of contractor
- Previous experience of both owner and contractor personnel
- Project period less than \_\_\_\_\_ weeks
- Urban project
- Rural project
- Other \_\_\_\_\_
- Other \_\_\_\_\_
- Other \_\_\_\_\_

---

Other \_\_\_\_\_

13. In your experience with partnered projects, which of the objective criteria below represents the best measurable yardsticks in which to access the benefits of partnering? You may mark as many as you feel are germane. If you mark more than one, please rank order your responses 1,2,3,... with "1" being the best choice and so on.

- |  | RANK ORDER |
|--|------------|
| <input type="radio"/> Value engineering dollars generated  | _____      |
| <input type="radio"/> Cost growth due to change orders     | _____      |
| <input type="radio"/> Number of change orders              | _____      |
| <input type="radio"/> Time extensions due to change orders | _____      |
| <input type="radio"/> Liquidated Damage Costs              | _____      |
| <input type="radio"/> Number of claims                     | _____      |
| <input type="radio"/> Claims cost                          | _____      |
| <input type="radio"/> Users' cost of construction          | _____      |
| <input type="radio"/> Administrative costs                 | _____      |
| <input type="radio"/> Time to resolve escalated issues     | _____      |
| <input type="radio"/> Other _____                          | _____      |
| <input type="radio"/> Other _____                          | _____      |

14. Please rank order the subjective partnering measurements using 1,2,3 and so on with 1 being the most important benefit of partnering.

- |   | RANK ORDER |
|---|------------|
| <input type="radio"/> Better communication    | _____      |
| <input type="radio"/> Increased trust         | _____      |
| <input type="radio"/> TxDOT satisfaction      | _____      |
| <input type="radio"/> Contractor satisfaction | _____      |
| <input type="radio"/> Better teamwork         | _____      |
| <input type="radio"/> Stronger Relationships  | _____      |
| <input type="radio"/> Public satisfaction     | _____      |

15. In my experience with partnered projects, the project team developed a process for resolving disagreements.

- Never       Some times       Most times       Always

16. In my experience with partnered projects, the project team felt that is was empowered to make the decisions it needed to make to complete the project.

- Never       Some times       Most times       Always

17. Overall, I believe that the TxDOT partner program as it affects TxDOT, the contractors, and the general public has been

- |                         |                         |                         |                         |                         |                         |
|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|
| Not Beneficial          |                         |                         |                         |                         | Extremely Beneficial    |
| <input type="radio"/> 1 | <input type="radio"/> 2 | <input type="radio"/> 3 | <input type="radio"/> 4 | <input type="radio"/> 5 | <input type="radio"/> 6 |

18. Overall, I believe that partnered projects improve quality.

- Agree       Disagree

19. Overall, I believe that partnered projects result in better safety and health for project personnel.

- Agree       Disagree

20. When did your company partner its first project? \_\_\_\_\_ Month \_\_\_\_\_ Year

---

21. What is your company's total partnered projects for 1996?

- a. TxDOT \_\_\_\_\_
- b. Other \_\_\_\_\_

22. What is your company's estimated yearly average claims expense for

- a. Partnered projects \$ \_\_\_\_\_
- b. Non-partnered projects \_\_\_\_\_

23. Based on your experience, does partnering a contract reduce the potential for claims?

- Yes                       No                       Not Sure

24. Any other comments

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This completes the questionnaire. TxDOT and the Research Team at Texas Tech University sincerely appreciate you taking time from your very busy work schedule to provide this vital input. Please return the questionnaire in the provided franked envelop. Again, your questionnaire will be treated confidentially.

Mail to:

Department of Engineering Technology  
Attn: TxDOT Partnering Research  
Box 43107  
Lubbock, TX 79409-3107



e. Role Reversals (putting yourself in the contractor's shoes):

O 1 O 2 O 3 O 4 O 5 O 6

Responses: 1% 3% 21% 29% 40% 6%

f. Mission Statement (or Charter) with measurable goals and objectives:

O 1 O 2 O 3 O 4 O 5 O 6

Responses: 2% 10% 19% 32% 31% 6%

g. Video Tape(s) on partnering:

O 1 O 2 O 3 O 4 O 5 O 6

Responses: 21% 19% 34% 15% 9% 2%

h. Personality Profile:

O 1 O 2 O 3 O 4 O 5 O 6

Responses: 8% 17% 29% 25% 19% 2%

i. Issue Resolution:

O 1 O 2 O 3 O 4 O 5 O 6

Responses: 2% 6% 8% 29% 32% 23%

j. Setting up Evaluation System:

O 1 O 2 O 3 O 4 O 5 O 6

Responses: 4% 5% 20% 25% 33% 13%

k. Getting to Know Project Team in a Relaxed Environment:

O 1 O 2 O 3 O 4 O 5 O 6

Responses: 3% 0% 6% 33% 26% 24%

4. Which of the following partnering tools have you used in partnered projects?

1. Never 2. Occasionally 3. Some of the time 4. All of the time

a. Mission statement with measurable goals and objectives

O 1 O 2 O 3 O 4

Responses: 12% 22% 25% 41%

b. Personality profiles

O 1 O 2 O 3 O 4

Responses: 25% 22% 38% 15%

c. Conflict resolution/issue escalation (agreeing to disagree and escalate)

O 1 O 2 O 3 O 4

Responses: 10% 7% 28% 55%

d. Problem solving

O 1 O 2 O 3 O 4

Responses: 3% 10% 39% 48%

e. Evaluating or monitoring system (periodic report cards)

1  2  3  4

Responses: 26% 27% 27% 20%

5. If you have not used the partnering tools, please indicate the reason(s)

Not enough time

Responses: 32%

Disinterest among team members

Responses: 52%

Too complicated

Responses: 3%

Too much paper work involved

Responses: 10%

Forgot to use them

Responses: 3%

Other: please specify \_\_\_\_\_

Responses: 0%

6. How do you think partnering has affected your job relationships? (please only answer those questions that apply)

1. Much Worse 2. Somewhat Worse 3. No Change 4. Somewhat Better 5. Much Better

a. Relationship with

(1) TxDOT

1  2  3  4  5

Responses: 0% 7% 26% 40% 27%

(2) Other

1  2  3  4  5

Responses: 0% 3% 33% 28% 36%

b. Relationship with Subcontractors

(1) TxDOT

1  2  3  4  5

Responses: 0% 12% 46% 27% 15%

(2) Other

1  2  3  4  5

Responses: 3% 8% 44% 19% 26%

c. Relationship with Architects

(1) TxDOT

1  2  3  4  5

Responses: 0% 21% 45% 27% 7%

(2) Other



10. Did you find the close-out partnering workshop(s) beneficial?

	Not Beneficial			Extremely Beneficial		
	1	2	3	4	5	6
TxDOT						
	O 1	O 2	O 3	O 4	O 5	O 6
Responses:	17%	22%	17%	17%	27%	0%
Other						
Responses:	22%	22%	52%	0%	0%	0%

11. Who should attend partnering workshops: (Check as many as apply for the initial partnering workshops)

Responses reflect percentages and do not sum to 100%.

- FHWA: 22%
- Inspector: 93%
- Foreman: 85%
- Material Suppliers: 30%
- Local Public officials: 28%
- Project Manager (TxDOT, Contractor): 100%
- CEO/Upper Management of Contractor: 64%
- TxDOT Division Support: 44%  
i.e. Mat. & Tests, C&M, Design
- District Construction Engineer: 57%
- Construction Records Keeper: 43%
- Other (please specify): \_\_\_\_\_
- Area Engineer: 92%
- Superintendent: 95%
- Estimators: 33%
- Utilities: 43%
- Continuous Improvement Office Personnel: 8%
- District Engineer: 31%
- Subcontractors: 80%
- Executive Director: 3%
- Designer of Plans: 38%
- City Entities: 33%
- DPS: 20%

12. An *informal* partnering project is defined as one in which a non-facilitated meeting between Owner and contractor representatives occurs. What criteria do you recommend for warranting the use of an informal partnered project instead of a formal partnered project? (For blank spaces provide your estimate)

Responses depicted as a percentage of total respondents that answered this to this question:

- Contract values less than \$500,000 (modal value: 27%) dollars
- Previous partnering experience of owner personnel: 100%
- Previous experience of contractor: 73%
- Previous experience of both owner and contractor personnel: 100%
- Project period less than 26 Weeks (modal value: 21%) weeks
- Urban project: 27%
- Rural project: 53%

13. In your experience with partnered projects, which of the objective criteria below represents the best measurable yardsticks in which to access the benefits of partnering? You may mark as many as you feel are germane. If you mark more than one, please rank order your responses 1,2,3,... with "1" being the best choice and so on.

	RANK ORDER
<input type="checkbox"/> Value engineering dollars generated	___ 6 ___
<input type="checkbox"/> Cost growth due to change orders	___ 6 ___
<input type="checkbox"/> Number of change orders	___ 6 ___
<input type="checkbox"/> Time extensions due to change orders	___ 5 ___
<input type="checkbox"/> Liquidated Damage Costs	___ 3 ___
<input type="checkbox"/> Number of claims	___ 2 ___
<input type="checkbox"/> Claims cost	___ 4 ___
<input type="checkbox"/> Users' cost of construction	___ 5 ___

- Administrative costs 4
- Time to resolve escalated issues 1

14. Please rank order the subjective partnering measurements using 1,2,3 and so on with 1 being the most important benefit of partnering.

- |   | RANK ORDER |
|---|------------|
| <input type="radio"/> Better communication    | 1          |
| <input type="radio"/> Increased trust         | 4          |
| <input type="radio"/> TxDOT satisfaction      | 5          |
| <input type="radio"/> Contractor satisfaction | 6          |
| <input type="radio"/> Better teamwork         | 2          |
| <input type="radio"/> Stronger Relationships  | 3          |
| <input type="radio"/> Public satisfaction     | 5          |

15. In my experience with partnered projects, the project team developed a process for resolving disagreements.

	<input type="radio"/> Never	<input type="radio"/> Some times	<input type="radio"/> Most times	<input type="radio"/> Always
Response:	2%	8%	55%	35%

16. In my experience with partnered projects, the project team felt that is was empowered to make the decisions it needed to make to complete the project.

	<input type="radio"/> Never	<input type="radio"/> Some times	<input type="radio"/> Most times	<input type="radio"/> Always
Response:	3%	18%	64%	15%

17. Overall, I believe that the TxDOT partner program as it affects TxDOT, the contractors, and the general public has been

	Not Beneficial			Extremely Beneficial		
	<input type="radio"/> 1	<input type="radio"/> 2	<input type="radio"/> 3	<input type="radio"/> 4	<input type="radio"/> 5	<input type="radio"/> 6
Responses:	7%	5%	22%	27%	25%	14%

18. Overall, I believe that partnered projects improve quality.

	<input type="radio"/> Agree	<input type="radio"/> Disagree
Response:	82%	18%

19. Overall, I believe that partnered projects result in better safety and health for project personnel.

	<input type="radio"/> Agree	<input type="radio"/> Disagree
Response:	81%	19%

20. When did your company partner its first project? \_\_\_\_\_ Month \_\_\_\_\_ Year

Response: 20% (modal value) started partnering in 1994
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21. What is your company's total partnered projects for 1996?

a. TxDOT Response: Average - 2.0
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**b. Other Response: Average - 1.7**

22. What is your company's estimated yearly average claims expense for

**a. Partnered projects Response: (only 13% of respondents reported): Average \$130,500**

**b. Non-partnered projects Response: (only 11% of respondents reported): Average \$23,285**

23. Based on your experience, does partnering a contract reduce the potential for claims?

	O Yes	O No	O Not Sure
Response:	56%	18%	26%

24. Any other comments

**Responses**

Extremely beneficial for 1st project with an engineer or complicated projects. Repetitive when it is the same contractor and engineers

Good idea. Need to shorten the program. Only do the really important things. Make it more relaxed and a chance to meet each other.

We have effectively completed projects and enjoyed great relationships with owner, architects, and engineers over the past 20 years. IMHO, Partnering is a way to create jobs for people who can't get them, create jobs for academia to run studies in order to justify more studies and create additional funding justification for TxDOT. It is a complete waste of money.

I feel that "mandatory partnering" is a contradiction in terms. It is silly that the state has forced all jobs to be partnered due to pressure from the "partnering lobby". My recent experience with the informal partnering has proven to be more time /cost effective than the formal partnering.

Some area engineers do not support partnering. Some Tx Dot employees at the project level think that partnering is a give away by TxDOT. Our company has had so called partnered projects where project inspector stated in meeting he did not believe in partnering in the presence of A.E. and Dist Eng. The further you get from Austin the less TxDOT employees believe in partnership.

The major problem now is that everyone is partnered "out". It takes something different to get everyone's minds of their work enough for the partnering to sink in.

Much of the basis for partnering is good. This new informal spec is better. Get rid of the touchy-filly stuff and get down to business more. Most contractors can't afford to spend the time for the people that need to be at these sessions. So, instead of foreman, supt's and inspectors, you end up with CEO's, Estimators, Area Engineers, Etc. Cut the time down and get the field people into the sessions.

Purpose of partnering not claims related, the purpose for partnering is to get two assholes - one on each side to take a lousy set of plans and build a job. Partnering should take place during design if we must have substandard plans.

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The long time reputable firms should be treated as such by the highway department and we wouldn't need partnering

A key to partnering is to support the partnering process with enhanced efforts to keep the process alive

Partnering is a great concept that seems to lose its effectiveness after the first or second disagreement or problem. The follow up partnering at 40% would be extremely beneficial. Our experience with partnering have helped us to get to know the players but hasn't dramatically changed our working experience with the field.

Mandate it. DBE's under General Contractor special session for them-keep all honest

Partnered projects only work if the "leadership" of parties involved already have a culture that is conservative and supportive, otherwise it is only up service and a wasted exercise

In my opinion on the smaller projects my company has done the same goals & needs are accomplished with the pre-construction meetings that are held before beginning a project. However my experience with large contracts as a sub-contractor the partnering that was discussed was a big joke. Nothing went as it should have and no partnering efforts were made by contractors.

By the time large projects are completed most personnel have changed jobs and very few of the people that attend the original session were around. Everyone that attended never used any of the information we took back to the project to resolve any issue but the concept of partnering was used and the issues were resolved.

With TxDOT in our district partnering has very little meaning except in word only- the concept is there-TxDOT wants to do it- but when the time comes TxDOT sacrifices everything to the GOD OF TOTAL CONTROL. They simply will not allow the contractor to build the job without doing everything their way. Good ideas- just won't work in the current atmosphere.

**This completes the questionnaire. TxDOT and the Research Team at Texas Tech University sincerely appreciate you taking time from your very busy work schedule to provide this vital input. Please return the questionnaire in the provided franked envelop. Again, your questionnaire will be treated confidentially.**

