

Preferences for Specific Project Delivery Systems Utilized by Texas Public Universities

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This paper describes the preferences of specific project delivery systems utilized by Texas public universities. Texas Senate Bill No. 1, passed by the 74th Legislature, and successor legislation provided governmental entities such as cities, counties and river authorities with the ability to choose between seven different project delivery systems for facility construction. The bill was passed in order to permit the governmental entities to choose a delivery system which provided the best value. Governmental entities must regularly explore the benefits as well as the weaknesses of each project delivery system with the intention of determining the best overall method for that entity. The objective of this research was to determine which delivery methods Texas public universities prefer based on a variety of variables and to analyze the trends over time of the selection of project delivery systems. Schools analyzed in this research are within the Texas A&M University System, the University of Texas System, the Texas State University System, the Midwestern State University System, and the University of Houston System. Analysis from the data collected revealed Construction Management at Risk has recently become the most frequently utilized project delivery system by Texas Public universities.

Keywords: Project Delivery System, Public University System, Construction Management at Risk, Texas Senate Bill No. 1

Introduction

Each project in the construction industry presents new challenges, opportunities and risks for owners, designers and constructors. A key element to the construction process is the delivery system utilized, primarily because it is a complex process of assigning the contractual responsibilities on a construction project (Associated General Contractors of America, 2004). In 1995, the Texas Legislature passed Senate Bill No. 1 (SB 1) enabling selected governmental entities to use of a variety of procurement processes. Two years later changes were made to the provisions of SB1 with the passage of Senate Bill 583 (SB 583). SB 583 allowed most governmental entities to utilize seven different project delivery methods. These governmental entities include public universities in the State of Texas. The seven project delivery methods are:

- Competitive Bidding,
- Competitive Sealed Proposals,
- Construction Management, Agency (CMA),
- Construction Management at Risk (CMR),
- Design-Build,
- Design-Build, Bridging,
- Job Order Contracting.

Texas public universities are continually seeking to find the best delivery system for each type of project encountered. The reason for selecting certain project delivery methods can be influenced by a variety of factors that need to be analyzed in order to better prepare university systems for future building projects. The purpose of this study was to identify and analyze the trends in project delivery systems used by Texas public universities in the last 10 years for projects that cost more than \$5 million and to examine how owner variables affect project delivery method selection.

Significance of Study

This study sought to provide accurate, up to date analyses of project delivery systems used by Texas public universities. Data was obtained and examined from 238 projects valued at \$5.149 billion. Research findings should benefit constructors who are interested in competing for state funded construction projects, as well as provide information for university systems as they add new facilities to their campuses in the near future. This report informs the construction industry as to what project delivery systems are being utilized by public universities, the reason why specific delivery methods are chosen and the trends in project delivery systems.

Review of Literature

Before Senate Bill No. 1 was passed, Texas public universities used Competitive Bidding as the primary project delivery method. This system, known as the “traditional” method, has drawbacks associated with it and is not necessarily the optimum method of selecting a contractor to perform all classes of construction work (Clough & Sears, 2005). One negative aspect about Competitive Bidding is that a contractor can take full advantage of any missing items within the construction documents to get the lowest bid. This process tends to move the bidding results away from the optimal results by turning the process into a negative or zero sum game in which the contractor can only improve his position at the expense of the owner or other bidders (Bezelga & Brandon, 1991). The competitive bidding system does not allow the flexibility and constructive effects which other delivery systems allow. Consequently, the passing of Senate Bill 583 allowed governmental entities the freedom to utilize any one of seven alternative delivery methods set forth by the state.

Konchar and Sanvido (1998) conducted a study in which Construction Management at Risk, Design-Build, and Competitive Bidding delivery methods were compared. They examined the delivery systems of 351 U.S. building projects where schedule, cost, and quality performance were analyzed and evaluated. The research established that administering a Design-Build project delivery system would achieve significantly improved cost and schedule advantages. Also, research concluded that Design-Build projects produce equal and sometimes more desirable quality performance than Construction Management at Risk and Competitive Bidding projects. The research concluded that Design-Build on average was the optimum project delivery system.

In a study by Col Debella and Ries (2006), delivery systems utilized in northeastern United States school districts were compared. The school districts targeted for this study were located within five states: Pennsylvania, Ohio, New Jersey, Massachusetts, and Virginia. The objective of the study was based on a statistical analysis of quantitative and qualitative metrics. The quantitative variables were related to cost, schedule, and litigation and the qualitative variables were related to the punch list, startup, call backs, administrative burden, team communication, team chemistry and project complexity. The research demonstrated that using Multiple Prime contracts with a CMA delivery system constructed more area per day than the sole utilization of a Multiple Prime delivery system. Also, the research showed that Multiple Prime with an Agent delivery system had a higher percentage of change orders than a multiple prime delivery system. However, every other parameter, qualitative or quantitative, did not find any significant differences among the project delivery systems.

Kesaria (2005) sought to identify the most preferred project delivery systems used by the five metropolitan cities of Texas and why they are preferred. In this study an email survey was conducted with the public works departments involved with facilities construction in the cities of Austin, Dallas, Fort Worth, Houston, and San Antonio. The survey instrument was broken down into an eleven part questionnaire in which seven of the eleven questions were open ended to facilitate conversation about the different delivery systems. The research established that from 2003 through 2004, those cities had completed or were in progress of completing 95 facility projects with approximately \$490 million in project costs. This research also determined a preference of alternative delivery methods. It revealed that the method chosen most frequently was the Competitive Sealed Proposal method followed closely by design-build and construction management at risk and the lowest ranking

delivery method was construction management agency. The research determined that “Best Value” allows the owner to award the contract to the best qualified and lowest cost contractor, rather than the contractor with the lowest cost. The concept of “Best Value” is important in avoiding forced utilization of construction firms lacking experience and financial resources to complete projects in an expeditious, quality manner.

Methodology

This study analyzed project delivery systems utilized by different public universities in the state of Texas. Several steps were required in order to gather the information needed for this research. First, a list of all 45 Texas public universities was compiled. Next, a list of contacts was created for representatives who could provide accurate responses on behalf of each university system. The list of contacts received was provided by a Mr. Theo Rouse, then area manager for the Texas A&M University System Office of Facilities Planning and Construction. In a meeting with Mr. Rouse, a proposed method of research was discussed to determine attainable data. He also provided preliminary information from the TAMU system. After this meeting, a survey consisting of three separate components entitled Part A, Part B and Part C was finalized. The purpose of Part A of the survey was to establish the importance of different owner variables in project delivery system selection. Part B was created to indicate a preferred delivery system based on a set of owner variables. Part C was developed to gather specific information on current and past construction projects by the university to create a listing of projects that have occurred within the last 10 years with specific information such as cost, date of the project, project location, and the delivery method used. Examples of the survey instruments for Parts A, B, and C are illustrated in appendices A, B, and C.

In order to implement the survey, phone calls were made to establish a relationship with representatives and to obtain their email addresses. Emails providing information on the purpose of the research with an attached survey instrument were then sent to the established contacts. Ideally the best way to gather the required information is through face-to-face contact with the appropriate representative, however, the extensive distance between universities created problems in arranging such meetings. The response rate was poor, therefore follow up emails were sent. The responding university systems were Texas A&M University System, University of Texas System, Texas State University System, Midwestern State University System, and the University of Houston System.

The final step of the study consisted of analyzing the survey data and deriving conclusions once the surveys were filled out and returned. Some university systems have one university within their system while others may have nine or ten universities within their systems. Therefore, in order to calculate the response rate, responses from individual universities were used rather than responses from university systems as a whole. Of the 45 public universities listed, 35 responded to the survey. This created a response rate of 78% which suggests that there is sufficient information to draw conclusions from.

Results

Part A was an effective tool in establishing the importance in delivery system selection of owner variables for each of the responding universities. Each school had different policies and procedures on selection of delivery systems, making it difficult to create a qualitative analysis from the findings. Data from the survey revealed certain variables were utilized more often than others, which can be an indicator of its importance in the delivery system selection process. Owner variables included schedule, such as a critical delivery date and a tight schedule, which was selected as most important by three of the four university systems. Another variable selected as being most important by the majority of the responding university systems was the need to know the project cost early. From this data it was evident that schedule and cost were important variables in the selection process. Having a well defined scope and a sufficient staff for design were the least important factors for delivery system selection as they were ranked the lowest by three of the four universities.

Based on the results from Part B of the survey a few conclusions can be drawn. Every university system ranked the DBB delivery system as the least preferred delivery system. Results also infers that the Design-Build,

Bridging delivery method is seldom utilized. The delivery method most preferred was Construction Management at Risk. Based on the given set of owner variables, Construction Management at Risk (CMR) was ranked the highest by all the university systems, especially when dealing with cost, best value, and schedule. Following CMR, the most selected methods are Competitive Sealed Proposals and Design Build. Competitive Sealed Proposals were preferred due to selection flexibility. Design-Build was preferred when a project had a tight schedule or when there was a critical delivery date.

Data collected from 238 Texas public university projects, valued at \$5.149 billion dollars, revealed that most university systems have moved towards a Construction Manager at Risk delivery method. At Texas A&M there has been a change in management within the last few years which may explain the shift to Construction Management at Risk. The Board of Regents of the Texas State University System have recently encouraged the Construction Management at Risk delivery method be considered as the default method of delivery for most projects in excess of \$5 million total project cost (Graves, 2008). The Midwestern State University System indicated that they preferred CMR due to the fact that they are able to see more of the process and feel that they will be getting the best value for the State's dollars. Another interesting analysis of Part C reveals that the Design Build method was utilized in specific areas for the University of Texas System (UTS) and the Texas A&M University System (TAMUS). The UTS consistently uses Design Build for medical related projects and TAMUS generally uses Design Build for housing projects. In order to display the findings of this research, two graphic representations were compiled in Figure 1 and 2. These graphs use summary data from all universities which provided project information.

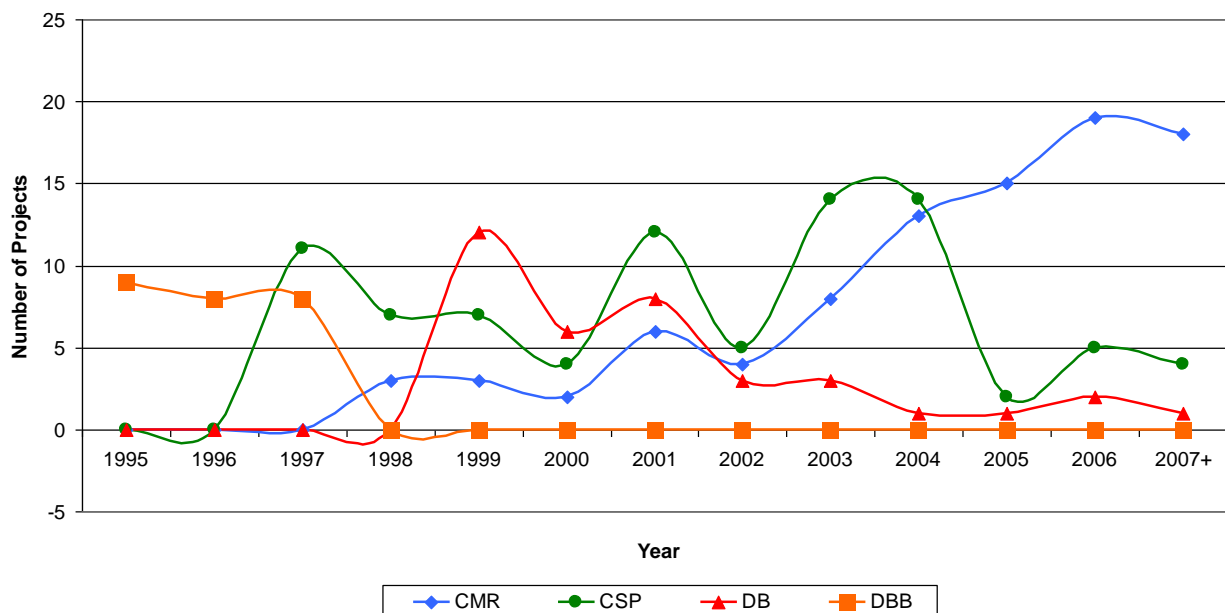


Figure 1: Project Delivery Methods Utilized Through Time (1995-2007)

The graph in Figure 1 depicts the usage of four project delivery methods by Texas public universities from 1995 through 2007. The data used in this figure was collected from 238 projects valued over 5 million dollars each. Design Bid Build is shown to be used in the beginning but has not been used since 1997 following the enactment of Texas Senate Bills 1 and 583. Usage of Competitive Sealed Proposals accelerated in 1997 and has been cyclical through 2006. The popularity of Design Build reached a peak in 1999 but has since declined in usage. Construction Management at Risk slowly increased from 1997 to 2002 and has increased substantially since 2002.

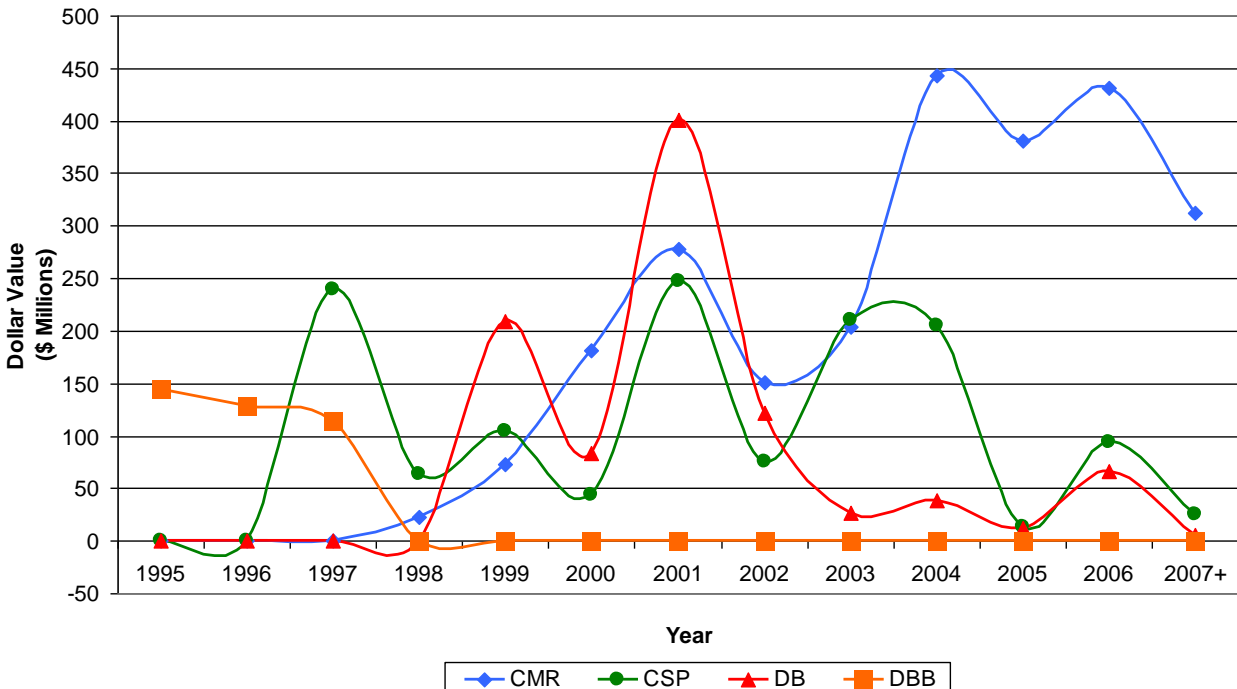


Figure 2: Dollar Value of Projects per Year Over Time (1995-2007)

Mirroring the results in Figure 1, the graph in figure 2 represents the dollar value of projects for each year, from 1995 through 2007, based on the delivery method utilized. The total dollar value of these projects was \$5.149 billion. Design-Bid-Build was the prime delivery method but quickly gave way to Competitive Sealed Proposals in 1997; Competitive Sealed Proposals have been cyclical since 1997. Design Build became widely utilized in 1998, declined shortly after, and then peaked in dollar value in 2001.

Discussion

The purpose of this study was to identify and analyze the trends of project delivery systems used by Texas public universities within the last 10 years for projects that cost more than \$5 million. This study examined a variety of Texas public university systems. The responding university systems were Texas A&M University System, University of Texas System, Texas State University System, Midwestern State University System and the University of Houston System.

Results from Survey Part A reveal there were important variables which directly impacted the selection of a delivery method. They included: Tight schedule, critical delivery date, and the need to know the project cost early. The least important variables impacting the importance of the selection of a delivery method were: Sufficient staff for design and a well defined scope.

Information collected from Survey Part B showed that the preferred delivery method based on a given set of owner variables was Construction Management at Risk. CMR was consistently given a high ranking from all university systems. The least preferred delivery method was Design Bid Build. In Part B of the Survey, DBB received the lowest ranking for every aspect of the owner variables.

Based on the information received from Part C of the survey, conclusions could be drawn based on the trend over time as well as which of the seven specified delivery methods was most widely utilized. From the records at Texas

A&M University System, a trend from Competitive Bid to Competitive Sealed Proposals then to Construction Management at Risk could be seen. TAMUS also utilized Design Build, but primarily for construction projects related to student housing. The University of Texas System initially used DBB, then transitioned to a CSP method, then to a CMR method, and for the last seven years has used both CSP and CMR equally. Also, UTS utilized a Design Build method for medical related projects. At Midwestern State University there appeared to be two choices for projects, CMR and CSP, but this information was limited compared to the other university data. Texas State University utilized CMR on all projects but one within the last two years and indicated that their Board of Regents preferred the CMR method. The University of Houston System primarily utilized a CMR method on the majority of their projects. The analysis of the Survey data demonstrates the most widely utilized delivery method is Construction Management at Risk. Based on the owner variables given in the survey, CMR is a growing trend and provides a good outcome for Texas public university systems. With the listing of projects in Part C of the survey, it is easy to determine the trend over time of delivery methods. Every university system began utilizing a DBB method and transitioned into a CMR delivery method. Currently, CMR is the project delivery system of choice for Texas public universities for projects that cost more than \$5 million.

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Appendix A

Survey Instrument Part A– Project Delivery Decision Variables

PROJECT DELIVERY DECISION VARIABLES

The purpose of this survey is to establish the importance of different owner variables in project delivery system selection. In the following survey, you are asked to circle the importance of the variables described on the left-hand side. Please use the key below in order to rank the degree of importance for the owner variables.

Owner Variables	Importance in Delivery System Selection		
SCHEDULE			
Tight Schedule	1	2	3
No Schedule Sensitivity	1	2	3
Critical Delivery Date	1	2	3
COST			
Very Tight Budget	1	2	3
Flexible Budget	1	2	3
Need to Know Project Cost Early	1	2	3
STAFF			
Sufficient Staff for Design	1	2	3
Limited Staff for Design	1	2	3
Sufficient Construction Mgmt.	1	2	3
Limited Construction Mgmt.	1	2	3
BEST VALUE			
Desire for the Best Value Selection	1	2	3
Desire for Higher Quality	1	2	3
Selection Flexibility	1	2	3
PROJECT SCOPE			
Well Defined Project Scope	1	2	3
Poorly Defined Project Scope	1	2	3

Please circle the value that best describes the overall importance.

- 1 - Extremely Important
- 2 - Somewhat Important
- 3 - Not Important

Comment: (Please include other variables in which may influence owner selection of projected delivery systems.)

Appendix B
Survey Instrument Part B– Project Delivery Decision Variables

