# A STUDY ON TASK MANAGEMENT OF THE PROJECTS IN CONSTRUCTION INDUSTRY

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**ABSTRACT:**
There are a lot of activities that depend on each other and go together in construction projects. The fast changing environments of the present era impose numerous financial, legal, ethical, environmental and logistic constraints. They have technical, economic, and social interactions with the environment and with other systems, structures, and organisations. These projects use a lot of materials. But they have problems, uncertainties, and risks built into them.

Construction Project is a term for something that has a lot riding on it and needs to be done by a certain date. No activity can be done on a set schedule unless the right resources are planned and bought ahead of time. Project managers have to make hard decisions under different scheduling needs (like smooth resource utilisation profiles and resource constraints) and in uncertain situations that sometimes last longer than the length of a task. This study looks at how to schedule resources for a fast-track project with limited time.

There have been two parts to the study. In the first phase, a project schedule for building a commercial building was put together with the help of the PRIMAVERA software. Then, the activities were given the resources they needed based on the Standard Schedule Rates (CPWD). The needed information has been gathered from the detailed drawings and the current state of the site. In the second phase, a Resource Constrained Analysis was done for each activity by decreasing the number of resources as the time took longer. This was done to study the time-cost implications.

## I. INTRODUCTION

Knowledge of the construction period is relevant to many project planning tasks prior to detailed design development. Financing, financing and resource allocation decisions take place early in project design development and are strongly influenced by the construction period. Currently, there is a lack of understanding on project factors that have a statistically significant relationship with highway construction duration. Other industry sectors have successfully used statistical regression analysis to identify and model project parameters related to the construction period. Although the need for such work appears in highway construction, there are very few studies that attempt to determine the time-dominant parameters and their relationship with highway construction time. This research identifies project factors known at the beginning of design development that affect road construction duration. The factors identified are specific to the project type and exhibit a statistically significant relationship with the construction period. This work also determines the relationship between duration-affecting factors and the duration of highway construction. The sum, magnitude and sign of the factor coefficient provide evidence about the importance of the project construction factor to road construction. Finally, the research involves mathematical models relating time-effective project factors and highway construction periods to assist in estimating construction periods. Complete and condensed models are displayed for the full-depth section and Highway Improvement project types. This research uses statistical regression analysis to identify, calculate, and model these early, time-dominated project factors.

**OBJECTIVES OF RESEARCH**

The main objective of the study was to increase manufacturing efficiency by improving specifications. To achieve this, the following tasks have been identified:

(1) Determine specific problems with specification items and classify them into appropriate problem types.

(2) Determine the most important problem types of specification elements with the use of cross classification tables.

(3) Propose problems Specify recommendations to resolve each issue in the mformauon base (SPIB).

(4) Determine the structural factors responsible for each problematic specification item in the SPIB.

(5) Recommend critiques to improve the process of rewriting and updating the specification.

By achieving this goal, less problems can be expected in the future and problems that occur can be solved in an efficient and productive manner.

## II. LITERATURE REVIEW

A descriptive specification is a detailed written description of the required properties of a product, material, or piece of equipment, and the workmanship required for its proper installation (CSI 1985). Descriptive specifications describe how the end result is to be accomplished. The burden of performance is assumed by the specifier when this type of specification is used. As projects become more complex, the descriptive specification is being used less because the writing process becomes very lengthy and tedious (CSI 1985). A descriptive specification is essentially a recipe for completing a project.

A performance specification states the required results with criteria for verifying compliance but without unnecessary limitations on the methods for achieving the required results (CSI 1985). This type of specification gives a contractor the initiative for selecting methods to accomplish the desired result (ASCE 1988). "Under a pure performance specification, the contractor accepts responsibility for design, engineering, and performance requirements, with general discretion as to how to accomplish the goal" (Sweet 1985). A performance specification is used mostly on large-scale industrial projects or in specialized work (Sweet 1985). The performance specification places a burden on the contractor requiring him to be a specialist, but it gives him the freedom to determine how he will complete a project to accomplish the prescribed goal. To phrase it simply, a performance specification describes the end result.

A proprietary specification identifies the desired products by manufacturer's name, brand name, type designation, model number, or other unique characteristics. Also, a specification is considered proprietary when the specified product is available from only one source, even if a manufacturer's name is not stated (CSI 1985). The proprietary specification usually increases the contract cost because it limits the contractor's ability to use material or equipment that may be just as good as the ones specified and cost less (Sweet 1985). The other disadvantages of these specifications are: Elimination of competition.

- Requiring products with which the contractor may have had little or bad experience.
- Favoring certain products and manufacturers over others.

However, several advantages are offered by using proprietary specifications. They are (CSI 1985): - Close control of product selection.

Preparation of more detailed and complete drawings based on precise information obtained from manufacturer's data.

Decreases the overall length of the specification and reduces production time.

Heuristic methods are noncomputer methods that require less computational effort than mathematical methods. Examples of heuristic methods include Fondahl's method (FondahI1961), Prager's structural model (Prager 1963), Siemens's effective-cost slope model (Siemens 1971), and Moselhi's structural stiffness method (Moselhi 1993). These heuristic methods provide a way to obtain good solutions but do not guarantee optimal solutions. In addition, the solutions offered by heuristic methods do not provide the range of possible solutions. The simulation approach for optimization project cost and schedule was one of a variety of tools that could use to bring projects back under control and reinforce the use of project management in organizations. The use of simulation to crash project management networks in order to reduce time and cost overruns was a worth endeavor. The optimization of time and cost process technique could be incorporated as a standard procedure for every project was concluded, the time spent on the actual crashing was minimal and the project management schedule could be reduced to a minimum optimum level to save time and money. Judging from the state of research, there is a need to develop a more efficient and accurate method to solve the time-cost optimization problems for construction planning. The following sections describe a new approach to solving construction time-cost optimization problems that provides an efficient means of finding optimal strategies for construction time-cost decisions.

The literature review conftrmed that constructability needs to be considered in all aspects of design, procurement, and construction. It is apparent that constructability is especially important in the writing of specifications since specifications are intimately concerned with design, procurement, and construction. With the establishment of a good constructability program, the specification writing process can be greatly facilitated. Also, by considering constructability, better, more coherent specifications can be written, thus providing better quality and cost efficiency for the end product.

## III. METHODOLOGY

Data analysis is a very critical part of any research study. Collected data have to be presented in an organized format so that they can be interpreted and understood. Once the organized format has been achieved, the data can be analyzed to satisfy the purposes of the research study. This particular research study had several purposes of data analysis.

One purpose of data analysis was to determine the primary potential causal constructability factors for the problem specification Items that were established. For each specification Item that is contained in SPIB, potential causal constructability factors were listed to determine potential causal relationships between problems and related attributes. This information was tabulated to determine the primary factors and where the emphasis should be placed in correcting the problems. Other reasons for analysis included the determination of the major problem types associated with specifications and the determination of the most problematic element~ of highway construction, as well as their frequency of occurrencewith problem specification Items. The problem types were established from the questionnaires given to the members of the steering committee. From the analysis performed, the problem types causing the greatest impact could be determined and studied. Likewise, the elements of highway construction causing the most problems could be identified from the data analysis. The data analysis also allowed the observation of the frequency of occurrence of different problem types with the related elements of highway construction. This identification allows for future effort to be concentrated in those areas of construction with the most problems.

Another purpose of the data analysis was to determine why the problems occur and how they could be solved. This was the most difficult part of the analysis, and it required the most effort and thought. Once this effort was solved, the main objective of the research was complete. After all problems had been critiqued in terms of constructability, the analysis would form the basis of reviewing the standard specification specifically from the constructability enhancement point of view.

METHODS OF DATA ANALYSIS

Two main methods of data analysis were used to satisfy the purposes of the research study. These methods included cross classification tables and HOT diagrams. The methods are briefly discussed below and expanded on further in Chapter V.

Three cross classification tables were used to determine the important potential causal constructability factors, the important problem types, and the importantelements of highway construction. The cross classification tables displayed these factors' relative imponance to each other on a matrix type of a grid. Simply by looking at the tables it could be seen where the greatest concentration of specification Items occurs. By observing the grid nodes with the greatest concentration, the factors requiring the most emphasis for study could be noted. After the critical factors had been determined, the areas with the greatest amount of problems were looked at ftrst to quickly reduce the vast amount of problematic issues.

The other method of data analysis that was used was a HOT diagram. A HOT diagram is a Hierarchy of Objectives Technique which was used to investigate the concern of constructability associated with specification Items (Fisher 1989). The logic used in a HOT diagram is that the question "how?" is asked as one moves from left to right through the diagram, and the question "why?" is asked as one moves from right to left through the diagram. This technique helped to determine why problems occur with the specifications and how the problems can be solved. Thus, the methods used for data analysis proved to be very effective at discovering what specification improvements are needed and how they can be made so constructability can be enhanced.

## IV. RESULTS AND DISCUSSIONS

The problem types, problem specification Items, and apparent causal constructability factors were presented in an organized format in the SPIB. This database was designed to enable an analysis to be carried out in order to determine the extent of the problem and formulate proposals for dealing with it. This relates problem types to Items.

Specification Items apparently impeding constructability were organized into a database, referred to as SPIB, to facilitate the process of analyzing the information. In compiting SPIB the information was initially structured with reference to five problem types viz. information deficiencies, communication deficiencies, unrealistic tolerances/ requirements, gold-plated designs, specifications, etc, and unsatisfactory methods of payment An analysis was done to determine how improvements could be made to the specifications to enhance constructability. Two primary methods were used for analysis. These were respectively, cross classification tables and a HOT diagram. These methods allowed for the identification of problems as well as their respective causes.

To facilitate the analysis of the problem types with respect to constructability,

The cross classification tables were structured under four main headings. These were:

- communications deficiencies
- Information deficiencies
- Functional exorbitance
- Practicality limitations.

The comments contained in the text in SPIB were also reviewed to establish findings not addressed by the cross classification tables or the HOT diagram.

**CROSS CLASSIFICATION- PRIMARY & SECONDARY FACTORS RELATED TO PROBLEM TYPES**

| Problem Types | Earthworks | Pavement | Drainage | Bridges/ Structures | Other | Subtotal ( |
|---|---|---|---|---|---|---|
| ***Communication Deficiency:*** Inconsistent Interpretation | 2.3 | 2.2, 2.4, 2.5 | | 2.6 | 2.1 | |
| ***Information Deficiency:*** | | | | | | |
| Irrelevancy/ Non-currentness | 1.8, 1.9* 1.14, 1.16 | 1.8, 1.9 1.10, 1.13 1.16 | | 1.12 | | 10 15.6% |
| Lack of Definitiveness | | 1.2, 1.3, 1.4 1.5, 1.6, 1.7 | 5.5 | 1.11 | 5.2, 5.3 | 10 15.6% |
| Inconsistency | | 1.1, 1.15 3.13 | | 3.9, 3.14 | | 5 7.8% |
| ***Functional Exorbitance:*** Gold Plating | 4.10 | 4.1, 4.2, 4.10 4.11, 4.12 4.14 | | 4.3, 4.4, 4.5 4.6, 4.7, 4.11 4.13 | 4.9, 4.15 | |
| ***Practicality Limitations:*** | | | | | | |
| Unrealistic Tolerances/ Impractical Requirements | 3.5, 3.7, 3.8 | 3.1, 3.2, 3.4 3.6, 3.7 3.10, 3.11 | | 3.3,3.6 3.12 | | 13 20.3% |
| Inflexibility | | | | 4.8 | | 1 1.6% |
| Impractical Measurement/ Payment Methods | | 5.6 | 5.1, 5.4 | | | 3 4.7% |
| Total | 9 | 31 | 3 | 16 | 5 | |
| % | 14.1% | 48.4% | 4.7% | 25.0% | 7.8% | |

* Note: Items may relate to more than one element

**TABLE 1: CROSS CLASSIFICATION (ELEMENTS RELATED TO PROBLEM TYPES)**

| APPARENT CASUAL FACTORS* | EARTHWORKS | PAVEMENTS | DRAINAGE | BRIDGES/ STRUCTURES | OTHER | TOTAL NO. ITEMS | % PERCENT |
|---|---|---|---|---|---|---|---|
| ***PROJECT SCOPING:*** (A2) FACILITY CHARACTERISTICS | 3.5, 3.7** | 3.2, 3.4, 3.6 3.7, 3.10, 3.11 4.1, 4.12, 4.2 | | 3.3, 3.12, 3.6 4.3, 4.5, 4.6 | 4.15, 4.9 | 19 | |
| ***RESOURCES:*** (B2) MATERIALS | | 4.11 | | 4.11, 4.13, 4.4 | | 4 | |
| ***PROCESSES:*** (E3)CONSTRUCTION | 3.8, 4.10 | 3.1, 4.10, 4.14 | | 4.7,4.8 | | 7 | |
| ***CONTROLS:*** (D2) COST & FINANCIAL CONTROL | | 5.6 | 5.1, 5.4 | | | 3 | |
| ***INFORMATION & COMMUNICATION:*** | | | | | | | |
| ***DOCUMENTATION:*** (E6)RELEVANCY/ CURRENTNESS | 1.14,1.16 1.8, 1.9, | 1.8, 1.9, 1.10 1.13, 1.16 | | 1.12 | | 10 | 15.6 |
| (E4)DEFINITIVENESS/ COMPLETENESS | | 1.2, 1.3, 1.4 1.5, 1.6, 1.7 | 5.5 | 1.11 | 5.2, 5.3 | 10 | 15.6 |
| (E3)CONSISTENCY | | 1.1, 1.15, 3.13 | | 3.9, 3.14 | | 5 | 7.8 |
| ***INTERPRETATION:*** (E3)CONSISTENCY | 2.3 | 2.2, 2.4, 2.5 | | 2.6 | 2.1 | 6 | 9.4 |
| TOTAL # OF ITEMS | 9 | 31 | 3 | 16 | 5 | 64 | |
| % | 14.1 | 48.4 | 4.7 | 25 | 7.8 | 100 | |

**TABLE 2: CROSS CLASSIFICATION OF ITEMS- ELEMENTS OF HIGHWAY CONS'IRUCTION RELATED TO APPARENT CAUSAL FACTORS**

| Problem Types | Project Scoping (*) | Project Scoping (**) | Resource (*) | Resource (**) | Processes (*) | Processes (**) | Controls (*) | Controls (**) | Info./Comm. (*) | Info./Comm. (**) | Env. Systems (**) | Totals (%) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ***Communication Deficiency:*** Inconsistent Interpretation | | 4 | | 1 | | 3 | | 1 | 6 | | 2 | 17 (11%) |
| ***Information Deficiencies:*** | | | | | | | | | | | | 60 (40.6%) |
| Irrelevancy/ Non-Currentness | | 3 | | 4 | | 4 | | 2 | 7 | | 1 | 21 (13.5%) |
| Lack of Definitiveness | | 4 | | 4 | | | | 6 | 10 | | | 24 (15.5%) |
| Inconsistency | | 5 | | 2 | | 2 | | 1 | 5 | | | 15 (9.7%) |
| ***Functionality Exorbitance:*** Gold-Plating | 8 | 9 | 3 | 5 | 3 | 9 | | | | 1 | | 38 (24.5%) |
| ***Practicality Limitations:*** | | | | | | | | | | | | 40 (26.5%) |
| Unrealistic Tolerances/ Impracticle Requirements | 9 | 2 | | 4 | 2 | 8 | | 7 | | | | 30 (20.6%) |
| Inflexibility | | | | | 1 | 1 | | | | | | 2 (1.3%) |
| Impracticle Measurement/ Payment Methods | | 3 | | | | | 3 | | | | | 6 (3.9%) |
| Subtotals: | 17 | 30 | 3 | 20 | 6 | 27 | 3 | 17 | 28 | 1 | 3 | 155 |
| %, Prim. | 29.8 | | 5.3 | | 10.5 | | 5.3 | | 49.1 | | | 57 (100%) |
| Cum. Factor Total | 47 | | 23 | | 33 | | 20 | | 29 | | 3 | 155 |
| % Prim. + Sec. | 30.3 | | 14.8 | | 21.3 | | 12.9 | | 18.7 | | 2 | 100% |

**TABLE 3: CROSS CLASSIFICATION- PRIMARY & SECONDARY Factor's RELATED TO PROBLEM TYPES**

| Problem Types | Earthworks | Pavement | Drainage | Bridges/ Structures | Other | Subtotal (%) | Total |
|---|---|---|---|---|---|---|---|
| ***Communication Deficiency:*** Inconsistent Interpretation | 1 | 3 | | 1 | 1 | | 6 9.4% |
| ***Information Deficiency:*** | | | | | | | 25 39.0% |
| Irrelevancy/ Non-currentness | 4 | 5 | | 1 | | 10 15.6% | |
| Lack of Definitiveness | | 6 | 1 | 1 | 2 | 10 15.6% | |
| Inconsistency | | 3 | | 2 | | 5 7.8% | |
| ***Functional Exorbitance:*** Gold Plating | 1 | 6 | | 7 | 2 | | 16 25.0% |
| ***Practicality Limitations:*** | | | | | | | 17 26.6% |
| Unrealistic Tolerances/ Impractical Requirements | 3 | 7 | | 3 | | 13 20.3% | |
| Inflexibility | | | | 1 | | 1 1.6% | |
| Impractical Measurement/ Payment Methods | | 1 | 2 | | | 3 4.7% | |
| Total | 9 | 31 | 3 | 16 | 5 | 64 | |
| % | 14.1% | 48.4% | 4.7% | 25.0% | 7.8% | 100.0% | |

**TABLE 4: CROSS CLASSIFICATION (ELEMENTS RELATED TO PROBLEM TYPES)**

| APPARENT CASUAL FACTORS* | EARTHWORKS | PAVEMENTS | DRAINAGE | BRIDGES/ STRUCTURES | OTHER | TOTAL NO. ITEMS | % PERCENTAGE | |
|---|---|---|---|---|---|---|---|---|
| ***PROJECT SCOPING:*** (A2) FACILITY CHARACTERISTICS | 2 | 9 | | 6 | 2 | 19 | | 29.7 |
| ***RESOURCES:*** (B2) MATERIALS | | 1 | | 3 | | 4 | | 6.3 |
| ***PROCESSES:*** (E3)CONSTRUCTION | 2 | 3 | | 2 | | 7 | | 10.9 |
| ***CONTROLS:*** (D2) COST & FINANCIAL CONTROL | | 1 | 2 | | | 3 | | 4.7 |
| ***INFORMATION & COMMUNICATION:*** | | | | | | | | 48.4 |
| ***DOCUMENTATION:*** (E6)RELEVANCY/ CURRENTNESS | 4 | 5 | | 1 | | 10 | 15.6 | |
| (E4)DEFINITIVENESS/ COMPLETENESS | | 6 | 1 | 1 | 2 | 10 | 15.6 | |
| (E3)CONSISTENCY | | 3 | | 2 | | 5 | 7.8 | |
| ***INTERPRETATION:*** (E3)CONSISTENCY | 1 | 3 | | 1 | 1 | 6 | 9.4 | |
| TOTAL # OF ITEMS | 9 | 31 | 3 | 16 | 5 | 64 | | 100 |
| % | 14.1 | 48.4 | 4.7 | 25 | 7.8 | 100 | | |

**TABLE 5: CROSS CLASSIFICATION OF ITEMS- ELEMENTS OF HIGHWAY CONSTRUCTION RELATED TO APPARENT CAUSAL FACTORS**

Impractical methods of measurement and payment and communication deficiencies were found to be significantly less of a problem. The importance of documentation is evident

Table 3 gives a summary of the results of the analysis relating Elements of Highway Construction to the Apparent Primary Causal Constructability Factors. It is once again clear that two Primary Factors are causing the most problems namely information and communication (48%) and project scoping (30%).

In the case of project scoping, it is apparent that the problems primarily stem from facility characteristics which are in many instances defined or influenced by departmental policy or prescription. It would therefore be necessary to review these in order to make changes to the specification

In summary, the matters identified to be of greatest concern were:

**PROBLEM TYPES:**

*** Information deficiencies**

- Irrelevancy/non-currentness

- Lack of definitiveness

*** Practicality limitations**

*** Information and communication**

-Documentation relevancy/currentness

*** Project scoping**

- Facility characteristics

## ANALYSIS BY HIERARCHY OF OBJECTIVES TECHNIQUE (HOT DIAGRAM)

The Hierarchy of Objectives Technique (HOT) is another insightful method of analysis for exploring both high-order and low-order managerial or technical objectives (Fisher 1989). HOT diagrams offer a particularly effective way of communicating the complex and detailed hierarchy of objectives supportive of improved specifications for constructability. Figure 5.1 illustrates the logic use for the HOT diagram. It can be seen that there are a number of basic tiers. These are: objectives, constraints, tactics and solutions or stated otherwise, concern, problems, ideas and solutions. The objective (concern) is established on the left side of the diagram, and it is constrained by problems that must be solved to appease the concern. Next, the problems generate ideas which in turn generate solutions for the problems).

Diagram interpretation is thus rather simple. High order objectives are listed on the left side of the diagram and low-order objectives or tactics are listed on the right side. The technique possesses a dual system of logic. As one reads from left to right the diagrams address "how?" or the manner of achieving objectives. The "why?" or motivation for objectives or tactics is provided as one reads from right to left. HOT diagrams have proven to be a very effective device for eliciting, structuring, and communicating knowledge.

The following example will demonstrate how the logic of these diagrams works. The primary concern may be to enhance constructability through improved specifications, and a major problem with this concern is to eliminate gold-plated specifications. This problem may be addressed by using the idea of not performing excessive work for aesthetic purposes, and a specific solution may be to eliminate the painting of bridgework below the ground line. This same logic can be applied to any part of the diagram. A HOT diagram is thus an effective method for generating possible ideas and solutions for constructability concerns. Figure 5.2 shows a HOT diagram that was developed from the information contained in SPIB to show in a logical manner how constructability can be enhanced through specification improvements. The HOT diagram in effect summarizes the options which need to be considered for addressing the various problems which were identified in this study.

**TESTING OF NEW SPECIFICATIONS**

New specifications are tested when they are used on a job as special specifications or special provisions. Specifications must be thoroughly tested by being used on several jobs to see if any problems exist with them. If a specification is not thoroughly tested, it will not be placed in the new specification manual. For those specifications that have been used only once, a careful examination is required to determine why the specification was needed and if it will be needed in the future. If future use of the specification is foreseen, it will probably be included in the new specification manual.

The wording and intent of proposed new specifications are tested when the AGC, districts, and divisions review the Items before they are approved for incorporation into the specification manual.

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## V. CONCLUSION

In many nations, SMCs make up a significant In this study, the ability to enhance constuctability through improved specifications was considered. From this the following conclusions and recommendations can be made:

(1) Specification problems are common for a multitude of reasons. The structure of desirable attributes of specifications (and corresponding problem types) presented is complex, yet of great value in the insight it affords. The day-to-day professional activities of specification writers should include consideration of these attributes in a rigorous and systematic manner.

(2) Highway specifications appear particularly problematic with respect to "gold-plating," tolerances, definitiveness, and currentness. In general, facility function and significance or criticality should drive project requirements. Additional communication between designer and constructor on achievability of tolerances is needed.

(3) Pavement and bridge/structured specifications deserve particular scrutiny.

(4) Common apparent causal factors that lead to problems include information and communication (documentation) and project scoping (facility characteristics). With regard to the latter it should be noted that facility characteristics are determinants which are generally defined or influenced by the Department. These should be reviewed from time to time to ensure timely changes to specifications.

(5) It is imperative to note that overall, processes and methods and project scoping are the apparent causal factors causing the majority of problems with tolerances and gold-plating. Also "lack of definitiveness" is the major problem related to "control" as apparent causal factor. The need to reconcile these discrepancies is apparent.

(6) Good specifications must be matched with effective inspector training programs if specification interpretation and enforcement are to be successful.

(7) Specifying current or up-to-date methods for construction or testing will continue to be a challenge. Modem information systems must incorporate a capability for tracking the timeliness of such requirements.

(8) The promise of end-result/performance type specifications, for the most part, is not yet a reality. Additional research is needed in testing and inspection procedures and technologies supportive of this approach. In general, the industry is badly in need of more expedient methods for quality control testing.

(9) Periodic updating of specifications should include an aggressive plan for personal interviewing of knowledgeable parties and should address each of the desirable specification attributes in detail.

(10) Additional statistical research is needed into the causes of specification-driven project problems.

(11) Future updating of the Specification Manual can be streamlined. As changes occur and special specifications and special provisions are needed, the appropriate specification Items should be incorporated into the computer file. These should be examined and analyzed by a committee periodically and when appropriate, a new specification should be printed and implemented. The form of the manual could be a book or a loose leaf binder to save the reprinting of the entire manual. The committee should be a standing committee composed of Department personnel and contractors.

(12) Some of the issues presented in SPIB need further research by the respective Divisions of the Department in order to fully clarify the information. Likewise, more investigation of the problem types should occur in order to determine other problematic specification Items of concern. With an increase in the amount of information contained in SPIB, more conclusions may emerge which will help to enhance constructability..

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