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### SHARPENING PROJECT MANAGEMENT SKILLS for the 21st CENTURY



AIA Chicago—a professional development program sponsored in cooperation with the Department of Engineering Professional Development of the University of Wisconsin

### Chicago, Illinois • November 13, 1999

### PURPOSE

Effective and profitable project management has become an essential part of nearly every successful organization. The project manager is called upon to establish objectives, plan how these objectives are to be met, and assemble and direct the applications of available resources.

Most organizations are searching—during good times and bad—for specially trained staff to assemble and manage the production of complex programs. The knowledge and experience required to fulfill this multi-discipline responsibility are not easily acquired through formal training. Many years of in-service experience often are needed to gain the skills that the role of project manager demands.

Organized exposure to the specialist in project management shortens the time needed to learn and perform integral tasks and quickly develops the base of information necessary to accept critical responsibilities and assume the authority so essential to effective project management. This special one-day program will focus on the critical role and responsibilities for the project manager of the future.

### INSTRUCTOR

RALPH J. STEPHENSON, PE, PC, consulting engineer and specialist in building design, planning, technical simulation and project management. He gained experience with Smith, Hinchman and Grylls and later served as vice-president with Victor Gruen Associates, Benjamin Schulz & Associates, and H.F. Campbell Co. He also is a former chief project manager for Victor Gruen's Detroit office. Mr. Stephenson-has extensive experience in teaching project management seminars and in planning and implementing project management systems for design and construction firms. He has written a book, Partnering, and co-authored a college textbook, Critical Path Planning. He also has completed more than 50 project partnering charters and published several articles on construction planning. In all, he has 50 years of experience in planning, programming, and managing the design and con-20 S ......

struction of public and private facilities. He is from. Mt. Pleasant, Michigan.

### PROGRAM DIRECTOR

PHILIP M. BENNETT, RA. Architect and Professor at the University of Wisconsin since 1967. His responsibilities in the University's Department of Engineering Professional Development include programming in the areas of architecture, urban development, and housing.

Over the last 29 years, he has developed and conducted over 400 continuing education programs in areas that include project management, workingdrawing production, specifications writing, construction inspection, field administration, community land-use management, and zoning administration. These programs have earned national recognition and presently are attended by participants from across

the United States, Canada and Australia.

#### Р R Ο G R Μ A

#### SATURDAY, NOVEMBER 13

#### A.M

#### Registration 7:30

8:00 **Welcome & Introduction** Philip M. Bennett **Program Director** 

#### 8:45, /Defining Project Management and the Role of the Project Manager

- Project Management's Role in Today's Construction and Darty
- **Construction and Design Business**
- Project Management as a Business Form
- Project Management and Current Methods of **Designing and Construction**
- Elements of Effective Project Management
- Functional vs. Project Management
- Definitions of Project Management Terms

#### **Developing a Systematic Approach** to Managing Projects

- The Line of Action: how a project is developed
- Project Management as a People-Oriented **Open System**
- Anatomy of a Project: its structure, nature and components
- Relation of Project and Functional Responsibility
- Relation of Project and Functional Authority Project Management Matrixes
- Factors that Make a Good Project Manager
  - Nine Master Keys to Good Management
- Nine Essential Steps to Good Project Management
  - The Need for Creativity in Project Management

#### **10:00 Coffee and Conversation**

#### **10:30 Project Management and Profit**

- The Need for Profit
- Types of Profit
- Project Factors Related to Profit
- The Project Manager's Part in Making a Profit

#### How to Plan Your Project

- Planning Methods Available
- Planning Methods in Current Use
- Advantages of Non-Scalar Planning
- Rules of Network Planning and Critical Path Method
- Steps in Preparing a Usable Project Plan
- Defining the Scope of Work

- Building the Graphic Logic Plan
  - Examples of Architecture/Engineer Production Network
- Gaining Approval of the Plan of Action
- Quantifying the Logic Plan
- Calculating the Logic Plan
- Preparing and Using the Working-day Calendar

#### 12:00 Lunch

#### P.M.

#### 1:00 **Project Budgeting** and Cost/Time Controls

- Project Budgeting
  - -Preparation of a Project Budget
- -Basic Financial Ratios Needed for Preparation of a Project Budget
- -How a Project Multiplier is Determined

#### **Techniques for the Project Manager**

- Situational Thinking for the Project Manager
- Pareto's Law and Its Place in Project Management
- Project Decision Making
- Decision-to-Action Time Span
- Management by Exception
- Motivation and Hygiene
- Settng Performance Standards
- Principles of Effective Documentation
- Risk and its Management

#### 2:50 Break

#### 3:10 **Planning the Project Organization** and Effective Communication

- Recognizing Unique Features of a Project
- Five Basic Project People Relations
- Department Organizational Relations
- Individual Organizational Relations
- When to Assign the Project Manager to the Project
- Project Manager Relations with Others on the Team

#### The Importance of a Good Closing to Project Profitability

- Elements of Closing Out the Project
- Obligations of the Project Team in **Project Closing**
- Defining Substantial Completion

#### 5:00 Adjournment

I. L L L I. L I.

### **TABLE OF CONTENTS**

**Speaker Biographies** 

Introduction to Project Management - Philip M. Bennett, Program Director

 Table of Contents - 10 Sections - Ralph J. Stephenson

Section 1 - Project Management and the Role of the Project Manager

Section 2 - Developing a Systematic Approach to Managing Design & Construction Projects

Section 3 - Project Management and Profitability

Section 4 - Planning and Monitoring Projects

Section 5 - Project Budgeting and Controls

Section 6 - Techniques for the Project Manager

Section 7 - Managing the Project Staff

Section 8 - Setting the Project Organization

Section 9 - The Importance of Properly Closing Out the Project

Section 10 - Reference Information

Section 11- Note Paper

### SHARPENING PROJECT MANAGEMENT SKILLS FOR THE 21ST CENTURY

AIA Chicago, Illinois November 13, 1999

# Introduction and Critical Project Management Responsibilities

## Philip M. Bennett Program Director

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### **Table of Contents**

### Introduction

rivjeti manayement	2
Creating the Linkage	3
Role of Project Management	4
Contract Relationship Starting Point	5
Attributes of the Successful Project Manager	6
Capabilities of the Effective Project Manager	7-8
Critical Responsibilities of the Project Manager	9
Minimizing Stressful Conditions	10
A Project Manager's Self-evaluation	11
Critical Issues in the Job Description	
of a Project Manager	12
Work Flow Problem	13
Years of Project Management Experience	14-15
Notetaking	16
Time/Cost Control	
Information Required to Manage the Project	18
Critical Cost Impact Area	19
Budget Control Measures,	
Specific Activities, and Techniques	20
Project Tracking: Applications for automation	21
Project Tracking	22
Cost/Time Graph	23

Cost Breakdown and Projections	24
Project Tracking: Information required	25
Task Breakdown: An example	26
Task Description: An example	27
Activity and Task Analysis	28
Cost, Time and Quality Triangle	29
Project Cost-control Triangle	30
Time and Cost-control Measures	31-32
Critical Cost-control Measures	33
Systematic Approach to Material	
and Product Selection	34
Maintain Cost Control through	
Effective Project Control	35-36
Time and Cost-control Tracking	37
Communication	
Communication System Goals	39
Understanding People	40
Major Problems Faced by Today's	
Project Managers	41
Planning for Project Communication	42
Information Channeling to the Project:	
Making every action count	43
Communication Network	44

Management and Communication	45		
Communication References	46		
Planning the Project Organization			
and Planning	48-49		
Establish Personal Goals and Objectives	50		
Project Activities Identification Process	51		
Project Execution	52		
Information Required	53		
Developing a Plan of Action for each Project	54-55		
Project-review Process	56		
Survey of Owner/Design Professionals			
1995 results	57-60		
1996 results	61-64		
Documentation Planning for Successful Project	65		
Time Management			
Managing and Budgeting Time	67-68		
Time Management	69		
Learn to Know Yourself	70		
Daily Schedule	71		
Time Management	72		

Project Monitoring	73
Controlling and Monitoring the Five Phases	
of Facility Development	74
Fine Tuning: Controlling and	
monitoring activities	75
Identify and Manage the Time-consuming	
Tasks in your Project-delivery Process	76
Monitoring Projects	77
Classification Specification	78
Project Management Actions	
before and during Project Execution	79-80
Critical Project Management	
Responsibilities: A case study	81
Developing a Project Manager's Handbook	82
Project Manager's References	83
The Project Manager's Office Production Manual	84
Project Manager's Responsibilities	85
Project Management Failures	86
Steps toward Project Success	87
Construction Industry Direction	88
Trends of the Owner	89
Stages Where Cost-Control Can Be Effected	90
Cost-Control Impact Areas	91

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# Introduction

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## **Project Management**

<u>Key Issue:</u> Successful linkage of each activity in the project development process



Chain of activities required to complete the project

• each "circle" represents an activity, task, or event

## **Creating the Linkage**

### Essential information required for each activity



Chain of activities

## Role of Project Management

### Why?

- Provide a valuable link between all project team members
- Assist in directing the flow of activities

### What?

 Need to know the specific responsibilities and resulting tasks to be performed

### How?

• Need to know the techniques and procedures to be used in performing tasks

### When?

 Timing of the project manager is critical in achieving a smooth, flowing sequence of events

## Contract Relationship Starting Point



Establishing the chain of command and lines of communnication

## Attributes of the Successful Project Manager

<u>Ability to:</u>

- 1 Comprehend the scope of the project and scale of activities
- 2 Understand the relationship between activities and events

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- **3** Organize and schedule activities
- 4 Plan ahead
- 5 Perceive problems
- 6 Work with people
- 7 Express ideas
- 8 Be innovative
- 9 Respond to demands
- 10 Listen and learn
- **11 Make decisions**
- 12 Lead and manage

## Capabilities of the Effective Project Manager

### <u>Ability to:</u>

- 1 Plan and organize a series of events or actions to fulfill goals and objectives
- 2 Identify the overall scope of activities needed to complete a project
- 3 Blend hindsight and foresight to structure a plan of action
- 4 Foresee problems and conditions that would alter a plan of action
- 5 Tap into information sources and provide critical facts for making decisions
- 6 Communicate concepts and responsibilities to all members of the project team

- 7 Unite members of the design/ construction team in a successful working relationship
- 8 Prevent and resolve problems without interfering with the work flow
- 9 Collect essential information for planning and programming activities
- 10 Lead and motivate other members of the project team

## Critical Responsibilities of the Project Manager

- 1 Planning
- 2 Scheduling
- 3 Coordination
- 4 Communication
- **5** Documentation
- 6 Management
- 7 Leadership

## Minimizing Stressful – Conditions

- **1** Systematically plan activities
- 2 Develop comprehensive overview of project
- 3 Know what is going on at all times
- 4 Design a program that is achievable
- 5 Keep people informed as to where things stand

Don't leave anything to chance

## A Project Manager's Self-evaluation

- 1 Do you know your role?
- 2 Are you performing your role?
- 3 Rank and weigh the value of each action before it is performed.
- 4 Follow up and evaluate each action after it has been performed.
- 5 Ask yourself: is your presence helping or hindering the project?

<u>Critical</u> Determining whether you are putting out fires, solving problems, or creating problems for other staff and the construction team

## Critical Issues in the Job Description of a Project Manager

Individuals who:

- Show a concern for details
- Find it easy to remember critical steps and linkages
- Recall events and take required actions
- Enjoy working with people and guiding them through activities and phases of work



Project manager's role: Bring money and need into alignment

## Years of Project Management Experience

### Participant Experience

0 to 3 years 3 to 5 years 5 to 10 years 10 to 15 years 15 to 20 years over 20 years

Region Directors Project Directors Other

### **Disciplines** Represented

Architects Planning Engineers Civil Electrical Mechanical Real Estate Other

### **Functional Areas**

Design and Construction Contracts Planning Real Estate Real Property

## Notetaking

### General and Long-range



### Short-range



Critical to do on Monday

# Time and Cost Control

## Information Required to Manage the Project

- 1 Contractual relationships
- 2 Duration of project
- 3 Budget
- 4 Staff availability
- 5 Activity and task identification
- 6 Documentation of time spent on tasks
- 7 Account of percent complete
- 8 Roadmap or schedule of events

## Critical Cost Impact Areas

- 1 Budget system is not integrated with project cost system
- 2 Budget variance reports not used to manage costs
- 3 Change orders carried out without concern for budget
- 4 Labor costs not included
- 5 Weak reporting process

## Budget Control Measures

- Planning
- Scheduling
- Managing
- Monitoring

## Specific Activities and Techniques

- Steamline procedures
- Use innovative procedures
- Systematize performance
- Use advanced technology
- Improve information flow

## Project Tracking: Applications for automation

- Shop drawings
- Change orders
- Contract modifications
- Correspondence
- Decisions
- Delays
- Directives
- Work in place
- Approvals
- Submittals
- Payments

# **Project Tracking**

- 1 Determine the frequency of project evaluations
- 2 Determine tasks that complete an activity area
- 3 Develop information systems that provide effective evaluation data
- 4 Have team members provide necessary data at predetermined intervals
- 5 Establish checkpoints and team reviews



### <u>Critical</u> Design control/monitoring measures for each phase

## **Cost Breakdown and Projections**



### Square-foot costs or



cubic-foot costs?
# **Project Tracking: Information required**

- Tasks completed
- Hours spent
- Percent complete
- Phase of work
- Material in place
- Department actions
- Staff persons in charge

# Task Breakdown: An example

- Office administration
- Project management
- Project program development
- Meetings
- Consultants
- Budgets, estimates and ordering
- Design development
- Documentation
- Specifications
- Contract administration
- General

# Task Description: An example

Level	Code	Description
5	10	Project documentation
6	8	Project scheduling
7	12	Meetings
8	15	Change orders

# Activity and Task Analysis

### <u>Task Variables</u>

- Duration
- Number
- Techniques
- Equipment
- Procedures

#### Question

What can we change to improve the overall work quality and production efficiency?



# Concept of Limited Resources

### **Impact Considerations**

- Costs (budgets) determine, dictate and control the amount of time and quality
- Fixed costs limit the size of triangle (resources available) for a project
- Controlling and managing time to minimize costs and maximize quality

# Project Cost-control Triangle



### Measuring/Monitoring

Scope of work

30

- Time
- Cost

# Time and Cost-control Measures

### **Use of Historic Data**

Use records of past projects to budget and determine requirements for new projects.

### **Design Considerations**

Use standard tooling and manufacturing systems to create new products and design solutions. Requires working closely with manufacturing representatives.

#### **Review Project Documents before Bidding**

Check drawings and specifications for errors, impractical solutions, unbuildable details and critical construction relationships.

### **Monitor Project Activity Phases**

Observe problem areas and develop effective solutions without delays.

#### Effective Utilization of Construction Workforce

Maintain effective distribution of workforce during all construction phases.

#### Reduce and/or Minimize Change Orders

Keep change orders to a minimum to hold costs within original budget.

### **Timely Decision Making**

Preplan decision-making process to reduce the turnaround time for effective decisions.

# Critical Cost-control Measures

- Scope of work
- Organization
- Planning and budgeting
- Accounting
- Analysis and monitoring
- Revising and updating
- Communications

# Systematic Approach to Material and Product Selection

### **Process/Techniques**

- Application of performance criteria
- Life-cycle evaluation
- Value engineering
- Historic and maintenance records

### **Examples of Cost Savings**

- Selection of high-quality materials can result in lower maintenance costs
- Effective applications of quality materials can generate energy savings
- Applications of triple glazing can contribute to lower energy costs

# Maintain Cost Control through Effective Project Control

#### Issue

Effective and Functional control

versus

Over-control and Overreporting

### Critical Steps

- Document critical (usable) information that helps stimulate project development and progress
- Monitor and evaluate project conditions to prevent or minimize problems
- Scale the project-management control system to the size of the project
- Design the communication and decisionmaking process for each project

- Clearly identify reporting requirements and schedules
- Conduct weekly meetings to identify and forecast project trends
- Structure a monitoring and recordkeeping system appropriate to the project
- *Reevaluate and adjust* the project control system after it has been implemented

# Time and Cost-control Tracking

Date	Activity	Time Budgeted	Time Spent	Percent Completed	Problem	Dollars Budgeted	Dollars Spent	Percent Spent	Problem	Action

# Communication

# Communication System Goals

- Develop information network that lets staff know where they are at in the overall project
- Develop a system that achieves a high level of self-monitoring
- Develop a scheduling system that is effective in tracking project events
- Record information that is essential in monitoring project progress
- Disseminate critical information systematically

# Understanding People

### Physiological Basis



40

# Major Problems Faced by Today's Project Managers

#### Class Participants' Responses

#### Design Professionals' Responses

- 8 Communication
- 5 Quality Control
- 4 Management
  - Leadership
  - Upper management
  - Lack of management
- 2 Record-keeping Documentation Number of projects Responsibility/Authority
- 1 Goals and Objectives Owner Awareness of Role Company Organization

#### **Contractors' Responses**

- 4 Communication Scheduling
- Management
  Interference
  Authority/Responsibility
- 2 Documentation Programming
- 1 Approval

#### **Owners' Responses**

- 10 Communication
- 7 Management
  - Lack of management
  - Interference
  - Knowledge
  - Lack of knowledge
- 6 Schedules
  - Lack of schedules
- 4 Quality Control
- 3 Record-keeping Decisions
  - Lack of decisions
- 2 Design Errors Flow of Data Time Approvals
- 1 Documentation Number of Jobs Responsibility/Authority Budgets Project Completion Justification of Project Education/Knowledge

# Planning for Project Communication

- 1 Identify key individuals who will be responsible for accompanying specific tasks or phases of activity
  - Develop a file of names, addresses and telephone numbers
- 2 Establish contacts with project representatives that have been assigned to leadership roles
  - Clarify the chain of command
- 3 Determine the critical issues that will require careful attention and recognition during each project phase
- 4 Develop working relationships with project decision-makers
- 5 Create a systematic scheduling process to record and document communication decisions 42

# Information Channeling to the Project: Making every action count



**Functional Areas** 

#### Questions

- 1 Is your work (the results) being used effectively and contribuing to the forward movement of the project?
- 2 Is the information you are generating properly linked to the on-going project?

represents one task

# Communication Network

- 1 Idenfity key individuals who can aid in the decision-making process
- 2 Establish effective lines or channels of communication
- 3 Organize and control the flow of information

### Management and Communcation

Up the Chain of Command

Report Inform Prod Below You

Understand problem Allow Encourage/stimulate

### Communication References

#### Making Yourself Clear

by John O. Morris McGraw-Hill Book Co. 1221 Avenue of the Americas New York, NY 10020

**The Art of Writing Effective Letters** by Rosemary F. Fruehling McGraw-Hill Book Co. 1221 Avenue of the Americas New York, NY 10020

#### How to Use Psychological Leverage to Double the Power of What You Say

by Les Donaldson Parker Publishing Co., Inc. West Nyack, NY

# Planning the Project Organization

# The Project Manager's Preparation & Planning

- Study the major activities and tasks associated with each phase of an assigned project
- Learn all you can about each activity and task so that the project manager can determine what should happen and when
- Learn the sequence of events and actions required to fulfill specific stages of the project
- Learn as much as you can about the individuals you will encounter and work with on a specific project

- Study the contract documents and learn about the legal relationships and expectations of the project
- Determine your role in managing the assigned project

### <u>Remember</u>:

To be an effective project manager, you must know first-hand the project development process and the critical tasks, events, and activities required to perform the functional management actions associated with each phase of the project.

# Establish Personal Goals and Objectives



# **Project Activities Identification Process**

# Successful project management comes from:

- Knowing the activities and tasks associated with a process
- Knowing the scope of responsibilities aligned with the activities for the process
- Creating a matrix of project controls

#### Activities/Tasks



#### A project manager's success comes from:

- Knowing the process and the role
- Developing the skills to manage the activities and actions



Planning

Contracts

Design and Construction

**Functional Area Activities** 

52

# Information Required

#### **Status Reports**

Project status from functional area

#### Time

Schedule information

### Dollars

**Dollars spent** 

Request information by project manager for planning Response

# Developing a Plan of Action for each Project

- 1 Develop a critical-path plan for project stages
- 2 Identify the potential high-risk or problem areas
- 3 Create a communication plan and network
- 4 Develop the project tracking and documentation system
- 5 Establish a routing and information-flow network
- 6 Structure a quality-assurance checking program

- 7 Identify the leaders and decision-makers
- 8 Determine the chain of command
- 9 Program a decision-making process to be used for the project
- 10 Identify planning meetings for team interaction

# **Project-review Process** J

- Quality assurance
- Document checking



### <u>Checking</u>

#### Quality

**1** Issues from failures

and Feedback

- 2
- 3 Project Evaluation
- 4

#### General

1 Goals and objectives



#### PREPARING OWNERS AND DESIGN PROFESSIONALS TO DETECT DEFICIENCIES IN WORKING DRAWINGS AND SPECIFICATIONS

#### November 6-9, 1995

#### --A SURVEY ON CHANGE ORDERS --

#### **Department of Engineering Professional Development**

1. What are the major causes for change orders on your projects? Identify source and percent attributed to each source.

Source	Percent
<b>Owner Generated :</b>	Total 2,854 + 61 = 46.8 Average
Design Consultant:	Total 2,279 + 63 = 36.2 Average
<b>Outside Impacts:</b>	Total $632 + 48 = 13.2$ Average
Other Identify :	Total 479 + 23 = 20.8 Average

2. What is the highest number of change orders witnessed on a project?

Number\_\_\_\_\_

Source\_\_\_\_\_

No. of Change	Orders 1	Responsible Respondent	
Totals Avg		Source Participants	
294	36.8	Owner	8
797	113.9	Architect	7
720	144	Contractor	5
237		User	1
4		Job Size	1
10		Field Conditions	2
1.955	391	Variety	5
20		Govt. Regulations	1
612	204	A/E	3
277	55.4	Owner & A/E	5
20		Owner/Contractor	1
432	86.4	Owner/A/E/Govt. Reg.	5
2,107	263.4	Misc. Change Orders	8
7,485			

Highest number of change orders witnessed on a project: 1,700 (on a \$210 million dollar project)

Party Responsible for Deficiency	Services Involved	Respondent Participant
Owners	Changes/Reality of Project	et 4
	Goal Clarity	1
	Lack of Communication	1
Architect	Incomplete	3
	Missing detail in drawing	g 3
	Lack of design experience	. 1
	Unscaled drawings	1
Contractor	Utilities, etc./Soil, etc.	2
	<b>Details/Coordination</b>	
	between trades	2
	Mechanical	1
	Failure to follow C.D.s	1
	Delivery problems	1
Gov't Agencies	Code interpretation	
-	conflicts	1
Engineer	Incomplete and	_
	non-accurate plans	1
A/E	Plans & Specs Not Meshi	ng 4
	Design and Drafting Erro	rs 4
	Incomplete Data/Detail	4
	Inappropriate Designs	1
	Failure to Integrate New	
	to Existing	1
	Inconsistency/Outdated	
	Specifications	1
	Interpretation	
	of Environmenal Issues	1
A/E & Contractor	Incomplete Drawing & Sp	ecs 1
Owner/A/E	Missing & Forgetting	
	Information/Details	5
	Lack of Coordination	ī
	Design Criteria Inadequa	te Ī
Arch/E/Mech/	<b>Coordination Errors in Pl</b>	ans
Plumb. Consult.	and Construction Confli	ct 14

.

3. What type of deficiencies are most common in your project?

J

	Interpretation and Thoroughness in Dealing w/ All Aspects of Change Lack of Coordination between Disciplines	3 1
Engineer/ Contractor	Engineering & Construction Oversights	1

#### 4. Do you feel that the quality of today's construction documents are:

13

- 1. Improving
- 2. Staying about the same 18
- 3. Deteriorating 30
- 4. Comments:
  - More projects are fast tracked, not permitting time for proper documentation
  - Owner is pushing project too fast, and architect is allowing.
  - Quality control by A/E is decreasing
  - Room to improve
  - Everyone is trying to do more work than they can accomplish and control
  - Not enough time and money spent

• In house design and different depts/units in charge of different areas of construction

• A master change committee is in place to implement change to specs and drawings

• More detailed drawings can be provided by CAD, but with less understanding by the drafters

Need detailing ability

• We're not learning from mistakes, keep doing things inadequately; knowing non-successes in past

• We all complain a lot, but really haven't addressed the problem

• ADA compliance problems; Owner anticipation of something else, or-I wanted to provide that

• Both design fees and project schedules continue to shrink; causing more pressure to produce accurate documents with less support

• A&E firms don't provide adequate drawings without extensive reviews and comments to make projects procurable • Amazing what most A&Es consider acceptable level of quality in DOC's

• Review process has gone downhill - not enough attention paid to coordinating plans and specs

• CAD is making it worse as is competitive bidding of fees

#### 5. What efforts or measures have you taken to prevent repeating deficiencies? List Measures:

#### <u>Respondents</u> <u>Measures to Prevent</u>

- 35 In-house; Implement comprehensive on-going review and checks by people experienced in all phases of construction who are not associated with the project – <u>before</u> design is issued.
  - Increase legal review
  - Implement sign-off checklist
  - Train in-house team
  - Standardize specifications
  - On-going quality control checks
  - 8 Review and learn from "hot" list of repeated problems
  - 6 Establish better communication with all services and the owner (partnering).
  - 4 Develop quality management, supported by a quality improvement program
  - 4 Document meetings with all services and owner, holding those involved accountable
  - 1 More time and money up front
#### PREPARING OWNERS AND DESIGN PROFESSIONALS TO DETECT DEFICIENCIES IN WORKING DRAWINGS AND SPECIFICATIONS

November 4-7, 1996

#### -A SURVEY ON CHANGE ORDERS -

#### **Department of Engineering Professional Development**

1. What are the major causes for change orders on your projects? Identify source and percent attributed to each source.

Source	Percent
Owner Generated :	31.5 Average
Design Consultant: Architect/Engineer	32.5 Average
Outside Impacts: State, Federal, & Local Government Regulations	12.9 Average
Other Identify:	<b>19.4 Average</b>

2. What is the highest number of change orders witnessed on a project? Number: 1,300 Source: coordination, constructible problems

\$3.8 million on \$30 million project

#### 2. (continued)

No. of Change	Respondent		
Totals	Participants		
1,300	-	1	(\$3.8 M on \$30 M project)
800		1	
657		1	
355		1	
350		2	
300		1	
280		1	
250		1	
235		1	
225		1	
200		2	
175		1	
150		5	
145		1	
126		1	
120		1	
100		6	
95		1	
90		1	
85		1	
80		3	
75		1	
70		1	
61		1	
60		2	
54		1	
50		7	
44		1	
40		4	
35		2	
30		8	
25		1	
20		3	
18		1	
17		1	
16		1	
15		2	
14		1	
10		7	
6		1	
5		1	
6,783			

Average 83.7 per project

62

3. What type of deficiencies is most common in your project?

Party Responsible <u>for Deficiency</u>	Services Involved Parti	Respondent cipant <u>Total</u>	
Owners	Changes (some late) Lack of Communication	5 1	6
Disciplines	· Cooperation and Coordination	11	11
A/E	Plans & Specs Not Meshing Incomplete Documents Coordination A/E Code Versus Design	12 24 11 1	48
Gov't Agencies	Discrepancy of Codes Between Agencies	1	1
Contract Errors	Poor Construction Mgmt Quantity & Quality Control Errors Mechanical Difficulties Hardware/Fire Systems/Wrong Ma Need for Experienced Staff	3 1 1 at7 1 3	9
Arch/Engr/Mech	Unexpected Site & Soil Problems Site & Soil Problems Better Organization to Meet Deadlines Time Extensions	2 8 1 _1	<u>12</u> 87

#### 4. Do you feel that the quality of today's construction documents are:

- 1. Improving 15
- 2. Staying about the same 26
- 3. Deteriorating 50
- 4. Comments:
  - The need to update specs by new standards
  - The need to make design firms accountable
  - Documents are improving due to technology
  - The need to make Project Managers really accountable

  - More time and money needs to be spent on adequate documents
    The busier an industry becomes, the less accurate the document

- There is no longer emphasis on quality
- The need to depend more on that which is tried and true
- Buildings are more complex

38

13

- There is need for better owner input and cooperation
- There should be improvement in contract language
- Coordinating all efforts is very important
- Need a better definition of overall scope
- 5. What measures have you taken to prevent repeating deficiencies? <u>Respondents</u>

this class; ISO-9000 plan, Better training in
fast track projects.
<ul> <li>Stress quality of documents</li> </ul>
<ul> <li>More time and money up front</li> </ul>
- Checklists for quality control & review
<ul> <li>More cooperation In-House &amp; Field</li> </ul>

Getting engineers into project earlier Project realistic time schedule Take a hard line on accepting incomplete drawings/specs. More review of City Level codes Better review of documents before budgeting Identifying & pointing out deficiencies before bidding

12 Steps Being Taken during & After Project: Quality assurance, object of reviews at all levels Quality control constructibility revue Use of industry recommended details and procedures Weekly progress reports 11 mo. post construction Walk thru. Sharing construction experiences with others 2/A program @ 30-60-90 % level of contract development

## Documentation Planning for Successful Projects

- 1 Identify critical phases, stages, and activities that produce valuable information for future planning and decision-making
  - planning
  - design
  - production
  - construction
- 2 Develop an information database to store and retrieve information
  - indexing system
  - retrieval system
- 3 Create a system to identify and document information
  - logs and forms
- 4 Appoint individuals to monitor activities
  - record critical information
  - provide information feedback

# Time Management

## Managing and Budgeting Time

- 1 Identify time available for each project
- 2 Identify critical goals and objectives
- 3 Identify tasks and activities to achieve end-goals
- 4 Connect critical goals and objectives with tasks and activities
- 5 Rank order of tasks and activities to achieve goals and objectives

- 6 Allocate time for critical and most valuable activities
- 7 Delegate tasks and activities as required to accomplish the project
- 8 Abandon trivial tasks and carry out highly-ranked critical tasks
- 9 Monitor actions to determine whether your plan of action is fulfilling your objectives and final goals

## **Time Management**

- 1 Determine amount of time available
- 2 Identify number of projects and activities that project manager needs to deal with
- 3 Critical: Rank and weight activities that carry major impacts
- 4 Need to zero in on valuable actions and spend time on critical decisions
- 5 Preplan a project management plan so that critical areas (tasks and activities) are known in advance

#### Learn to Know Yourself

#### When you are best at:

- Thinking
- Creating
- Talking
- Working
- Decision-making

## **Daily Schedule**



Cycle of rise and decline in body temperature associated with human performance

#### <u>Time\_for</u>

- Clear thinking
- Making decisions
- Action/production
- Phone conversation
- Relax/rest

71

#### **Time Management**

#### Plan

## Organize

## Follow through

- Identify activities
- Organize activities
- Rank and weight items
- Create a checklist
- Select best time of day to accomplish tasks

# Project Monitoring

### Controlling and Monitoring the Five Phases of Facility Development

- 1 Schematic-design phase
- 2 Design development phase
- 3 Construction-document phase
- 4 Contracting phase
- 5 Construction phase

## Fine Tuning: Controlling and monitoring activities

- 1 Determine the time-consuming and problem phases
- 2 Systematize the activities and procedures
- 3 Take advantage of automation systems
- 4 Plan and schedule the events in your project-delivery
- 5 Establish a monitoring and quality-assurance program

## Identify and Manage the Time-Consuming Tasks in your Projectdelivery Process

- 1 Facility programming
- 2 Client approvals
- 3 Materials evaluations and selection
- 4 Planning for production
- 5 Organizing the production team
- 6 Preparing specifications
- 7 Finalizing the contract documents
- 8 Bidding and contractor selection
- 9 Preconstruction organization
- 10 Construction monitoring and the project close-out process

# **Monitoring Projects**

1 Wall graphs and story boards

Project	:S	

- Wall display of project progress
- 2 Computer printout of hours and cost analysis
- 3 Schedule tracking of events
- 4 Staff and team-member project production sheets
- 5 Team conference meetings

## **Construction Specification**

		Division Section						
	1	Part 1	Ge	neral	<b>-</b> .			
	2	Part 2	Pr	oducts <	∠ Costs — Maintena ``Numbers	nce		
<b>3</b> Part 3 Execution — Labor (i.e., time X costs)								
		1		2				
Item	Spec se	division/ ection	Product/ equipment no.		Drawing no.	Installation no./date	Contractor	$\square$
			2	3	3			
	Z	Warr dates	anty s/no.	Tests	Balancing	Maintenance dates		

Product/Construction and Maintenance Tracking

## Project Management Actions before and during Project Execution

- **Step 1** Identify all project phases that you will be responsible for during the project management process
- **Step 2** Identify the critical tasks and actions that must be performed to fulfill each phase of project development
- **Step 3** Identify key linkages that must take place for a smooth, flowing sequence of tasks
- **Step 4** Identify and plan the project manager's involvement and role in making the communication linkage and interfaces essential for a smoothly flowing project

- **Step 5** Identify critical records, reports and documents that must exchange hands on a timely basis
- **Step 6** Prepare forms, logbooks, and documentation formats for maintaining and transferring critical information
- **Step 7** Identify planned meetings and coordination events essential for decision-making and production
- **Step 8** Preplan site visits to identify critical items to be inspected for compliance with contracts
- **Step 9** Study contract documents: plans, specifications for all actions, requirements and dates that must be fulfilled
- **Step 10** Fulfill responsibilities by tracking each event and taking action on the preplanned monitoring program

### Critical Project Management Responsibilities: A case study

- Project planning
- Establishing milestones
- Team building
- Breaking down barriers
  - Most time spent breaking down barriers between people
- Working with people
  - Consider people as being important
- Provide safety incentives
  - Develop safety training
- Role of owner is critical in achieving a successful project
- Good "project management" is essential
  - Response from a project manager

## Developing a Project Manager's Handbook

#### Essential sections:

General procedures

Critical management techniques

Time and financial-planning techniques

Valuable forms and checklists

References and information sources

Procedures for critical-task areas

- Code search
- Municipal ordinances
- Contractual relationships
- Examples and case studies of past projects

#### **Project Manager's References**



Project Manager's Handbook: Procedural guidelines

#### The Project Manager's Office Production Manual

- Acceptable manufacturer's information
- Communication procedures
- Quality-control requirements
- Specifications, drawing checklists, and review procedures
- Standards and guidelines
- Common problems and solutions
- Project manager's responsibilities and guidelines

#### **Project Manager's Responsibilities** G K B F A Linkage Activity 2 E Action Η D Μ

#### Project activities/actions required

- Identify need/problem
- Identify source of support
- Obtain information

85

- Communicate information
- Make decision/solution
- Create proper linkages

### Project Management Failures

- Lack of measurement system
- Uncontrolled work authorizations
- Changing scope of work
- Unauthorized and unsupported cost changes or transfers
- Inability to account for use of materials

## Steps toward Project Success

- Comprehensive planning
- Project manager's commitment and dedication
- Project team motivation
- Project manager technical skills
- Well-defined scope of work
- Effective control systems

#### Construction Industry -Direction

- Greater complexity in facility needs and design
- Increased scale of projects
- Increased number of disciplines
- Increased number of people
- Increased number of products
- Greater complexity in working relationships
- Greater constraints on dollars and time
- Disagreement over contract relationships and language

## Trends of the Owner

#### **Concerns for:**

- Point source control
- Cost control
- Time control
- Quality control
- Meeting deadlines
- Quality of documents

#### Stages of Project Where Cost-Control Can Be Effected

- 1 Programming
  - scope of work
- 2 Design/Production
- 3 Scheduling
- 4 Prebid Review
- 5 Construction

## **Cost-Control Impact Areas**

#### Programming

#### Design/ Construction

#### Scheduling

**Prebid Review** 

#### Construction

- Space Allocation
- Material Consideration
- Project Size
- Material Selection
- Space Relationships
- Construction Details
- Time Constraints
- Sequence of Work
- Work Force
- Evaluation of:
  - Specifications
  - Drawings
- Consistency
- Understandable
- Buildable
- Addenda
- Compliance
- Interpretation
- Decision-making
- Monitoring

.

## 6 PHASES OF A PROJECT

- 1. Enthusiasm
- 2. Disillusionment
- 3. Panic
- 4. Search for the Guilty
- 5. Punishment of the Innocent
- 6. Praise and Honors for the Non Participants
- 7. Destruction of Useful Documentation

Ralph J. Stephenson, P.E. Consulting Engineer

#### **EFFICIENT VS. EFFECTIVE**

#### • EFFICIENT - DOING THINGS RIGHT.

• EFFECTIVE - DOING THE RIGHT THINGS

date printed: 11/9/99
# SOME KEY DEFINITIONS

(1) <u>**Project</u>** - A set of work actions having identifiable objectives, and a beginning and end.</u>

(2) <u>Profit</u> - The return in resources obtained by investing other resources in a business or an enterprise. Usually the returned resource has a greater value to the investor than does the invested resource.

(3) **<u>Profitability</u>** - Realizing a profit on one's efforts - an important element of project success.

(4) **Business** - One's occupation, profession or trade.

(5) <u>Enterprise</u> - A project that is of above average importance and requires boldness and readiness in its undertaking.

(6) Project management - As a business form, project management is a process of improving project profitability.

As a enterprise form, project management is a process of optimizing project profit achieved by a series of effective, well managed actions taken by skilled practitioners.

WEX AIA Project Management Seminar Chicago, Illinois

# Table of Contents- WEX AIA PM seminar -Chicago, Illinois Section 01 - Project management and the role of the project manager

- 1.01 Thinking patterns
- 1.02 Managing complex change
- 1.03 Functional and project management in evolution
- 1.04 The Project Manager
- 1.05 Participants in designing & building
- 1.06 Macro matrix boundaries of design & construction
- 1.07 Elements of effective project management
- 1.08 1.10 Elements of import to success in design & construction
- 1.11 Professional service contract characteristics
- 1.12 Construction contract characteristics

# Section 02 - Developing a systematic approach to managing design and construction projects

The project program
Development line of action & organization
Development phases
Project costs committed & spent - graphic
Project costs committed - definition
Types of management in project oriented business
Traditional project delivery system characteristics
Non traditional project delivery syst. characteristics
Nine major steps to effective project management
Creativity and how it is used in project management

# Section 03 - Project management and profitability

- 3.01 Pogo 3.02 The need for profit 3.03 Profit potential levels 3.04 Profit potential levels - details 3.05 - 3.07 Setting goals & objectives **Destructive conflict** 3.08 3.09 People 3.10 **Positive conflict** Causes of destructive conflict 3.11 - 3.12 3.13 7 actions to resolve potentially destructive conflict
- 3.14 3.15 Case study Architectural Vyvyan

3.16 - 3.17 Prob	lem mentions
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3.18 8 most freq. mentioned design and const. problems

## Section 04 - Planning and monitoring projects

4.01	Job planning - what is it?
4.02	Advantages of good planning
4.03 - 4.05	Act from a plan
4.06	CPM exercise #1
4.07	Solution to exercise #1 - precedence
4.08 - 4.11	Working day calendar
4.12	Questions to be asked about your project
4.13	Chicago area weather
4.14	Network model for preparation of contract documents

## Section 05 - Project budgeting and controls

5.01	Line of action
5.02	Budgeting terms

- 5.02 Budgeting terms
- 5.03 Iterative costing sequence
- 5.04 Design work phasing
- 5.05 Scope of design work
- 5.06 Architectural/Engineering % fee guidelines
- 5.07 5.09 Project cost plan

# Section 06 - Techniques for the project manager

- 6.01 Apply situational thinking
- 6.02 Translation definition
- 6.03 Schedule definition
- 6.04 6.05 Clarion base network plan
- 6.06 Clarion base network data
- 6.07 Clarion bar chart translation (1) ho 381
- 6.08 Use of float time in project planning
- 6.09 GTRV section
- 6.10 6.13 GTRV contract document matrix
- 6.14 6.17 Guidelines to prep contract document matrixes
- 6.18 Procurement network model
- 6.19 Submittal turn around
- 6.20 Bulletin change order
- 6.21 Equipment activity tabulation
- 6.22 Money flow
- 6.23 Turnover cycle analysis

WEX AIA Project Management Seminar Chicago, Illinois

## Section 07 - Managing the project staff

- 7.01 4 i's improvement cycle
- 7.02 7.03 Manage by exception
- 7.04 7.05 Claim prone job characteristics
- 7.06 7.09 Common causes of contested claims
- 7.10 Ethics questions to ask in ethical decision making
- 7.11 7.14 How to spring the time trap
- 7.15 7.19 Documentation degree

## Section 08 - Setting the project organization

8.01 - 8.02	Forerunner & conservatively managed companies
8.03	Bengst corporation expansion
8.04	Bengst organization blank
8.05	Bengst a/e case study
8.07 - 8.08	Where do we go from here? U of Q case study

8.09 Owner and separate primes

## Section 09 - The importance of properly closing out the project

- 9.01 9.06 Retentions, collections & final payment
- 9.07 9.10 Closing out a construction project

## Section 10 - Reference information

- 10.01 10.33 Glossary of terms
- 10.34 10.36 Bibliography

10.37 Scope of design work phasing

- 10.38 10.40 Kinds of estimates
- 10.41 10 42 What is partnering?
- 10.43 Partnering components
- 10.44 Dispute resolution steps
- 10.45 10.52 ADR & partnering
- 10.53 10.54 Problem listing
- 10.55 10.56 Project management software

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WEX AIA Project Management Seminar Chicago, Illinois

# Section 01 - Project management and the role of the project manager

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- 1.12 Construction contract characteristics

Ralph J. Stephenson PE Consulting Engineer

# **THINKING PATTERNS**

Why p	lan?.	to	eval	luate
-------	-------	----	------	-------

- Why translate?.....to communicate
- Why control?.....to achieve
- Why correct?.....to maintain
- Why learn?.....to improve

# MANAGING COMPLEX CHANGE



Adapted from T. Knoster (1991)

page 1.02

ho 511 - May, 1998



page 1.03

# The Project Manager - d494

# I. Project related definitions

A. Project

A set of work actions having identifiable objectives, and a specific beginning and end.

# B. Project team

A specific management group assigned to achieve a set of objectives by accomplishing a group of related, discrete operations which have a defined beginning & end. Examples include the design team, the program team, the construction team, the tenant work team, and others similar in nature.

# C. Project component

A set of related objectives achieved by a defined work group, and gained by accomplishing a set of related, discrete operations which have a defined beginning & end. Examples include designing the project, constructing the foundations, putting the building in the dry, closing out the job, and others similar in nature.

## D. Project director

The individual responsible for implementation of several projects upon which his or her organization is engaged.

# E. Project operations

Management and staff direction of resource use to accomplish overall project activities.

# F. Project organization

The arrangement and interrelations of people charged with achieving project objectives.

# G. Project stages

The groupings of actions that make up an entire project work sequence such as conception, programming, approval, design development, contract document preparation and other similar sequential operations.

# II. What does a project manager do?

In conjunction with the project team, <u>establishes</u> objectives generated by a need, <u>plans</u> how these objectives are to be reached through a set of work actions, and then <u>assembles</u> and <u>directs</u> the application of available resources to <u>achieve</u> the objectives on one or more projects.

Usually the project manager is most concerned with <u>supportive</u> actions which <u>bring</u> resources to the point of effective use by team members.

Ralph J. Stephenson PE PC Consulting Engineer

# **PARTICIPANTS IN DESIGNING & BUILDING ENVIRONMENTS**

There are six basic participants in the process of designing and building environments. These are the conceiver, the translator, the constructor, the user, the operator and the regulator.

<u>Conceivers</u> - Those who conceive the idea and provide the wherewithal to bring the environmental program to a successful conclusion. The conceiver may be the owner but it also might be a governmental agency, a financial source, an architect, an engineer, a contractor, a vendor or a potential tenant looking for space. We identify the conceiver since he usually is the key person driving the project on to completion.

**Translators** - Those who translate the environmental program into construction language. Traditionally we think of the architect/engineer as the translator. However careful consideration of this matter shows there are many others who translate the conceiver's fundamental ideas into understandable, workable construction language. Subcontractors, suppliers, vendors, manufacturers, contractors and the conceiver may all play a role in translating.

<u>Constructors</u> - Those who interpret the construction language and convert it to a actual physical environment. Occupying this role are general contractors, specialty contractors, vendors, suppliers, manufacturers, artists and others who actually put the materials into place in the field.

<u>Users</u> - Those who occupy and use the completed facility to conduct their work, their recreation, their domestic living, or other activities for which the facility was specifically designed and built.

**Operators** - Those who operate and maintain the completed physical environment on a continuing basis. Usually the party responsible for this function is an owner or tenant working through a plant or facilities manager.

**Regulators** - Those who fill a review & inspection position to help insure protection of the health, safety & welfare of the people. This is usually done by enforcing regulations written and adopted by qualified public or private bodies. Examples of regulators include those who work for building departments, departments of natural resources, public health agencies, fire prevention organizations, technical societies and other such groups.



MACRO MATRIX BOUNDARIES

Page 1.06

Handout 417

# ELEMENTS OF EFFECTIVE PROJECT MANAGEMENT

- 1. Technical competence
- 2. Proper project planning
- 3. Good project staff morale
- 4. Clearly defined authority lines
- 5. Clearly defined responsibility lines
- 6. Respected leadership
- 7. Clear understanding of the project mission
- 8. A sensitive monitoring system
- 9. Prompt and effective resolution of problems
- 10. Discerning points of view
- 11. Effective modes of action
- 12. A feeling for people
- 13. A project wide desire for excellence
- 14. Inquisitive minds
- 15. A sense of humor
- 16. Collective patience
- 17. Collective endurance

#### Ralph J. Stephenson, P. E. Consulting Engineer

#### <u>38 Elements of importance to success in design and construction - ho 341</u> • <u>Summary</u>

In the design and construction industry there exist many factors which influence the degree of success achieved on a project. They deal with project goals, profit types, project sequencing, the nature of the participants and the kinds of problems most likely to be encountered.

If the parties to a planning, design and construction program recognize the nature and importance of these factors, a major step will have been made toward their proper and effective combination and management.

Below are listed 38 basic influences on project delivery systems. Project management concerns how to combine these into a successful job of which all participants are proud.

#### Six major goals to meet for design & construction project success

The client, owner & user must be assured upon completion of his job that:

1. The facility program and the facility design have met their needs, desires and wishes.

2. The planning, design and construction work on the project has been accomplished within the time and cost structure required and desired.

3. All relationships on the project have been maintained at a high technical and professional level, and have proven rewarding for those involved and affected.

4. The people involved at all levels of work on the job have realized a financial, professional and technical profit for themselves and their associates by being on the project.

5. The project has been closed out with little or no residual potential for major problems of maintenance or operation.

6. The entire process has been free of unresolved contested claims for additional money, additional time, damage payments, and of the potential for future financial demands after the job has been closed out.

#### • Seven types of profit

- 1. Financial an improvement in a money position
- 2. Social a gratifying experience contributing to society's well being
- 3. Self actualization a gain in personal non financial satisfaction by contributive work
- 4. Value system reward gained by application of values in which one believes
- 5. Technical acquisition of technical skill or technical data of value
- 6. Enjoyment personal enjoyment of a situation gained from involvement in it
- 7. Educational learning made possible only by efforts exerted in any given situation

page 1.08

date printed: September 29, 1998

#### • Nine major elements in the design & construction sequence & how they are done

1. Conceive the basic project

Visualize and state the fundamental nature of the proposed project, what purpose it is to serve, and its base characteristics.

#### 2. Prepare the program

Set down the physical characteristics of the total project in written and graphic form so as to be able to translate these characteristics into approval documents from which the full design can proceed.

#### 3. Articulate the program for approval

Merge the concept, and the written and graphic program into written and graphic construction language which can be reviewed and released by the ultimate decision makers for full design.

#### 4. Approve the basic project

Approve the concept, the program, and the merging of the two. This approval by those in authority initiates the full design and construction process

#### 5. Design the project

Prepare full contract documents for construction use.

6. Construct the project

Build the project and make it ready for turnover to the owner or user.

#### 7. Turn over the project

Release the constructed project to the owner or user with full documentation needed to operated and maintain the completed environment.

#### 8. Operate the project

Take over, run in, and make the new environment fully operational.

#### 9. Maintain the project

Keep the new environment in proper operating condition by a well conceived and effectively managed maintenance effort.

#### Six major participants in the design & construction process

- 1. Conceiver The ultimate decision making force behind the entire program
- 2. Translators The parties that translate the project concept into construction documents
- 3. Constructors Those who build the facility
- 4. Operators Those who operate the completed facility
- 5. Regulators Those who help assure project adherence to the cause of public good
- 6. Users Those who occupy and use the facility for the purpose for which it is intended

#### • Ten major types of design & construction problems

#### 1. Constructive acceleration

An action by a party to the contract that forces more work to be done with no time extension, or the same amount of work and a shorter period of time in which to do it.

#### 2. Constructive change

A construction action or inaction by a party to the contract that has the same effect as a written order.

#### 3. Defective or deficient contract documents

Contract documents which do not adequately portray the true contract scope.

#### 4. Delay

A situation, beyond the control and not the fault of a contract party, that causes a delay to the project

#### 5. Differing site condition

A situation in which the actual conditions at the site of a project differs from those represented on the contract documents, or from reasonable expectations of a site in that area.

6. Directed change

A legitimate change within the contract scope for which the owner is obligated to pay. 7. Impossibility of performance

A situation in which it is impossible to carry out the work within the contract requirements.

#### 8. Maladministration

The interference of one contract party with another contract party's rights, that prevents the latter party from enjoying the benefits of least cost performance within the contract provisions.

#### 9. Superior knowledge

The withholding of knowledge by one party to a contract from another party to the contract during the precontract period, and that, subsequent to contract execution, adversely affects the second party's construction operations in matters of importance.

#### 10. Termination

Dismissal of a party to the project contract for convenience or default.

# Professional Service Contract Characteristics



ho 362 Aug 97

# Construction Contract Characteristics



# Section 02 - Developing a systematic approach to managing design and construction projects

2.01 - 2.02	The project program
2.03	Development line of action & organization
2.04 - 2.06	Development phases
2.07	Project costs committed & spent - graphic
2.08	Project costs committed - definition
2.09	Types of management in project oriented business
2.10	Traditional project delivery system characteristics
2.11	Non traditional project delivery syst. characteristics
2.12	Nine major steps to effective project management
2.13 - 214	Creativity and how it is used in project management

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#### • The Project Program - summary outline

## Definition of a project program

A narrative oriented statement of the needs and character of the proposed user operation, the requirements of the user and owner, the nature of the environment to be planned, designed and built, and the corresponding characteristics of the space that will satisfy these needs and requirements. Sometimes called the brief.

#### Contents of the project program - listed alphabetically

The program for facility work contains specific information about the following items. For special uses the list below should be expanded to accommodate the unique needs of the facility.

- 1. Addresses, and phone and fax numbers of key people.
- 2. Advertising needs.
- 3. Aesthetic needs.
- 4. Backup needs
- 5. Codes and ordinances applicable.
- 6. Communication needs.
- 7. Community needs.
- 8. Cost goals pro forma

A financial model unusually built early in a design and construction program to show by projecting income and expenses, how the money flow to and from the project will occur. It is often used to establish the capital amount to be allocated to a project based on simulated operating conditions. The term pro forma means according to form.

- 9. Dimensional needs horizontal and vertical
- 10. Employee facilities and amenities
- 11. Expansion needs.
- 12. Functional needs what design will make the project behave the way it is supposed to when it is built and in operation?
- 13. Handicapped needs.
- 14. Heating and air conditioning needs.
- 15. Horizontal transportation needs.
- 16. Lighting needs.
- 17. Location of project.
- 18. Logistical needs

Logistics - The design and implementation of operations that deal with the procurement, distribution, maintenance, and replacement of material and personnel.

- 19. Name of project.
- 20. Nature of the project what is it supposed to do when it is built and in operation?
- 21. Parking needs.
- 22. Participants specifically, who are they now and in the future?
  - 1. Conceivers

Those who conceive the idea and provide the wherewithal to bring the environmental program to a successful conclusion. The conceiver may be the owner but it might also be a governmental agency, a financial source, an architect, an engineer, a contractor, a vendor or a potential tenant looking for space. We identify the conceiver since he usually is the key person driving the project on to completion.

page 2.01

#### 2. Translators

Those who translate the environmental program into construction language. Traditionally we think of the architect/engineer as the translator. However careful consideration of this matter shows there are many others who translate the conceiver's fundamental ideas into understandable, workable construction language. Subcontractors, suppliers, vendors, manufacturers, contractors, and the conceiver may all play a role in translating.

3. Constructors

Those who interpret the construction language and convert it to an actual physical environment. Occupying this role are general contractors, specialty contractors, vendors, suppliers, manufacturers, artists and others who actually put the materials into place in the field.

4. Operators

Those who operate and maintain the completed physical environment on a continuing basis. Usually the party responsible for this function is an owner or tenant working through a plant or facilities manager.

5. Regulators

Those who fill a review & inspection position to help insure protection of the health, safety, & welfare of the people. This is usually done by enforcing regulations written and adopted by qualified public or private bodies. Examples of regulators include those who work for building departments, departments of natural resources, public health agencies, fire prevention organizations, technical societies and other such groups.

6. Users

Those who use the facility either directly or remotely. Direct use is permanent or temporary occupancy of the facility. Indirect use is any interface with the building's occupants that is conducted from a location other than at the facility.

- 23. Personnel special needs.
- 24. Plumbing needs.
- 25. Power needs.
- 26. Project delivery systems to be considered. A method of assembling, grouping, organizing & managing project resources so as to best achieve project goals & objectives.
- 27. Public transportation needs.
- 28. Receiving needs.
- 29. Recreational needs.
- 30. Security needs
- 31. Shipping needs.
- 32. Special hazards and environmental problems.
- 33. Stand by needs.
- 34. Storage needs.
- 35. Structural needs.
- 36. Surveillance needs
- 37. Trash disposal and recycling needs.
- 38. Vertical transportation needs.



## Development phases - Ralph J. Stephenson P.E. - d 162 I. <u>Phase A - Launching a project</u>

The launch phase of the work is concerned primarily with locating & nurturing development opportunities or assets intended for long-term ownership and use. If the company's desire is to create negotiable development assets, the launch group works on the front edge of this effort. The launch group may call upon other functional elements of the organization as needed but the launch group must be independently creative, flexible, knowledgeable & understand and enjoy the development process.

The launch group is headed by the chief operating officer of the firm. Upper management members in charge of the other functional elements are members of his launch group. They are charged with locating high potential project opportunities, and screening and profiling them so as to maintain a high percentage of success probability.

The launch group should be relatively unstructured but must maintain a rigorous discipline relative to communication with others in Element A as well as those in their specific area of functional responsibility.

In addition, members of Element A are responsible for maintaining meticulous documentation of opportunities and related action.

## II. Phase B - Developing the project program

In the project program work phase the development staff works closely with the launch group to take over the created and profiled opportunity and substantiate its validity, or justify its rejection. The programming group's job is to bridge the gap between the free wheeling creative actions necessary in the launch action and the project implementation action. They often are the cool voice of business reason.

It is critical to understand that the program phase is where development funds are actually committed. These funds are then spent during another phase. Thus projects that emerge from the program analysis must be those with the highest probability of success.

In a sense the program function forces the project to prove itself as a feasible course of action to produce a negotiable development, or a long-term ownership asset.

Where deficiencies are located in a created opportunity, but there appears to be some soundness to the project, the program function is responsible for effecting acceptable changes to the elements that are their responsibility so as to make the project a go!

In this sense the program group must be every bit as creative as is the launch group.

## III. Phase C - Implementing the project

During the project implementation period the specific contract documentation is produced

and the project is built, leased and occupied. In essence, the majority of the funds commuted to the project during the launch and program phases are actually spent on design and construction during implementation.

Leasing during project implementation is basically rental work taking place that allows tenant improvements to proceed concurrently, sequentially and in harmony with owner work.

The project implementation staff also carries out major remodeling work to existing properties as compared to minor improvements made by the properties staff. Decisions on what is a major & minor project must be arrived at jointly by the functional groups with the aid of the executive staff.

## IV. Phase D - Managing improved properties

In the property management phase the development staff exerts management control over improved properties to insure they are successful investments. The property management staff is also responsible for continuous evaluation of each property to determine the best future course of action relative to that property at any given time.

Minor improvements to existing properties in the portfolio are the responsibility of the property management group. Property management determines the scope of work, arrange for the design and construction, and sees that the necessary field work is done.

#### V. Phase E - Maintaining the ongoing organization

The ongoing organization is an essential supportive staff designed to permit effective functioning of project oriented elements of the organization. It is a relatively high overhead operation built to serve operations.

In a project oriented firm the individual programs or projects drive the company; as such the support or ongoing group must be kept lean but be given all the tools needed to properly buttress line activities.

## VI. Phase F - Leasing the asset

Leasing of an asset usually signals the start of income flow which can be used to retire outstanding indebtedness. Many of the actions of the leasing program are accomplished in close cooperation with work accomplished in Elements B, C & D. However, final responsibility for leasing results rests with the leasing department and those charged with its management.

The leasing program usually includes both lease negotiations, and design and construction of the tenant space within the tenant's demised premises.

Tenant design and construction is usually carried out at a different pace than the landlord design and construction. For this reason the design and construction of the space may be

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assigned to a tenant coordinator who acts as the project manager for the tenant space work.



Ralph J, Stephenson PE Consulting Engineer

# Costs Committed vs. Money Spent

Committed costs are promised funds for purposes, that if such purposes are aborted a penalty must be paid, and a loss is often incurred.

Penalties and losses may include such items as:

- OPTION COSTS
- RIGHT OF FIRST REFUSAL COSTS
- LEGAL FEES
- EARLY ENGINEERING FEES
- EARLY PLANNING FEES
- DISPLEASURE OF POLITICAL ENTITIES
- STAFF TIME EXPENDITURES
- LOSS OF CREDIBILITY
- LOSS OF OPPORTUNITY

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# **TYPES OF MANAGEMENT IN PROJECT**

# **ORIENTED BUSINESSES**

• FUNCTIONAL - as related to <u>continuous</u> management

A business operation designed or adapted to perform a specialized activity or duty usually exerting a direct influence on the continuous operations of the company.

Examples are departments of estimating, accounting, legal, office administration and similar ongoing functions.

• **PROJECT** - as related to <u>discrete</u> management

A specific management assignment designed to achieve defined objectives by accomplishing a group of related, discrete project operations. Project operations have well defined beginning and ending points.

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# TRADITIONAL PROJECT DELIVERY SYSTEM CHARACTERISTICS

1. Checks and balances normally built in from start

2. Construction decisions usually based on capital costs

3. Participant selection often made by cost competitive bidding

4. Job control is highly centralized in most stages

5. Project usually being built for owner/users

6. Contract documents completed before bidding

7. Bidders selected from short list derived from long list (occasionally use long list)

8. Bonding is often required

9. Site preparation and expense work often by owner before construction starts

<u>Note</u> - Expense work includes those costs that do not directly increase life or value of the facility.

10. Majority of attention given to the need and want list. Wish list usually considered a luxury.

# NON TRADITIONAL PROJECT DELIVERY SYSTEM CHARACTERISTICS

1. Checks and balances evolve as project proceeds and when need arises.

2. Construction decisions based on capital costs, maintenance costs, operating costs, project quality desired, and desired investment return.

3. Lead participant selection made on professional and technical abilities, and on reputation and past performance, along with estimated project cost.

4. Job control somewhat decentralized during early program and design stages with progressive centralization as the working document and construction phases are approached.

5. Project could be for a variety of conceivers and prime movers including owners, users, investors, developers, funds, syndicates, governmental agencies (privatisation), and groups assembling capital to gain desired returns on investment.

6. Construction is often closely dovetailed with design of the project. Design usually proceeds with construction guidance, and advice from a construction discipline.

7. Capital cost is often negotiated from the pro forma base and reduced in stages to a guaranteed maximum price (gmp).

8. Need for bonding is usually minimized or eliminated by careful selection procedures to maximize probability of success.

9. Site preparation and expense work often done by various members of the selected project or program team.

Note - Expense work includes those costs that do not directly increase life or value of the facility.

10. Design and construction is heavily influenced by consideration of the needs, wants and wishes of the participants.

# NINE MAJOR STEPS TO EFFECTIVE PROJECT MANAGEMENT

#### **DEFINITIONS**

• PROJECT - A set of work actions having identifiable objectives, and a beginning and an end.

• <u>EFFECTIVE</u> - Of a nature that achieves identifiable goals and objectives in accordance with an action plan, and reaches worthwhile peripheral goals through intermediate accomplishments.

• <u>MANAGEMENT</u> - The identification, assembly and direction of resources to achieve desired results.

#### **OUESTION**

- What is different about project organization compared to functional organization?
- 1. Project organization is usually temporary.
- 2. Project organization is usually based on a different rationale than is functional organization.
- 3. Project authority positions tend to be vested first and earned later.

#### STEPS TO GOOD PROJECT MANAGEMENT

• A good project seems to require 9 major steps, done well, to be successful.

1. Goals and objectives for the project are clearly identified, and starting, intermediate and ending measuring points established early in the project life.

2. A suitable project delivery system is selected as the goals & objectives are defined.

3. An action plan showing desired and necessary courses of action from beginning to end of the project is prepared.

4. The action plan is translated into schedules, and the resources needed are determined and balanced for most profitable performance.

5. A project organization is built under (not over) the resources required to provide resource management quality, continuity, and monitorbility.

6. A method of isolating, identifying and correcting deviations from desired performance standards is designed and put into action.

7. The needed resources are assembled and the project team gets to work.

8. Progress and performance of the project team is measured and evaluated using management by exception.

9. The project is closed out promptly, cleanly, and totally as work draws to a close.

# CREATIVITY AND HOW IT IS USED IN PROJECT MANAGEMENT

Creative thinking is an essential ingredient to successful project management. It helps the alert project manager to solve problems, establish management patterns, provide leadership and motivation, and to insure that design, quality and cost integrity of a project is maintained.

Creative thinking is applied to the management process on a routine basis by continuing to learn with an open mind; being among the first to accept something new while being among the last to discard the old.

There is also a special requirement for creative thinking that demands getting rid of what Roger von Oech in his book, A WHACK ON THE SIDE OF THE HEAD, calls mental locks. These mental locks are recognized by such familiar phrases as:

- 1. I'm looking for the right answer.
- 2. That isn't logical.
- 3. Be certain to follow the rules.
- 4. Let's be practical about this.
- 5. And don't make any mistakes.
- 6. Playing is a waste of time.
- 7. That's not my area of work.
- 8. Don't be silly.
- 9. But I'm not a creative person

The above statements indicate a set pattern of thinking, that when used blindly, get in the way of the creative process.

Other major obstacles to thinking creatively include making premature judgments, and excessive use of the self fulfilling prophecy. The self fulfilling prophecy usually indicates you have your mind made up before even starting any heavy thinking about the idea. You then never give your brain a chance to do any creative thinking.

Remember, it is nearly impossible to be creative and judgmental at the same time. So, in project management it is a good idea when creatively considering a complex matter to prepare a random, or non judgmental, laundry list of things that have to be done or thought about. The list should include all items within reason, whether or not you and the others involved think it should be included. Often the combination of a single idea of doubtful merit is a brilliant thought in league with other ideas.

Processes of creatively tackling a problem have been used for hundreds of years by many excellent thinkers. The creative procedure can be described in six major steps.

1. Gather all facts that time will allow, about the subject under consideration. Try not to be judgmental while you are collecting information.

2. Think hard about the data and the other information you have gathered in relation to the problem or situation you are involved with.

3. Forget about the problem! Let the material looked at so far, and the ideas you might have, get mulled over by your subconscious. This period is called gestation.

4. Ideas (illumination!) will usually start springing to mind soon after the gestation period starts. However, in some cases it might take several days, weeks, or even months. Be alert for the sudden revelation of the solution. When the solution or idea or lost thought appears grab it and write it down!

5. Act on the solution, idea or thought!

6. Follow up and check to see if the solution was a good one and if it has worked.

Creativity is a simple, elegant way of life. All you must do to enjoy it is to unlock your thinking, exercise your mind and use your imagination!
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## Section 03 - Project management and profitability

3.01	Pogo
3.02	The need for profit
3.03	Profit potential levels
3.04	Profit potential levels - details
3.05 - 3.07	Setting goals & objectives
3.08	Destructive conflict
3.09	People
3.10	Positive conflict
3.11 - 3.12	Causes of destructive conflict
3.13	7 actions to resolve potentially destructive conflict
3.14 - 3.15	Case study - Architectural - Vyvyan
3.16 - 3.17	Problem mentions
3.18	8 most freq mentioned design and const. problems

# WE HAVE MET THE ENEMY AND HE IS US.

From Walt Kelly and Pogo

ho 499 Aug 97

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## THE NEED FOR PROFIT

## A. KINDS OF PROFIT

- 1. Financial
- 2. Social
- 3. Self actualization
- 4. Value system
- 5. Technical
- 6. Enjoyment
- 7. Educational

## **B. ELEMENTS OF MULTI VALUE COMPETITION**

- 1. Competence
- 2. Service
- 3. Integrity
- 4. Cost
- 5. Delivery
- 6. Understanding

## C. HOW DO WE ACHIEVE PROFIT - TRUE PROFIT?

- 1. Be smarter
- 2. Plan better
- 3. Control closer
- 4. Achieve more

& profits will be automatic!

## **PROFIT POTENTIAL LEVELS**

# LEVEL 1 - INCLUDE EVERYTHING

# LEVEL 2 - PREPARE A GOOD WORK PLAN

# LEVEL 3 - PREPARE A GOOD SCHEDULE

## **Profit Potential Levels**

In construction the concept of profit is complex and often misunderstood. There are many kinds of profit - financial, socioeconomic, value system, self actualization, education, enjoyment, technical, and probably as many more equally important but less obvious.

If we view the various kinds of returns on investments relative to project management, it appears there are three major levels of profit potential available, that achieved by arranging these elements in an affective action sequence and the profit achieved by making effective use of discretionary of float time. These are identified as levels A, B, C respectively.

A brief discussion of each is given below.

#### Level A Profit Potential

The basic profit potential is realized when the manager and his project team have made certain to include all project elements in the estimating, planning and control process; when they have made certain that everything is counted and there are no missing pieces. Every element missed erodes the profit picture just as a missing piece of a jigsaw puzzle spoils the pleasure in assembling it.

#### Level B Profit Potential

Once project elements are accounted for they must be properly arranged in a logic pattern to produce the most effective plan of action. In any plan there are identified desired and necessary relationships. The proper expression of desired relations is a major factor in realizing level B profit potential. Here is where the true skill of the project manager begins to impact upon the job. The experienced, intelligent, knowledgeable manager will explore, stimulate and select the most effective ways of assembling the job under his control. The level B profit potential is highest when the best ways have been selected.

#### Level C Profit Potential

This profit is highest when the job is scheduled well and a selection made as to where each task should be done in relationship to the discretionary time available to it. Often discretionary time is identified as float time. Where the good manager schedules the task when he has resource options ( time, money, equipment, etc. ) will largely determine how profitable the level C management work has been.

In a nutshell, level A profit potential deals with <u>identifying</u> all the elements involved. Level B profit potential is concerned with <u>arranging</u> these elements in a logical and effective action plan. The level C profit potential is engaged when the project is <u>managed</u> well by proper scheduling within allowable resource limits.

## Setting goals & objectives

To effectively manage a project you need to know what is to have been accomplished when the job is complete.

Some guidelines to identifying and writing out project goals and objectives are given below:

#### <u>Step 1.</u>

Answer this question

# • What is the most important result to be achieved by this project being successfully completed?

Write your response.

Your statement now becomes a project mission from which detailed goals and objectives can be generated.

#### <u>Step 2.</u>

Decide upon and write the major activity classifications within which you wish to achieve the mission stated in Step 1. Some classifications for detailed goal definition in project management might include:

- Company
- Organizational
- Departmental
- Project
- Social
- Financial
- Community
- Technical
- Professional
- Educational
- Personal
- Project staff
- Career

#### <u>Step 3.</u>

Select the classifications you feel most comfortable with, and write several brief statements of what you want to achieve within these activity categories. Don't think about numbers and time frames yet. Concentrate on getting good content in each statement. Typical statements might be:

For the project:

- To implement a job data base tracking system for submittal turn around
- To significantly reduce job meeting times and improve follow up results.

- To design and implement a structured job inspection and reporting system procedure

For your career:

- To learn and use network modeling techniques

- To work specifically toward using this project experience to move to the next higher position rating

- To diagram and study the organizational structures of effective design and construction firms on the project

## <u>Step 4.</u>

When you have written out as many targets you wish or must achieve, and that you can comfortably think of, reorganize them into a classification system best suited for the project you are on. Classification can be by the original groups, or you may wish to rearrange them by subject, time span, people involved, degree of achievability, people influencing their achievement, or any other common qualities that allows you to work comfortably in converting the desires to accomplishments.

#### Step 5.

Once you have a satisfactory list of desires, begin assigning quantities to the goals in the list. Quantities may be in dollars, manpower, time, space, talent, opportunity, or any other you may wish. This quantification step converts non numerical goals to numerical objectives. It is a step you must take to get from wish to reality. Remember <u>project management is objective oriented</u>. Converting goals to objectives is essential for effective project management.

For example the unquantified target stated in Step 3 above, "<u>To significantly reduce</u> job meeting times and improve follow up results.", might now be amplified by such specific objectives as:

- Within 3 weeks of field job start to have all project minutes being done on an IBM compatible word processor.
- Within 6 weeks of field job start to be using technography methods to record and approve job meeting notes.
- Within 7 weeks of field job start to publish job minutes by late afternoon of the meeting day.
- Within 1 week of field job start to be discussing in job meetings only job matters having a minimum decision to action time span of one week.

## Step 6.

When you have enough objectives, to satisfy your initial needs, stop for a while and concentrate on achieving what your objectives demand of you. The call now is for action!

## <u>Step 7.</u>

As you put the goal and objective achievement process into operation, keep adding goals and objectives to the list you have prepared.

Remember, your needs, and the project's needs change continually. In Step 1 you defined the fundamental project mission. Around this stable base the detailed goal & objective setting must continue as the project unfolds.

# **DESTRUCTIVE CONFLICT**

Animosity or disagreement which results in lowering the potential for an individual or organization to succeed.

# PEOPLE

Most people are honest, concerned, desirous of challenge, need attention, and welcome help in times of turmoil.

# **POSITIVE CONFLICT**

Hostility that is managed so that its resolution raises the potential for individuals or organizations to succeed at being excellent.

# Destructive conflict in today's technical world is often caused by:

• Not understanding that conflicts lead directly to results.

• Frustration over a lack of control of events affecting performance.

• Differences in goals and objectives of parties in the project.

• Lack of understanding about the needs of others also involved in the planning, design, and construction process.

• Resentment or dislike resulting from a perceived lack of value added to projects by those responsible for adding value.

• Excessive technical and legal delays to resolution of conflict.

- Excessive demands on resources normally depended on to assist in the resolution of conflict.
- Greed.

- Incorrect assumptions made from biased perceptions.
- Demands for higher quality than specified.
- Failure to meet commitments.
- Insufficient time to make required decisions.
- Lack of ability to do the job.
- Poor or inadequate training.
- Inadequate credentials to do the job.
- Indifferent leadership.
- Actual or perceived overwork.
- Bad blood among participants.
- Desire to take advantage of those in weaker positions.
- Misplaced attempts to demonstrate who is in charge.

# Seven actions to smooth out and resolve potentially destructive conflict

• Action 1) Understand the cause of the conflict.

• Action 2) Put yourself in the other person's shoes.

• Action 3) Understand the relative importance of resolution vs. nonresolution.

• Action 4) Become competent in properly applying the technical and professional management tools of our profession.

• Action 5) Don't lie. Always tell the full truth.

• Action 6) Thoroughly understand the obligations you have to society and to your clients, your employer, and your peers.

• Action 7) Understand everything you can...not just your own field, and work to be effective in managing intersections of diverse interests.

## **CASE STUDY - DEFINITION OF GOALS & OBJECTIVES**

You have just been promoted to senior project manager for Vyvyan and Associates, a moderate size architectural firm of about 120 people. You are a registered architect with a bachelor's degree in architecture and a master's degree in urban planning. Your strong features brought you to the forefront of the project management group at Vyvyan and now you are recognized as the possible future vice president in charge of operations and projects.

Vyvyan is organized around strong functional operations, but has a management that understands and appreciates the value of project management. The firm has a good reputation for competent architectural design and good technical backup.

The design department under Jon Teleman tends to design expensively, but will listen if sound, rational reasons are given for disagreeing with their concepts.

The architectural production department head, Carl Trilar, is a hard headed man of 39, who has a wealth of experience and is well thought of by his staff. He does not always agree with the design group and frequently revises major details without consulting the design team. This leads to hard feelings and recently has caused budget overruns on several weakly managed projects.

The engineering departments have tended to follow patterns set by the design and architectural department without too many problems or conflicts. However, Mr. Vyvyan just brought in a new chief engineer, Bob Lott, who has already clashed with Carl Trilar in a dispute in which Mr. Lott sided with Jon Teleman.

Your firm has been contacted by a moderate size developer, The Dreyfus Corporation, and offered an architectural and engineering commission to design a new 8 story office building of 240,000 square feet. The building is to be a tenant occupied structure with a core utility space containing elevators, stairs, riser shafts, toilet rooms, telephones, and electrical and janitor closets. Perimeter spaces will consist of standard rental areas, and will be finished with a smooth concrete floor, acoustic ceiling, lights and diffusers.

As the space is leased Dreyfus will install tenant improvements consisting of carpeting, partitions, doors and other items covered by the standard lease. Tenants will have the option of adding additional items in the space subject to Dreyfus approval.

You have worked for several months cultivating the Dreyfus organization in the hope Vyvyan would be awarded this project. When Mr. Dreyfus called yesterday and said they had selected Vyvyan and Associates to do the work you were delighted. Mr. Vyvyan has told you he wants you to be the project manager and to develop a solid ongoing business and professional relation with Dreyfus.

Your pleasure has been somewhat dulled by the news that Dreyfus has also retained a general contracting firm, Spencer Brothers, a traditional old line but reliable organization, to advise the design team on costs and construction materials and systems during the design period. Mr. Dreyfus is known to want Spencer to build the job on a negotiated basis. The chances of this happening are about 90%.

You have no bone to pick with Spencer but certain people in your firm, particularly Carl Trilar, feel Spencer's appointment as a peer indicates a lack of confidence in you by Mr. Dreyfus. You don't share this opinion and feel there is a good chance to profit from the association with both Dreyfus and Spencer.

With this background address the following questions:

- 1. What goals would you set for the design work of Vyvyan and Associates?
- 2. What goals would you set for the relations between Dreyfus and Vyvyan?
- 3. Translate the goals in 1, and 2 into some specific objectives.
- 4. What personal goals would you define for yourself in this situation?

5. Identify some of the department related peripheral goals that might emerge from the project organization.

6. Could you shape the goal setting of Dreyfus and Spencer? How, and in what direction?

# PROBLEM MENTIONS

Total assignments of problem types from 2,855 responses to the questions "What job difficulties are caused by us and by others?" Listed by frequency of appearance.

- 01. 1146 Job management.
- 02. 0984 Communicating with others.
- 03. 0684 Staff morale and attitudes.
- 04. 0593 Personnel quality and problems.
- 05. 0475 Being a good on-site neighbor.
- 06. 0467 Timely action.
- 07. 0396 Planning and scheduling.
- 08. 0371 Organization, authority, and responsibility.
- 09. 0288 Work site conditions.
- 10. 0268 Revision processing.
- 11. 0267 Construction document quality.
- 12. 0233 Program conditions.
- 13. 0205 Submittal processing.
- 14. 0166 Issue, conflict, and problem resolution.
- 15. 0166 User group interaction.
- 16. 0145 Equipment and material problems.
- 17. 0141 Documents and documentation.
- 18. 0133 Decision making.
- 19. 0125 Procurement of materials and equipment.
- 20. 0116 Project cost structure.
- 21. 0112 Closing out the project.
- 22. 0097 Contract interpretation.

- 23. 0097 Quality management.
- 24. 0095 Payment processing.
- 25. 0092 Paper and administrative work.
- 26. 0090 Approval processes.
- 27. 0088 Being a good off-site neighbor.
- 28. 0073 Time growth.
- 29. 0070 Policies and procedures.
- 30. 0069 Inspecting and testing.
- 31. 0069 Staffing and manpower.
- 32. 0064 Cost growth.
- 33. 0058 Substitutions and alternates.
- 34. 0052 Maintaining regular project evaluations.
- 35. 0052 Safety.
- 36. 0049 Regulatory agency matters.
- 37. 0022 Constructibility.
- 38. 0022 Training.
- 39. 0022 Value engineering.
- 40. 0014 Labor conditions.
- 41. 0014 Legal matters.
- 42. 0011 Backcharges.
- 43. 0011 Financial problems.
- 44. 0010 Weather conditions.
- 45. 0005 Warranty conditions



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## Section 04 - Planning and monitoring projects

- 4.01 Job planning what is it?
- 4.02 Advantages of good planning
- 4.03 4.05 Act from a plan
- 4.06 CPM exercise #1
- 4.07 Solution to exercise #1 precedence
- 4.08 4.11 Working day calendar
- 4.12 Questions to be asked about your project
- 4.13 Chicago area weather
- 4.14 Network model for preparation of contract documents

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## JOB PLANNING - WHAT IS IT ?

1. <u>PLANNING</u> is to formulate a sequence of actions leading to an end goal.

2. <u>NETWORK PLANNING</u> is to graphically depict this sequence of action.

3. <u>CRITICAL PATH PLANNING</u> is a technique of establishing resource limits on each plan component.

## PLAN VISIBLY !

# ADVANTAGES OF GOOD PLANNING

1. Provides accurate simulation of the project.

2. Provides early statement of intent.

3. Encourages good communication on the project.

4. Provides management by exception potential.

5. Allows accurate tracking of project progress.

6. Allows accurate performance evaluation.

7. Provides accurate project history.

## Act from a Plan - If you can't plan it, you can't manage it. Good plans shape good decisions.

## I. Five essential planning questions for the manager to ask and answer.

- A. What?
- B. Where?
- C. When?
- D. How?
- E. Who?

## II. Five essential planning actions for the manager to take.

- A. Set goals and objectives.
- B. Prepare and action plan.
- C. Organize the work.
- D. Assemble the resources needed.
- E. Do the job.

## III. Set goals and objectives.

- A. Definitions
  - 1. Goals Targets, desires, wishes and aims expressed without a time scale.
  - 2. Objectives Expressed goals upon which a time frame has been imposed.
- B. The DIG/DEG/DOG
- C. Be specific when setting objectives.
- D. Set objectives so that movement toward their achievement can be measured.

## IV. Prepare an action plan.

- A. May be verbal, written, or visual.
- B. May be strategic or tactical, detailed or summary.
- C. May be short, medium, or long range (the manager must set the planning time scale.
  - 1. The shorter the time interval covered by the plan, the greater is the chance the plan will succeed. However, the shorter the time interval, the greater the probability that longer range needs, which truly measure the manager's effectiveness, will remain unfulfilled.

- 2. The higher you are in the management structure the larger and longer the planning scale you must use.
- 3. The concepts of decision to action time span.
- D. Plan the work and work the plan!

## V. Organize the work

- A. Plans should be build upon maximum integration of management viewpoints.
- B. Establish relationships through functional diagraming of interconnections.
  - 1. Formal.
  - 2. Informal.
  - 3. Reporting.
  - 4. Staff.
  - 5. Temporary.
- C. Make clear cut assignments.
  - 1. The manager should not assume a person will automatically know his full pattern of responsibilities.
  - 2. Don't leave definition of authority and responsibility to chance. Be specific.
- D. Build a feedback system.
  - 1. Grapevine often used in informal feedback.
  - 2. Formal feedback system should be built by specific assignment (must have a standard of performance for the feedback system to work well).
- E. Organize to accomplish goals and objectives.
  - 1. Keep organization lean avoid unnecessary overhead.
  - 2. Make provisions in the organization to delegate and train.
  - 3. Tend to build around targets and needs rather than people (there are major exceptions to this, watch carefully)
  - 4. Provide for proper grading of decision to action time spans.

## VI. Common planning failures

- A. Not touching all organizational bases what, where, when, how, and who.
- B. Committing to too many goals ad objectives at one time.
- C. Underestimating the value and need for good forward planning.
- D. Failure to challenge plans and actions at the right time.
- E. Not providing proper escape hatches and safeguards.
- F. Failure to encourage timely, knowledgeable participation.
- G. Not obtaining higher level approvals of goals and objectives.
- H. Inadequate monitoring and control of costs, progress, documentation and resource loading.

- I. Poor assignment of duties, responsibilities, and actions.J. Failure to understand that planning is a major task of the manager.

## CPM Exercise #1

Project starts with task A.

D can be concurrent with A.

B must follow A and precede F.

C follows A

E cannot begin until both C and D are complete

F precedes G and H.

G cannot begin until E is complete

H, G, and I must precede J.

I follows E and precedes L.

K follows D.

L cannot begin until K is complete.

J and L must be complete before M can start.

N cannot start until L is complete.

O follows N.

P is the last task and can start only when M and O are complete.



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07	004	20	056	01	106	12	157	26	209
08	005	23	057	02	107	13	158	27	210
09	006	24	058	03	108	14	159	28	211
12	007	25	059	04	109	17	160	29	212
13	008	26	060	05	110	18	161	30	213
14	009	27	061	08	111	19	162	Nov.	98
15	010	30	062	09	112	20	163	02	214
16	011	31	063	10	113	21	164	03	215
19	012	Apr.	98	11	114	24	165	04	216
20	013	01	064	12	115	25	166	05	217
21	014	02	065	15	116	26	167	06	218
22	015	03	066	16	117	27	168	09	219
23	016	06	067	17	118	28	169	10	220
26	017	07	068	18	119	31	170	11	221
27	018	08	069	19	120	Sep.	98	12	222
28	019	09	070	22	121	01	171	13	223
20	020	10	071	23	122	02	172	16	224
30	021	13	072	24	123	03	173	17	225
Feb	98	14	073	25	124	04	174	18	226
02	022	15	074	26	125	08	175	19	227
02	022	16	075	20	126	09	176	20	228
00	024	17	076	30	127	10	177	23	229
05	025	20	077	Jul	08	11	178	24	230
05	025	20	078	01	128	14	170	25	231
00	020	22	070	02	120	15	180	27	232
10	027	23	079	02	130	16	181	30	233
11	020	20	000	07	131	17	182	Dec	98
12	029	27	082	08	132	18	183	01	234
12	030	20	002	00	192	21	184	02	235
10	031	20	085	10	13/	22	195	02	236
17	032	29	004	12	135	23	186	03	237
10	033	Max	005	14	136	20	187	07	238
10	034	<b>Miay</b> ,	086	15	197	25	188	08	230
20	035	04	087	16	132	28	180	00	240
20	030	05	007 .	17	130	20	100	10	240
20	037	05	000	20	140	30	101	11	242
24	038	07	009	20	140	Oct	08	14	243
20	039	07	090	22	140	01	102	15	240
20	040	11	091	22	142	02	103	16	245
2/	09	10	092	20	143	02	193	17	245
mar,	90	12	093	24	144	05	194	10	240
02	042	10	094	20	146	00	195	21	210
03	043	14	090	20	147	02	197	22	240
04	044	10	090	30	148	00	198	23	250
05	040	10	007	31	140	12	100	24	251
00	047	20 19	000	Δ1141	08	1.9	200	28	252
10	047	20	100	749, 03	150	14	201	20	253
10	040	20	101	03	151	15	202	30	254
10	049	26	102	05	152	16	203	31	255
12	050	20	102	00		10	204		200
19	001					13	207		

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Jan,	1999	15	306	25	357	05	407	18	458
04	256	16	307	26	358	06	408	19	459
05	257	17	308	27	359	09	409	20	460
06	258	18	309	28	360	10	410	21	461
07	259	19	310	Jun,	99	11	411	22	462
08	260	22	311	01	361	12	412	25	463
11	261	23	312	02	362	13	413	26	464
12	262	24	313	03	363	16	414	27	465
13	263	25	314	04	364	17	415	28	466
14	264	26	315	07	365	18	416	29	467
15	265	29	316	08	366	19	417	Nov,	99
18	266	30	317	09	367	20	418	01	468
19	267	31	318	10	368	23	419	02	469
20	268	Apr,	99	11	369	24	420	03	470
21	269	01	319	14	370	25	421	04	471
22	270	02	320	15	371	26	422	05	472
25	271	05	321	16	372	27	423	08	473
26	272	06	322	17	373	30	424	09	474
27	273	07	323	18	374	31	425	10	475
28	274	08	324	21	375	Sep,	99	11	476
29	275	09	325	22	376	01	426	12	477
Feb,	99	12	326	23	377	02	427	15	478
01	276	13	327	24	378	03	428	16	479
02	277	14	328	25	379	07	429	17	480
03	278	15	329	28	380	08	430	18	481
04	279	16	330	29	381	09	431	19	482
05	280	19	331	30	382	10	432	22	483
08	281	20	332	Jul,	99	13	433	23	484
09	282	21	333	01	383	14	434	24	485
10	283	22	334	02	384	15	435	26	486
11	284	23	335	06	385	16	436	29	487
12	285	26	336	07	386	17	437	30	488
15	286	27	337	08	387	20	438	Dec,	99
16	287	28	338	09	388	21	439	01	489
17	288	29	339	12	389	22	440	02	490
18	289	30	340	13	390	23	441	03	491
19	290	May,	99	14	391	24	442	06	492
22	291	03	341	15	392	27	443	07	493
23	292	04	342	16	393	28	444	08	494
24	293	05	343	19	394	29	445	09	495
25	294	06	344	20	395	30	446	10	496
26	295	07	345	21	396	Oct,	99	13	497
Mar,	99	10	346	22	397	01	447	14	498
01	296	11	347	23	398	04	448	15	499
02	297	12	348	26	399	05	449	16	500
03	298	13	349	27	400	06	450	17	501
04	299	14	350	28	401	07	451	20	502
05	300	17	351	29	402	08	452	21	503
08	301	18	352	30	403	11	453	22	504
09	302	19	353	Aug,	99	12	454	23	505
10	303	20	354	02	404	13	455	27	506
11	304	21	355	03	405	14	456	28	507
12	305	24	356	04	406	15	457	29	508
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					e-mail: raipnjs@g	ic.net			
Jan,	2000	13	560	23	611	03	661	17	713
03	510	14	561	24	612	04	662	18	714
04	511	15	562	25	613	07	663	19	715
05	512	16	563	26	614	08	664	20	716
06	513	17	564	30	615	09	665	23	717
07	514	20	565	31	616	10	666	24	718
10	515	21	566	Jun,	2000	11	667	25	719
11	516	22	567	01	617	14	668	26	720
12	517	23	568	02	618	15	669	27	721
13	518	24	569	05	619	16	670	30	722
14	519	27	570	06	620	17	671	31	723
17	520	28	571	07	621	18	672	Nov,	2000
18	521	29	572	08	622	21	673	01	724
19	522	30	573	09	623	22	674	02	725
20	523	31	574	12	624	23	675	03	726
21	524	Apr.	2000	13	625	24	676	06	727
24	525	03	575	14	626	25	677	07	728
25	526	04	576	15	627	28	678	08	729
26	527	05	577	16	628	29	679	09	730
27	528	06	578	19	629	30	680	10	731
28	529	07	579	20	630	31	681	13	732
31	530	10	580	21	631	Sen	2000	14	733
Feb	2000	11	581	22	632	01	682	15	734
01	531	12	582	23	633	05	683	16	735
02	532	13	583	26	634	06	684	17	736
02	532	1.4	594	27	635	07	685	20	737
04	534	17	585	28	636	08	686	21	738
07	535	1.0	586	20	637	11	687	22	730
07	536	10	597	20	638	12	688	24	740
00	537	20	588	Jul	2000	13	689	27	741
10	539	21	590	03.	630	1.4	600	28	749
10	530	21	500	05	640	15	601	20	742
4 /	535	27	501	05	641	10	602	20	740
14	540	25	502	07	647	10	603	Dec	2000
10	541	20	592	10	642	20	693	01	745
10	542	21	595	10	643	20	605	04	745
10	545	20	2000	10	645	21	695	04	740
10	544	_ ivia.y,	505	12	645	22	607	05	7/0
21	545	01	595	13	640	25	6097	00	740
22	540	02	590	14	647	20	600	07	749
23	547	03	597	10	640	21	700	11	750
24	548	04	590	10	049	20	700	10	751
25	549	05	233	19	650	29	701	12	752
28	550	08	600	20	051		2000	13	753
29	551	09	601	21	652	02	702	14	754
Mar,	2000	10	602	24	653	03	703	15	755
01	55Z	11	003	20	004	04	704	10	130 757
02	553 554	12	004 605	20	000	00	703	19	131 750
03	334 555	10	005	21	000	00	700	20	750
00	555	10		20	007	10	707	<u>د ا</u>	759
0/	555 557	17		J   A	000	10	700	22	700
08	55/	18	800	Aug,	2000	11	709	20	701
09	558 550	19	0U9 610	01	660	12	710	21	102
10	228	22	010	02	000	13	711	20	103
						0	112	<u>ر ع</u>	/04

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Jan,	2001	13	815	23	866	03	916	17	968
02	765	14	816	24	867	06	917	18	969
03	766	15	817	25	868	07	918	19	970
04	767	16	818	29	869	08	919	22	971
05	768	19	819	30	870	09	920	23	972
08	769	20	820	31	871	10	921	24	973
09	770	21	821	Jun.	2001	13	922	25	974
10	771	22	822	01	872	14	923	26	975
11	772	23	823	04	873	15	924	29	976
12	773	26	824	05	874	16	925	30	977
15	774	27	825	06	875	17	926	31	978
16	775	28	826	07	876	20	927	Nov.	2001
17	776	29	827	08	877	21	928	01	979
18	777	30	828	11	878	22	929	02	980
19	778	Anr.	2001	12	879	23	930	05	981
22	779	02	829	13	880	24	931	06	982
23	780	03	830	14	881	27	932	07	983
24	781	04	831	15	882	28	933	0.8	984
25	782	05	832	18	883	20	034	ng	985
26	702	00	833	10	884	30	035	12	380
20	793	00	834	20	885	31	900	13	0.97
29	795	10	835	21	886	Can	2001	14	088
21	785	11	836	20	997	04	037	15	080
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Γ <b>υ</b> υ, Δ1	2001	12	007	20	000	05	930	10	001
01	707	10	030	20	009	00	939	19	991
02	700	10	039	21	090	107	940	20	992
05	789	10	040	20	091	10	941	21	993
00	790	10	041	29	092	10	942	23	994
07	791	19	842	Jui,	2001	12	943	20	992
08	792	20	843	02	893	13	944	27	990
09	793	23	844	03	894	14	945	20	997
12	794	24	040	05	090	10	940	29	990
13	795	20	040	00	090	10	947	Dee	999
14	796	20	047	10	89/	19	940	Dec,	1000
10	797	27	848	10	090	20	949	03	1000
16	798	30	849	11	899	21	950	04	1001
19	799	may,	2001	12	900	24	951	05	1002
20	800	01	850	13	901	25	952	00	1003
21	801	02	851	10	902	26	953	107	1004
22	802	03	852	17	903	27	954	10	1005
23	803	04	853	18	904	28	955	11	1006
26	804	07	854	19	905	Uct,	2001	12	1007
27	805	80	855	20	906	01	955	13	1008
28	806	09	856	23	907	02	957	14	1009
Mar,	2001	10	857	24	908	03	958	17	1010
01	807	11	858	25	909	04	929	18	1011
02	808	14	859	26	910	05	960	19	1012
05	809	15	860	27	911	08	961	20	1013
06	810	16	861	30	912	09	962	21	1014
07	811	17	862	31	913	10	963	24	1015
08	812	18	863	Aug,	2001	11	964	26	1016
09	813	21	864	01	914	12	965	27	1017
12	814	22	865	02	915	15	966	28	1018
						16	967	31	1019

# Questions to be answered about your project

1)	What?	 What is the scope of the activity?
		 What is the standard of performance?
		 What are our objectives?
		 What are our goals?
		 What is needed to start?
2)	Where?	 Where will the work take place?
3)	When?	 When does the work start?
		 When is the work supposed to finish?
		 When <u>will</u> the work be completed?
4)	How?	 How do I know when the job is done?
		 How do I know if we've done a good job?
		 How do I get out of the job when it is done?
5)	Who's?	 Who's responsible?
		 Who's in charge?
		 Who's doing the work?
		 Who's liable?
		 Who's in charge for my client?
		 Who's the ultimate decision maker? (UDM)

## Chicago Area Weather

## Source: Jack Kolstadt

Weel	¢	Working Day	Total Working Days Worked	Loss in Working Days
Dec.	1	234	3.5	1.5
	2	239	3.5	1.5
	3	244	4	1
	4	249	3	2
Jan.	1	256	2.2	2.8
	2	<b>26</b> 1	2.2	2.8
	3	266	3.5	1.5
	4	271	3	2
Feb.	1	277	3	2
	2	282	3	2
	3	287	4	1
	4	292	3.5	1.5
Mar.	1	297	4.5	0.5
	2	302	4.5	0.5
	3	307	4	1
	4	312	3.5	1.5
Apr	1	320	3.5	1.5
-	2	325	4.5	1.5
	3	330	4	1
	4	335	5	0

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### Section 05 - Project budgeting and controls

- 5.01 Line of action
- 5.02 Budgeting terms
- 5.03 Iterative costing sequence
- 5.04 Design work phasing
- 5.05 Scope of design work
- 5.06 Architectural/Engineering % fee guidelines
- 5.07 5.09 Project cost plan

date printed: 10/18/99

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page 5.01

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# **Budgeting terms**

## I. Proforma - in real estate development

A financial model unusually built early in a construction program to show by projecting income and expenses, how the money flow to and from the project will occur. It is often used to establish the capital amount to be allocated to a project based on simulated operating conditions. The term pro forma means <u>according to form</u>.

# II. Program - as defining a step in the design process

A narrative oriented statement of the needs and character of the proposed user operation, the requirements of the user and owner, the nature of the environment to be planned, designed and built, and the corresponding characteristics of the space that will satisfy these needs and requirements. Sometimes called the brief.

# III. **Program - as defining a generic construction effort**

A major planning, design, construction, and operational construction effort made up of several projects.

## IV. Must list

Items that must be included in the scope of work to make the project a go. If any of the items in the must list are not able to be included the project is a no-go.

# V. Want list

Items that are wanted and can be included in the scope of work, over and above the must list items, since they provide a definable and acceptable rate of return on their cost.

# VI. Wish list

Items that the owner and the user wish they could include but might not be able to due to budgetary or other reasons. Wish list items are best added, not deleted, as the project moves into construction.



### THE ITERATIVE COSTING SEQUENCE

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> > Sheet #IT1

ho 418 - October, 93

Ralph J. Stephenson PE PC Consulting Engineer

# **DESIGN WORK PHASING**

The following list is a commonly used combination of design document phases for preparation and processing of construction contract documents. Other phases may be added to, or substituted for those listed depending on the needs of the project, the owner, the user, and the project team. Further modifications may also be made to suit special requirements of the project delivery system being used.

- **<u>PROGRAM PHASE</u>** Narrative statement of facility characteristics.
- <u>SCHEMATIC DESIGN PHASE</u> Conceptual development of the design.
- **DESIGN DEVELOPMENT PHASE** Refined details of conceptual design
- **<u>CONSTRUCTION DOCUMENT PHASE</u>** Full construction documents.
- **<u>CONSTRUCTION ADMINISTRATION PHASE</u>** Construction presence.

### **SCOPE OF DESIGN WORK PHASING**

The following list is a commonly used combination of design document phases for preparation and processing of construction contract documents. Other phases may be added to, or substituted for those listed depending on the needs of the project, the owner, the user, and the project team.

• <u>PROGRAM PHASE</u> - A narrative statement of the project requirements, characteristics, and allowable costs. During the program phase rough estimates of total cost may be made by various costing techniques. All factors that will affect the feasibility, cost and constructability of the project should be incorporated into the project program requirements.

• <u>SCHEMATIC DESIGN PHASE</u> - The conceptual development of the project in accordance with the program requirements. Usually review and approval of schematics in part or completely, allows design development work to begin. During schematic design the rough program phase estimates are refined to a level of detail consistent with the information available. These kinds of estimates may be known as order-of-magnitude estimates.

• **DESIGN DEVELOPMENT PHASE** - The program and schematics are used to fully develop preliminary architectural and engineering details of the facility. Approval in part or fully of design development documents allows preparation of construction documents, or working drawing to begin.

Estimates may now be refined to a point where early stages of construction, such as site preparation, mass excavation, grading, foundations may be moved into final construction document design. Occasionally design development phase documents can be used for providing a guaranteed maximum proposal for selected portions of the project.

• <u>CONSTRUCTION DOCUMENT PHASE</u> - The full set of construction contract documents are prepared in such detail to allow the early construction contracts to be awarded and field work to begin. At the point where part or all of the construction documents are completed, hard money proposals, or fixed cost proposals may be solicited. The type of project delivery system selected determines how the work is to be awarded.

• <u>CONSTRUCTION ADMINISTRATION PHASE</u> - Contractor or subcontractor construction proposals are evaluated, contracts are let and submittals on items to be used in the project are made, reviewed, checked, and approved. During this period the design firm of record usually provides an inspection or review presence on the project site. This may be for part or full time depending on the nature of the project, and the requirements of the owner, user, and contractor. The delivery system selected will also influence the amount of construction administration required.

# <u>Architectural/Engineering Fee Guidelines -</u> expressed in % of total construction cost

Building Type	Range of fees in % of total cost
• Industrial & warehousing	4% to 8%
• Commercial & multi family residen	ntial 6% to 10%
• Institutional and single family resid	dential 7% to 14%

### General Notes

1. Generally the larger the facility, the smaller the fee.

2. Fees may vary widely for facilities containing large numbers of wish items.

3. The above % fees are very rough estimates and must be validated by checking against fees estimated from more detailed design cost estimates. These detailed estimates are made by applying costs to the actual scope of work as dictated by the project program, the staff available, the client's want and wish list, and your best estimates of the cost of the client's must list.

4. Do not base fees solely on % of cost.

# Components of a Design Project Cost Estimate

Date: \_\_\_\_\_Project Name: \_\_\_\_\_

Project #: \_\_\_\_\_

### ESTIMATED CONSTRUCTION COST

Site work	\$
General contract work	\$
Plumbing work	\$
HVAC work	\$
Electrical work	\$
Elevator work	\$
General work	\$
Food service work	\$
Other	\$

Total

### SERVICES PROVIDED WITHIN THE FIRM

Total base labor & overhead

\$\_

Pre design	hrs @ \$	/hr = \$
Site analysis	hrs @ \$	/hr =
Schematic design	hrs @ \$	/hr = \$
Design development	hrs @ \$	/hr = \$
Construction documents	hrs @ \$	/hr = \$
Propose/negotiate	hrs @ \$	/hr = \$
Construction admin	hrs @ \$	/hr = \$
Supplementary services	hrs @ \$	/hr =
(to be defined)		
Total base labor	hrs	\$
Overhead (%)		\$

### NON-REIMBURSABLE DIRECT COSTS (costs that come out of fee)

\$\_

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Structural consultant	\$
Mechanical consultant	\$
Electrical consultant	\$
Site work consultant	\$
Food service consultant	\$
Other consultants	\$
Subtotal of consultant costs	\$
Travel expenses	\$
Reproduction & supplies	\$
Models & graphics	\$
Telephone, telegraph, fax	\$
Supplementary services	\$
Other	\$
Subtotal - non reimbursable expenses	\$
-	
Total of non-reimbursable direct costs	\$

### RECAPITULATION

Total labor, overhead & direct costs	\$
Contingency	\$
Profit	\$
Total fee for services	\$
Markup on reimbursables (where appropriate)	\$

Fee quoted client		\$
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### **REIMBURSABLES**

Total budgeted or by contract	••••••	\$
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### TOTAL COMPENSATION ...... \$\_\_\_\_\_

Comments and notes:

(adapted from second edition of Project Management for Building Designers and Owners - by Howard G. Birnberg - used with permission)

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### Section 06 - Techniques for the project manager

6.01 Apply situational thinking 6.02 Translation definition 6.03 Schedule definition 6.04 - 6.05 Clarion base network plan 6.06 Clarion base network data 6.07 Clarion bar chart translation (1) - ho 381 6.08 Use of float time in project planning 6.09 GTRV section 6.10 - 6.13 GTRV contract document matrix 6.14 - 6.17 Guidelines to prep contract document matrixes 6.18 Procurement network model 6.19 Submittal turn around Bulletin change order 6.20 6.21 Equipment activity tabulation 6.22 Money flow 6.23 Turnover cycle analysis

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Ralph J. Stephenson P.E., P.C. Consulting Engineer

## **APPLY SITUATIONAL THINKING**

Continually try to widen the scope of your perceptions. The ability to expand your view beyond the immediate boundaries of a situation is critical in almost any situation. Moving easily from the macro to the micro, and being able to stop anywhere in between, helps insure that the manager viewing the scene gets a full look at what's going on in <u>and</u> around the situation.

Zoom thinking of this type is known as <u>situational thinking</u>. The process allows and encourages you to examine as many aspects of a subject system or decision as time allows.

Some basic ideas related to situational thinking

• A. The reason for failure of Impulsive, narrow minded men and women as managers is often because they don't, can't, or won't look carefully and see what's going on around them.

- B. Most inadequate managerial decisions are a result of
  - 1. Failure to include enough significant factors for the time available to make the decision
  - 2. Delaying action until after cause-effect relations have changed

• C. <u>How</u> a manager views a particular problem is likely to determine the individual's and the organization's success or failure in handling it.

- D. Five situational failings the excellent manager must guard against
  - 1. Views too narrow mental tunnel vision
  - 2. Assessments too subjective
  - 3. Missing moving targets
  - 4. Failing to allow for momentum
  - 5. Trying to control the impossible
- E. To think situationally
  - 1. Find the overall picture get out to the boundaries of the biggest picture available to you
  - 2. Look at the edges of the situation as well as at the center
  - 3. Identify and explore areas of minimum information
  - 4. Seek and locate significant internal and external relationships
  - 5. Use time as an asset, just like you use labor, materials, or money
  - 6. Pretest decisions whenever possible
  - 7. Constantly strive to increase the number and range of your informal interfaces

Ralph J. Stephenson, P.E., P.C. Consulting Engineer

# **TRANSLATE**

To recast project planning & management information into other graphic, narrative & oral forms to insure effective use by those involved.

Ralph J. Stephenson, P.E., P.C. Consulting Engineer

# **SCHEDULE**

To lock individual project tasks & the resources needed to do them into a specific time position.



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lasue #1 - July 7 330 starion base pien disk 162 - 45%

**Reserved Activity Numbers** 

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Base Plan of Action

NETWORK N	IODEL FOR
CLARION O	FFICE BUILDING
PENTHOUSE	MECHANICAL
EQUIPMENT	ROOM #1

Luther Mechanical Contractors Washington D.C.

page 6.

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sheet ph-1

page 6.05 ho330

#### 10/6/98

	activity	early	early	late	late
		start	finish	start	finish
1	01-T/R TO JULY 7	7/7/90	7/7/90	7/9/90	7/9/90
2	02-FAB & DEL PENTHOUSE STRUCT STEEL & DECK - 15	7/9/90	7/27/90	7/12/90	8/1/90
3	08-DELIVER PENTHOUSE FILTERS - 20	7/9/90	8/3/90	8/6/90	8/31/90
4	05-FAB & DEL CHILLED WATER PUMPS - 29	7/9/90	8/16/90	7/24/90	8/31/90
5	06-FAB & DEL CONDENSATE PUMPS - 30	7/9/90	8/17/90	7/23/90	8/31/90
6	03-FAB & DEL PENTHOUSE ECONOMIZER PUMP - 35	7/9/90	8/24/90	7/16/90	8/31/90
7	04-FAB & DEL AC-1 AT PENTHOUSE - 40	7/9/90	8/31/90	7/9/90	8/31/90
8	07-FAB & DEL EXHAUST FAN #1 - 40	7/9/90	8/31/90	7/9/90	8/31/90
9	09-ERECT STRUCT STEEL & METAL DECK - 7	7/30/90	8/7/90	8/2/90	8/10/90
10	11-LAY PENTHOUSE INSUL & ROOFING - 4	8/8/90	8/13/90	8/21/90	8/24/90
11	10-FORM, REINF & POUR PENTHOUSE FL DECK - 10	8/8/90	8/21/90	8/13/90	8/24/90
12	12-FORM, REINF, POUR & STRIP EQUIP BASES - 2	8/22/90	8/23/90	8/27/90	8/28/90
13	13-INSTL PIPE & EQUIP HANGERS AT PENTHSE - 6	8/22/90	8/29/90	9/7/90	9/14/90
14	14-CURE PENTHOUSE EQUIP BASES - 3	8/24/90	8/28/90	8/29/90	8/31/90
15	15-HOIST & SET MAJOR PH MECH & ELECT EQUIP - 3	9/4/90	9/6/90	9/4/90	9/6/90
16	16-ERECT METAL SIDING & LOUVERS - 6	9/7/90	9/14/90	9/7/90	9/14/90
17	17-INSTL GYP BOARD CEILINGS & ENCLOSURES - 10	9/17/90	9/28/90	9/17/90	9/28/90
18	21-INSTALL ELECT PANELS & FEEDERS - 5	10/1/90	10/5/90	11/7/90	11/13/90
19	20-MEASURE, FAB, DEL & INSTALL DUCTWORK - 13	10/1/90	10/17/90	10/10/90	10/26/90
20	18-INSTALL ALL CONTROLS - 15	10/1/90	10/19/90	10/12/90	11/1/90
21	19-INSTL STM, HOT & CHLLD WTR, COND & AIR PIPG - 24	10/1/90	11/1/90	10/1/90	11/1/90
22	23-INSULATE DUCTWORK AT PENTHOUSE - 12	10/18/90	11/2/90	10/29/90	11/13/90
23	22-TEST & INSULATE PIPING AT PENTHOUSE - 8	11/2/90	11/13/90	11/2/90	11/13/90
24	24-PAINT INT OF PENTHOUSE, INCLUDING PIPING - 5	11/14/90	11/20/90	11/14/90	11/20/90
25	25-APPLY LIQUID WATERPRFG TO FLOOR - 3	11/21/90	11/26/90	11/21/90	11/26/90
26	26-CHECK, TEST & TURN OVER EQUIP ROOM - 5	11/27/90	12/3/90	11/27/90	12/3/90

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### **Clarion Office Building**

#### Equipment Room

#### Clarion base network model • ho 381 derived from issue 1, dated July 7

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Activities	25	2	9	16	23	30	6	13	20	27	3	10	17	24	1	8	15	22	29	5	12	19	26	3	10	'90 17	24	31
01-T/R TO JULY 7			l																	-								
02-FAB & DEL PENTHOUSE STRUCT STEEL &	<u> </u>	┢	Ē					+			-										-							
08-DELIVER PENTHOUSE FILTERS - 20			F			5					-	<u> </u>		-								-						<u> </u>
05-FAB & DEL CHILLED WATER PUMPS - 29			F																			+						
06-FAB & DEL CONDENSATE PUMPS - 30			F	<u>†</u> 									<b>†</b>															
03-FAB & DEL PENTHOUSE ECONOMIZER PUMP - 35			-				t												-								Π	
04-FAB & DEL AC-1 AT PENTHOUSE - 40				1		I		1	; ;																			
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10-FORM, REINF & POUR PENTHOUSE FL DECK - 10							C																					
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15-HOIST & SET MAJOR PH MECH & ELECT EQUIP - 3																												
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17-INSTL GYP BOARD CEILINGS & ENCLOSURES - 10																												
21-INSTALL ELECT PANELS & FEEDERS - 5																												
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18-INSTALL ALL CONTROLS - 15																												
19-INSTL STM, HOT & CHLLD WTR, COND & AIR PIPG - 24			Γ																									
23-INSULATE DUCTWORK AT PENTHOUSE																	5											
22-TEST & INSULATE PIPING AT PENTHOUSE - 8																					2							
24-PAINT INT OF PENTHOUSE, INCLUDING PIPING - 5																												
25-APPLY LIQUID WATERPRES TO FLOOR - 3																						C						
28-CHECK, TEST & TURN OVER EQUIP ROOM - 5																												

Open bar shows early starts & finishes
Solid bar shows late starts & finishes

page 6.07

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### Use of float time in project planning

What is float time? It is a number of working days determined by the total plan of work, and mathematically set by the logic of the network plan, by the durations assigned to each task, and by the completion date set for the project and its component parts.

Float is the amount of time between the earliest date an activity can start, according to a given plan of work, and the latest date it can start according to the same plan of work. Float time occurs in a task when the activities that restrain it are able to be completed before the latest date by which the restrained task <u>must</u> start, as determined by the latest allowable finish date of the project or project component.

Float time is not assigned by the planner, nor is it automatically allocated to activities that are traditionally critical.

Because of the nature of the construction business in which many normally unrelated organizations and individuals are brought together by agency and contract arrangements to do a job, float or discretionary time is potentially valuable to all parties to the job. Thus ownership of float time often becomes a subject of dispute and controversy.

A few guidelines which have seen general acceptance and some legal concurrence in practice are given below:

1. In a hard money fixed time contract the float time within the contract boundaries belongs to the contractor.

2. Ownership of float time should be established very early in a project. Where some question of ownership exists, the ownership rights should be noted on the plans and schedules of work prepared by the contractor.

3. On negotiated projects, where there may be a cost and time span to be mutually agreed on by the contracting parties as the project gets under way, ownership of float time is usually a matter to be worked out in advance as job conditions demand.

4. Relative to subcontractors, the ownership of float time within a hard money, fixed cost subcontract is usually set by implied consent, but normally rests with the prime contractor under which the subcontractor is working. In situations where there is very little interface between a prime contractor's tasks and his subcontractor's tasks, it is possible that ownership of self contained float may remain with the subcontractor.

5. Ownership of float time does not release a contractor from the obligation to provide a high quality service to the client. Where poor use of float time to the detriment of the job is encountered, fault for the poor performance will usually temper the ownership of the float.

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In general most problems with float occur where approval delays are encountered, where intermediate project dates are not specified but are desired and imposed, when poor performance pushes tasks beyond scheduled end dates, or where uncontrollable obstacles to meeting project contract obligations appear.



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	CONTRACT DOCUMENT MATRIX SU	MMAR	Y					PAG	i <b>E</b> 1
	GRAND TRAVERSE RESORT VILLAGE TOWE	R 🍇 DATE	LOW PRI	RISE	: 11	. 1 2 1	305		à
e					1.0	τ	61	50	BECH
3							21		
-	SET HORIZ & VERT CONTROLS	A	-	-	-	-	A	_	4
-	MASS EXCAVATE TO 677'4	Ä	-	-		-	A	-	:
-	HAUL EXCAVATION TO BORROW AREA	A	-	-	-		Α	-	é
-	CONSTRUCT HAUL ROAD		-	-	-	-	Α	-	7
-	KEEP EXISTING ROADS CLEAN		-	-	-	-	Α	-	E
-	REMOVE ABANDONED UTIL IN EXCAV AREAS	-	-		-	-	Α	-	9
-	STRIP BLDG SITE & STOCKPILE TOPSOIL	A	-	-	*****	-	A	-	10
-	DEMOLISH EXISTING ROAD IN EXCAV AREAS	-	-	-	-	-	Α	-	11
-	OBTAIN FOUNDATION PERMIT	B	-	-	-		-	-	28
-	EXCAVATE FOOTINGS-NOT FOR SLB ON GRD	B	-	-	B	₿		-	14
-	ERECT NECESSARY CONSTRUCTION FENCING	B	-	_	-	-	-	-	12
	PART BACKFILL AT EXT FOUND WALLS	B	-	B	B	B	-	B	72
-	LAY OUT BUILDING	8	-	-	_	-	-	-	13
-	BACKFILL INT FOUND TO EL ?	B	-	-	B	B	-	-	15
	LAY DRAIN TILE AT PITS	-	-	-		8	-		21
X.	EFRP PIT SOG	-	-	-	-	8	<b>-</b> .		20
X.	FRP EXT LOWER LEVEL WALLS	8	-	8	8	8	-	-	13
÷.	EFRP CUL FIGS	8	-	-	8	5	-	8	17
÷	EFRF WALL FUULINGS	в	-	-	5	5			15
÷.	DRIVE SHEELING HI EXISTING BLDG	-	_	5	5		-	5	
Ŷ	PART AFFLT EXT WALL WATERFRUOPING	5	_	5	5	5	_	-	20
Ŷ	FRES COLS TO LOBBY LEVEL	-	_	-	5	-	_	-	
Ŷ	FRPS COLS TO LUBBI LEVEL	-	-	_	R	R	_	_	-
2	RACKETLI & COMPACT AT DITC	_	_	_	-	ř	_	_	À
_	CAMP INCT REATH THE AT EVE WALLS	Ē	_	_	_	-	_	-	
x	APPLY PIT WATERPROCEING	_	-	_	_	C		_	1.4
Ŷ	FRPS FIEV 5 WALLS TO IS	-	_	-	_	č	-	-	27
Ŷ	INSTALL TRENCH DRAIN COVERS	-	-	С	С	_	_	-	29
x	INSTALL STEEL STAIRS & FILL	C	_	-	_	-	-	-	31
-	COMPLETE PHASE 2 ECAVATION	_	_	С	С	-		С	33
X	FRP PIT WALLS	-	-	-	-	С	-	-	185
-	BACKFILL EXT BUILDING WALLS	С	-	-	-	-	-	-	35
-	BACKFILL EXT RETAINING WALL	-	-	-	-	-	С	-	
X	EFRP RETAINING WALL FOOTING	-	-		-	-	С	-	37
X	FRPS RETAINING WALL STEM	-	-		-	-	С	-	35
-	EXCAVATE FOR ALL SLABS ON GRADE	-	-	С	С	С	-	-	49
-	POUR OUT SUPPORTED DECKS	С	-	-	C	С		-	53
-	DEMOLISH EXISTING CANOPY	-	-	-	-	-	-	C	77
X	CURE, PART & TOTAL STRIP SUPTD DECKS	С	-	-	С	C	-	-	51
X	INSTL ELECT GROUNDING SYSTEM	С	-	-	-	-	-	-	52
X	FRPS COLUMNS ABOVE LOBBY LEVEL	С	-	-	-	C	-	-	54
X	FRPS COLS ABOVE LL MEZZ	-		С	C	C	-	-	43
X	CURE, STRIP & RESHORE SUPTD DECKS	C	-	-	Ç	C	-	-	50
X	ERECT MISC MTLS RELATED TO SS CONC WOR	C	-	-	-	-		-	190
X	CONSTRUCT LB SLABS ON GRADE	-	C	-	-	-	-	L	40
X	INSTL MISC IRON SKIN EMBEDS & SUPPORTS	5	-	-	-	- -	_	-	20
X	COMP APPLY EXTERIOR WALL WATERPROOFING	5	-	-	-	_	-	-	42
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Ŷ	CONSTRUCT TOWER LL MEZZ DECK	-	-	С	-	C		-	
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PAGE 2

CONTRACT DOCUMENT MATRIX SUMMARY GRAND TRAVERSE RESORT VILLAGE TOWER & LOW RISE D106 - RALPH J. STEPHENSON PE PC - DATE PRINTED: JAN 11 505

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T	c		AL	LB	LL	LR	τw	SI	EB	REC#
<u> </u>	-									
D	X	FURNISH ELEVATOR EMBEDMENTS	-	-	-	-	D	-	-	192
D	X	INSTALL ELEVATOR RAILS, EQUIP, CAB	-	<b>-</b> .	-	-	D	-	-	58
D	X	INSTALL ELEVATOR HYDRAULIC CYLINDER	-	-		-	D	-	_	59
E	X	ERECT LR METAL FLOUR & ROOF DECK	-	-	-	5	-		5	108
E	X	ERECT, PLUMB & BOLT LR STRUCT STL & JS	-	-		2	-	-	E	107
r	X	INSTE EXT SKIN MISE METALS	<b>r</b>	_	_		-	-	-	70
F	Å,	INSTALL SLIDING DOURS	Ξ	-	_	-	- -	_	_	27
-	Ŷ	EPERT ALLM SIDING	-	_ ·	_	_	Ē	-		75
Ē	Ŷ	ERECT CHETAIN WALL FRAMING	_	_	_	-	F	-	_	81
Ē	Ŷ	INSTALL BALCONY BAILS		_	-	-	F	-	-	78
G	Ŷ	INSTL PLUMBING FIXTURES	G	-	-	-	-	-	G	145
Ğ	X	INSTL SPRINKLER HEADS	Ğ	-	-	-	-	-	G	169
Ğ	X	INSTL GRILLS & DIFFUSERS	G	-	-	-		-	G	139
G	X	INSTL FAN COIL UNITS	-	-	-	-	G	-	-	142
G	X	PROCURE FAN COIL UNITS	G		-	-	-	-	-	99
G	X	PROCURE WATER SOFTENER	G	-	-	-	-	-	-	94
G	X	PROCURE CHILLERS	G	-	-		-	-	-	101
G	X	PROCURE DOMESTIC WATER TANKS	G	-	-	-	-	-	-	93
G	X	PROCURE BOILER	G	-	-	-	-	-	-	100
G	X	PROCURE COOLING TOWER (OR COND)	G	-	-		-		-	98
G	X	PROCURE FIRE PUMPS	G	-	-	-	-	-	-	96
G	X	PROCURE HOT WATER TANK	Ģ	-	-	-		-	-	91
G·	X	PROCURE DOMESTIC WATER PUMPS	G	-	-	-	-	-	-	92
G	X	PROCURE AIR HANDLING UNITS	6	-	-	-	-	_	-	174
5	-	INST AF DURESTIC RECH FIFING	G	-	_	<u> </u>	_	_	·	147
5	-	INSTL HARD CEILING SUSP & BLACK IKUN	9	_	-	_	_	_	6	144
G	-	TNSTE STUDS & IN WHEL WURK	6	_	6	G	G	-	-	*07
6	Ŷ	TNET WATER WEATING SYSTEM	G	-	-	-	-	-	G	159
å	Ŷ	INSTE WHIER HEATING STOTEN	G	-		-	-	-	_	160
G	Ŷ	INSTL HOOD DUCTS	Ğ	-	-	G	G	-	-	136
G	x	EIB UG UTIL AT LB LVL SLAB ON GRADE	-	G	-	-	-		G	30
G	X	INSTL INSIDE GREASE TRAP	G	-	-	-	-	-	-	161
Ğ	X	INSTL AF SHT MTL DUCTWK	G	-	-	-	-	-	G	133
G	X	INSTL & PIPE FUEL TANK	G	-	-	-	-	G	G	162
G	X	INSTALL ROOF EQUIP CURBS	-			G	-	7	-	104
G	X	INSTL SIAMESE CONNECTIONS	G	-	-	-	-	-	G	131
G	X	INSTALL ROOF MOUNTED EQUIP	-	-	-	G	-	-	-	105
G	X	INSTL HOSE BIBBS	G	-	-	-	-	-	G	130
G	-	INSTL MECH SLEEVES	G		-	-	-	-	6	125
G	X	INSTL ALL MECH EMBEDS IN C CONCRETE	G	-	-	-	-		-	40
G	-	TEST & BALANCE MECHANICAL SYSTEMS	. G	-	-	-	_	_	с.	120
G	X	INSTL SPRINKLER SYSTEM	9		_	-	_	_	- U	192
G	X	SET & PIPE CHILLER	G	Ξ	-	_	_	_	_	104
G	X	INSTALL WATER MEATING EQUIP		_	_	_	G	-	-	143
G	. X	SEL & HUUK UP JACU1213 INCTL TOTLET DOOM ACCESSORIES	G	_	-	_	-	-	G	149
G	, X	INSTL TUILET ROUM ACCESSIONIES	Ğ	-	-	-	-		G	140
5	× v	PROCHRE MECH CONTROL SYSTEMS	H		-	-	-	-	_	88
п Ц	Ŷ	INSTL FLECT TRIM ITEMS	H	-	-	-	-	-	н	123
ц	Ŷ	INSTL LIGHT FIXT	H	-	-	-	-	-	н	120
н	Ŷ	PROCURE EMERGENCY GENERATOR	н	-	-	-	-	-	-	87
н	X	PROCURE TRANSFORMERS	н	-	-	-	-	-	-	102

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		CONTRACT DOCUMENT MATRIX SL GRAND TRAVERSE RESORT VILLAGE TOWE	Immar Ir & I	Y Low	RISE	-			PAG	5E 3
		D106 - RALPH J. STEPHENSON PE PC -	DATE	PRI	NTED	: Jai	12 13	33		1
I	S	ACTIVITY DESC	AL	LB	LL	LR	TW	SI	EB	REC#
н	x	PROCURE MOTOR CONTROL CENTERS	н	-	-	-			-	97
H	X	PROCURE UNIT SUBSTATIONS	H	-	-	-	-	-	-	86
н	X	PROCURE SWITCH GEAR	н	-	-		-	-		89
н	-	INSTL ABOVE FLOOR ROUGH ELECT WORK	н			-	-	-	н	170
н	-	INSTL HARD CEILING SUSP & BLACK IRON	н	-	-	-	-	-	H	168
Н	-	INSTL EXPOSED RUFF ELECT COND & FEEDER	н		-	-		-	н	119
Н	X	INSTL POWER PANEL BOXES	н		-		-	-	-	117
H	X	INSTL LIGHT PANEL BOXES	н	-	-	-	-			118
H	X	INSTL STUDS & IN WALL WORK	н	-	-		-	-	<b>H</b>	163
H	-	INSTL TV CONDUIT	H	. –	-	-	_	_	<b>—</b>	115
H		INSTL EMBEDDED ELECT CUNDUTT	n L	_	_	_	_	_		174
H L	_	INSIL ELELI SLEEVES Insti Emperder ei ECT Rovee	5	_	_	_	_	_	-	116
п ц	Ţ	INSTL EMBEDDED ELECT BUKES		_	_	_	_	-	ы	126
п ц	, v	INSIL IELEFAUNE CUMPUIA INSIL ALL ELEFT EMBERG IN C CONCRETE	- 	_	_	_	_	-	-	40
-	Ŷ	INSTLACE ELECT ENDEDS IN C CONCRETE	H	-	-	-	-	-	н	128
п Ц	<u> </u>	TEST & BALANCE ELECTRICAL SYSTEMS	н	-	-	-	-	-	H	141
н	¥	PROCURE ELECT CONTROL SYSTEMS	н	-	-	-	-	-	H	114
н	Ŷ	INSTL & HOOK UP ELECT EQUIP	н	-		-	-	-	-	129
H	x	INSTL GROUNDING MAT	н	-		-	-	-	-	121
н	x	INSTL LIGHTENING ARRESTER SYSTEM	н	-	-	-	-		-	122
J	x	FRP EQUIP BASES	J	-	-	-	-	-	J	1
Ĵ	X	PROCURE TRASH COMPACTOR	J	-	-	-	-	-	-	<u> </u>
Ĵ	-	INSTL HARD CEILING SUSP & BLACK IRON	J	-	-			-	J	
Ĵ	X	INSTL STUDS & IN WALL WORK	J	-	-	-	-	-	J	کل
Ĵ	X	ERECT INTERIOR MASONRY	J	-	J	J	J	-	J	<b>2</b> .
J	X	INSTL LINEN CHUTE	-	-	-	<b>—</b> `	J	-	-	148
J	X	INSTL TRASH COMPACTOR	J	-		-	-	-	-	171
J	X	INSTL TRASH CHUTE	-	-		-	J	-	-	147
J	X	INSTALL INT HOLLOW METAL FRAMES	J	-	-	-	-	-	-	103
J	X	INSTALL DOCK LEVELLERS	-	-	J	J	-	-	-	61
J	X	INSTL SHOWER PANS	J	-	-	·•••	-	-	J	146
J	0	INSTALL INSULATION AT EXPOSED SOFFITS		-	-	J	J		J	6ú 80
J	X	INSTALL PLASTER SUFFITS	-	-	-	J	3	-	3	174
J	-	HANG BUARD	J 7	_	_	_	-	_	J .T	175
J		IAPE & SANU BUAKU	J	_	_	_	_	_	.1	101
1	×,	INSTE ALOUSI LLG SUSP & GRID	J	_	-	_			J	183
J	Ŷ	INSTL SIGNAGE	J	-	-	-		-	J	173
.1	Ŷ		J	-	-	J	J	-	_	137
.1	Ŷ		-	-	-	-	J	-	-	150
	Ŷ	INSTALL PLASTIC LAM DOORS & HARDWARE	J	-	-	-	-	-	-	109
J	Ŷ	INSTI RESILIENT FLOORING	Ĵ	-	-	-	-	-	J	180
J	x	INSTALL DUMBWAITER				-	J			2
J	x	INSTL MILLWORK & TRIM	J	-		-	-	-	J	172
Ĵ	X	INSTL INTERIOR LANDSCAPING	J	-		-	-	-	J	185
Ĵ	X	INSTL CERAMIC TILE	J	-	-	-	-	-	-	144
J	X	INSTL ACOUST CLG PANELS	J	-	-	-	-	-	J	182
J	X	INSTL QUARRY TILE	J	-	-		-	<b>-</b> .	J	179
J	X	INSTALL INT WOOD DOORS & HARDWARE	J	-	-	-	-	-	-	111
J	X	INSTALL INT HARDWARE	J	-	-		-	-		?
J	X	INSTALL INT HOLLOW METAL DOORS	J	-	-	-	-	-	-	.0
J	X	LAY CARPETING IN CORR & PUBL SPACES	J	-	-	-	-	-	J	77
J	X	INSTL VINYL WALL COVERING	J	<b>.</b> .	-	-		-	J	57

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CONTRACT DOCUMENT MATRIX SUMMARY

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#### GRAND TRAVERSE RESORT VILLAGE TOWER & LOW RISE D106 - RALPH J. STEPHENSON PE PC - DATE PRINTED: JAN 1 2 1905

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	Z	X	LAY CARPET AT GUEST ROOMS	-		-	-	Z	-	-	178

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### GUIDELINES TO PREPARING CONTRACT DOCUMENT & PROJECT LAUNDRY LIST MATRIXES

#### **DEFINITIONS**

<u>Contract document matrix</u> - A two dimensional grid of rows and columns. The rows contain action items required to design, procure, and build the various project components The columns usually designate the geographic location of the item.

At the intersection of a row and a column, the designation of the contract document package in which the information appears is inserted .

<u>Project laundry list matrix</u> - A matrix listing of the actions that must be taken within various project components to execute the plan of action for a project. In the matrix form, the action is shown in the row. Supplementary information regarding the action is shown in in the action row under the appropriate columns.

Supplementary information often given, is listed below under <u>possible fields to be included in matrixes</u>. Frequently the contract document matrix and the project laundry list are combined.

#### PREPARING THE MATRIX

The first step in building a contract document matrix is to prepare a detailed random laundry list of component actions required to design, procure and construct all project work. Actions are usually classified by the major building component to which they belong. For instance, constructing wall footings is a substructure work component (sbw); forming a supported deck is a superstructure work (ssw) component; preparing and submitting a design development package is a design work (des) component. A suggested range of components is given below in the list of possible fields to be used in the contract document and laundry list matrix.

As the laundry list is prepared, items of work are classified by the contract document package to which they are assigned. Usually assignment to a specific package is made to those items which are interdependent within the package. A typical package assignment is illustrated below:

COD (contract document) package A - Foundation concrete (at random)

- Form, reinforce, pour & strip concrete wall footings
- Form, reinforce, pour basement walls
- Set basement wall miscellaneous iron embeds
- Install basement wall electrical sleeves
- Install basement wall pipe sleeves
- Form, reinforce, pour & strip column footings
- Set anchor bolts
- Form, reinforce, pour & strip column piers
- Form, reinforce, pour & strip truck dock footings
- Form, reinforce, pour & strip truck dock walls

Note that the list may includes action items requiring work on several trades in addition to concrete work. This definition of related activities is one of the main reasons a contract document matrix is

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valuable - it encourages the owner, designer and constructor team to properly assign actions, and consequently, drawings and specifications that depict the action, to the correct issue package.

The list is constantly refined and items added and relocated when necessary so as to ultimately produce a document packaging plan that allows that allows the most effective procurement and installation processing.

It is important to understand that the contract document package prepared by the design team is not the same as a trade bid package assembled and issued by the contractor.

• A contract document package may contain the drawing and specs needed for several trade contracts.

• Solicitation of proposals within a contract document package may encompass many trades.

It is the responsibility of the manager of construction operations (depending on the delivery system being used) to assemble the issued contract document packages in such manner that individual specialty contractors can propose on their work accurately, and with full confidence that their proposals will contain the full scope of work to be accounted for in the package.

Several advantages are gained by joint preparation of a contract document matrix by the owner, and the design and construction team. These include:

1.) The design team is guided toward preparing a set of documents that best fits the project delivery method selected and the proposal strategy desired by the owner and the construction team.

2.) The matrix provides a detailed reference check list to help insure that all items in the project are placed in the most effective portion of the documents.

3.) The laundry list prepared can be arrayed in approximate construction sequence within components to provide an excellent planning check list (laundry list) from which detailed and summary network models can be prepared.

4.) The matrix helps identify the timing of the package issues and allows most effective use of the design and owner team's attention in making project related decisions.

5.) The matrix will often point the way to the most effective project delivery method for the circumstances surrounding the job.

6.) Submittal requirements can be anticipated in advance and planned for by the design team when identified properly in the matrix. This has the effect of alerting all concerned with procurement that is truly needed to properly bring critical materials and equipment to the site.

\* \* \*

The <u>laundry list matrix</u> is a natural extension of the contract document matrix and is often prepared concurrently. It contains supplementary column data about each task as defined in the list of suggested data fields given below.

#### POSSIBLE FIELDS TO BE INCLUDED IN MATRIXES

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- 1. Actions required to accomplish the intended construction act
- 2. Geographic area in which the action is to be taken area
- 3. Responsibility codes of those who are to take the action rsp
- 4. CSI specification section number for major trade items used in action csi
- 5. Submittals required for action to be taken sbm

Submittal types include Design submittal - dsb

Shop drawings - shd Samples - smp Cuts & equipment brochures - cut Mock ups - mup Color & material boards - cmb Warranties - war Operating and maintenance manuals - omm

6. Major planning, design or building component to which an action belongs - cpt

Typical building components include:

• Front end work - fen - All non construction project related work concerning such items as real estate & financing

• Design work - des - Project related work that concerns production and issuing of contract documents.

• Procurement work - pro - Work related to solicitation of proposals, award of contracts, preparation of submittals, and fabrication and delivery of materials and equipment to the job site

• Substructure work - sbw - All foundation work upon which the superstructure bears directly or indirectly. May also include site preparation for start of field work on the building area.

• Superstructure work - ssw - All major structural load carrying components that bear on the substructure directly of indirectly.

• Exterior building skin work - esk - All elements needed to close the building to weather.

• Interior rough work - irw - All interior building components that can be exposed totally or in part to the weather without damage to their prime function.

• Interior finish work - ifw - All interior building components that must be totally or partially protected from damage by weather

• Unit systems work - usy - All work that can be installed as a unit somewhat

ho 329 - October 98

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isolated from other component work inside or outside the building.

• On site work - ons (sometimes called site work - siw) - All exterior work outside the building line and inside the property or contract boundary lines.

• Off site work - ofs - All exterior work outside the property or contract boundary lines.

7. Responsibility codes - The identification code of those who are to take the action (rsp).

8. Contract document package - The document package in which the action to be taken appears (cdp).

**9.** Construction sequence - A number showing roughly the installation sequence within a set of related actions (csq).



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#### **DIVISION 10**

#### ITEMS INCLUDED

- 1. Chalk, tack & liquid marker boards (ctl)
- 2. Access flooring (aff) 3. Full height demountable partitions (fdp)
- Full neight demountable partitions (idp
   Folding partitions (fop)
- 5. Woven wire partitions (wwp)

PROCUREMENT NETWORK MODEL FOR TRINITY LAB & OFFICE BUILDING MARTINLY DNR HEADQUARTERS GENERAL SERVICES ADMINISTRATION MARTINLY, OKLAHOMA

Issue #1 - November 15	
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RALPH J. STEPHENSON, P. E. CONSULTING ENGINEER

\* TABULATION TAKEN FROM POINT IN TIME WHERE SUDMITTAL ARENES AT PRIME CONTRACTOR'S OFFICE.

ENDS WHEN APPROVED SUBMITTAL SUBCONTRACT -'S OFFICE.

\* \* TABULATION ARRIVES AT

TIMES TURN AROUND SUBMITTAL

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RALPH J. STEPHENSON, P.E. Consulting Engineer

EQUIPMENT AGTIVITY TABULATION

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## Turnover Cycle (t) Example

#### **Definitions**:

x = completion date in working days (wd)

i = starting date in working days

- d = duration in elapsed working days to complete one unit
- t = turnover cycle in working days (the number of working days between the completion of one unit and the completion of the next.)
- n = number of units

#### **Basic equations:**

$$x = i + d + t (n - 1)$$
  

$$i = x - d - t (n - 1)$$
  

$$t = x - i - d$$
  
(n - 1)

#### Examples:

For x unknown i = 160 d = 7 wd t = 4 wd n = 11 units

For i unknown

x = 325 d = 10 wd

t = 6 wd

n = 21 floors

For t unknown x = 352 i = 280 d = 9n = 15 sectors

WEX AIA Project Management Seminar Chicago, Illinois

#### Ralph J. Stephenson, P.E. Consulting Engineer

## Section 07 - Managing the project staff

- 7.01 4 i's improvement cycle
- 7.02 7.03 Manage by exception
- 7.04 7.05 Claim prone job characteristics
- 7.06 7.09 Common causes of contested claims
- 7.10 Ethics questions to ask in ethical decision making
- 7.11 7.14 How to spring the time trap
- 7.15 7.19 Documentation degree

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## Manage by Exception

To manage by exception (MX) means to build and use an alarm system that goes off when something is wrong but otherwise remains silent.

## I. MX provides management leverage

- A. MX payoff comes from forcing the manager to use forethought and self discipline.
- B. Allows multiplying manager's energies and resources (the manager is a multiplier of work of others).
- C. Allows use of input/output zones (modification of Pareto's Law).
  - 1. Zone 1 A relatively small input of managerial resources gives control of a large part of the total results (critical zone for the manager).
  - 2. Zone 2 A relatively large input contributes a small portion of the results (good delegation zone).
  - 3. Zone 3 The zone where managerial input generates about the same corresponding amount of results (zero leverage, high frustration zone).

## II. Examples of MX.

- A. Thermostat.
- B. Sprinkler system.
- C. To do list.
- D. Network model (CPM).

## III. Questions to answer in MX.

- A. What can I as a manager do that will contribute to achieving objectives. (planning)
- B. How can I determine if I am concentrating on the key items? (controlling and correcting)

## IV. Watch for the dangers in MX.

- A. May require excessive observation and data collection.
- B. Tends to increase paperwork.
- C. If used correctly can give false sense of security and well being.
- D. Is silent only on items predetermined not to be critical. Conditions may change.
- V. The big advantage of MX is that much of the decision making is done in advance. (much like a trouble shooter's manual, a decision tree or decision table)
- VI. The manager must understand that once freed by a good MX system from the demands of routine work, he must dill his time with creative effort directed toward improving his plans, organization, staff, and decisions.
- VII. MX is always invaluable in detecting trends movements toward or away from objectives.
- VIII. Beware of overreaction to am MX alert. Remember MX is a tool of the manager, not the manager.

#### IX. Four MX alert levels.

- A. No unusual difficulties everything OK.
- B. Moderate deviations the situation needs the managers attention and analysis.
- C. Above average deviations the performance is unacceptable and needs corrective action, or is excellent and may be desirable to sustain.
- D. Unusually large deviations the performance is vitally disturbed or is so good as to demand investigation by the manager now.

### X. Methods of reporting with MX.

- A. Word of mouth.
  - 1. Fast.
  - 2. No record left.
  - 3. Listener may appear to comprehend, but might not.
- B. Written.
  - 1. Permanent record available.
  - 2. Can be studied anytime.
  - 3. Easily systematized.
  - 4. Irregular reports may allow critical factors to go unnoticed.
- C. Charted.
  - 1. Good for presentation to large numbers of people with limited amounts of time.
  - 2. Subject to scale misinterpretation.
  - 3. Requires special resources and talents to do well.
- D. Electronically reported.
  - 1. Easily used on selective basis.
  - 2. Data available quickly.
  - 3. High processing error potential.

## **Claim Prone Job Characteristics**

During the profiling, proposing and negotiating period, it is often possible to gain a good insight into the expected nature of the job if one is fortunate (or unfortunate) enough to be the successful proposer. The problem job is becoming increasingly serious in our business and professional lives and it should be identified early. The problem job generally results in increased costs during the construction period and quite often requires arbitration or litigation to achieve resolution of costs and damages.

Thus, it is good policy for the perceptive owner, architect/engineer and contractor to become familiar with those characteristics that early identify a job as having potential for being a trouble project.

This list of characteristics is by no means complete, nor is it meant to imply that a job having these features will necessarily be claim prone. It is, on the other hand, an honest effort to state certain unique job features that have been identified in projects that have ended in litigation of arbitration. The list is at random with no attempt to classify or characterize the features.

Claim prone job characteristics may include:

- a. A wide spread in proposal prices.
- b. Issuance of a large number of pre-bid addenda and instructions.
- c. For subcontractors, a poor general contractor reputation if the project is being built by one prime.
- d. For projects with separate primes, poor other prime contractor reputations.
- e. More than four to six prime contractors involved (applicable on normal building work only).
- f. Poor reputation of architect/engineer preparing contract documents.
- g. Excessive how-to-do-it emphasis in contract drawings and specifications.
- h. Non liable party involvement in responsible positions, i.e. non-liable construction manager.
- i. Large numbers of allowance items.
- j. Zero (or excessively small) tolerance specifications.

- k. Poorly defined authority and responsibility patterns in the offices of the architect/engineer, the owner, the general contractor or other prime contractors.
- 1. Inexperienced specialty contractors.
- m. Excessive number of pre-selected suppliers for key material and equipment.
- n. Large dollar amount or numbers of owner purchased equipment.
- o. Location in strike prone areas.
- p. Location in jurisdictionally sensitive areas.
- q. Heavy use specified for untried products and equipment.
- r. Non-liable party involvement in establishing delivery commitments, i.e. construction manager, architect/engineer, owner representative.
- s. Involvement of politically accountable owners, architect/engineers or other contractors.
- t. Multi responsibility payment structures.
- u. Excessively long time periods to award contracts after a proposal.
- v. Poor owner reputation.

## **COMMON CAUSES OF CONTESTED CLAIMS**

Contested construction claims have increased over the past few years and now must be recognized as a serious road block to proper and profitable construction procedures.

The reasons for the increase in contested claims are many and must be understood in the sense that our society has become somewhat legalistic. That is to say, the recourse to legal resolution, as opposed to interpersonal, technical, or administrative resolution of problems has become a common fortunately shows some signs of diminishing as costs and time involvement in legal matters have increased astronomically.

However, there are claims, there always have been claims, and there will probably always will be contested claims. Those in construction should however, thoroughly understand the structure of the contested claim.

Specifically, contested claims lead to resolution by an administrative settlement, litigation, arbitration, or mediation. There are some common causes of conflict and it is these that stimulate the parties to go to a formal settlement by outsiders. It is important for those in construction to understand how to avoid the mistakes that cause wasteful contested claims.

Several years ago a firm specializing in construction claims and their settlements studied some of the most common causes of disputes. Of two hundred occurrence of contested claims the following percentages were found.

#### 1. Directed Change - 48%

A legitimate change within the contract scope for which the owner must pay.

#### Examples

- Owner changes the door color after the door is painted.
- Owner revises size of electrical room door opening

Advice.

- Required extensions of time should be stated in writing.
- Costs for extended general conditions should be agreed upon early
- The client or owner is obligated to pay for the change, if there the charge.

- Payment for the work should be explicitly agreed upon before starting.

#### 2. Constructive change - 42%

An owner's action or inaction that has the same effect as a written order.

#### Examples

- Shop drawing corrections, showing additional work not covered in contract documents.

- Owner's representative tells a superintendent to relocate a wall with no payment intended.

#### <u>Advice</u>

- Don't assume changes will be free. Find out if there is a cost.
- Don't enrich contract documents.
- Don't enrich shop drawings.
- Make certain the scope and costs of additional work is clearly understood.

#### 3. Defective or deficient contract documents - 41%

Contract documents which do not adequately portray the true contract scope.

#### Examples

- A retaining wall shown dotted on the contract documents and expected by the architect/engineer and the owner to be built as part of the contract.

- Dimensional errors that cannot be resolved by verbal clarification.

- Contract documents that expect performance by default. For instance, specifying a miscellaneous iron ladder but not showing it on the drawings.

#### **Advice**

- Expect to pay your architect and engineer for good quality assurance in the production of contract documents.

- Select your design team on the basis of performance not cost.

- Clearly define design and construction delivery methods to be used.

- Don't expect your contractor to design the job unless it is a design/build project.

- Don't make unrecorded corrections to contract documents.

#### 4. Delays - 41%

A delay situation beyond the control and not the fault of the contractor.

#### Examples

- Rock encountered that delays the job but was not shown on the contract documents.

#### **Advice**

- Be as thorough as possible in defining physical conditions of the site upon which the facility is to be constructed.

- Specify weather standards when it is necessary to clarify time extensions that might be caused by inclement weather.

- Determine delay costs quickly and eliminate them as soon as possible.

- Don't stop field work without proper authority and a very good reason.

#### 5. Constructive acceleration - 35%

More work with no time extensions, or the same work and a shorter time period in which to do it.

#### Examples

- Owner refuses to grant time extension for work that will take longer to perform.

- Owner makes unauthorized use of critical path time without extension.

- Owner makes use of float time with the expectation that the contractor will not request or require a time extension.

#### <u>Advice</u>

- Never assume the contractor will do extra work within the contract time.

- Work out an early agreement on the use of float time in the network model.

- Never assume a field order is a no cost, no time extension change.

#### 6. Maladministration - 35%

Owner interference with the contractor's right to enjoy least cost performance.

#### Examples

- Owner directs contractor to provide a certain space in a facility early without such early turn over having been specified in contract documents.

- Owner directs contractor to start work on an encumbered site.

- Architect/engineer unresponsive to legitimate requests for information.

#### Advice

- Always allow the contractor to select construction methods and means.

- Make certain the site is fully available to the contractor before the job begins.

- Process submittals promptly.

- Clearly define the time frame and the sequence by which submittals are to be processed, and do it early in the job.

#### 7. Differing site conditions - 31%

The actual site differs from that represented on the contract documents, or deviates from ordinary or normal expectations of such a site in that area.

#### Examples

- Artesian water encountered in sand seam outside of where soil borings were taken.

- Existing basements encountered but not indicated on contract documents.

- Restrictive easements or assessments on the property not made known to the contractor before contract execution.

#### **Advice**

- Expect to pay for and get a good site survey

- Make certain soil borings are adequate to show any unusual conditions.

- Locate and define all easements.

- Check the site history for unusual or restricted conditions.

- Take photos of any unusual conditions encountered.

#### 8. Impossibility of performance - 18%

A situation where it is impossible to carry out the contract work.

#### Examples

- Expecting a contractor to work on an encumbered site.

- Owner refuses to move interfering utilities he is supposed to relocate by contract.

- Specifying installation of above ceiling work that won't fit in the space provided.

#### **Advice**

- Expect the design team to check their work thoroughly for interferences.

- Accept your legitimate design and administrative duties and responsibilities and take care of them.

- Resolve dimensional difference early.

- Do your homework to presolve expected problems and interferences.

#### 9. Superior knowledge - 18%

Withholding data or information during the pre contract period, that affects construction on matters of

ho 228 March 1996

#### importance.

#### Examples

- On a steel erection contract not telling the bidders that the steel had been refabricated from a previous job.

- Failing to tell bidders that there is a cost cap on the first two months costs

- Not telling bidders that there is a high pressure gas line through the site that must be accommodated during construction.

#### **Advice**

- Be certain all bidders know as much as they must know to propose properly.

- Be certain demolition contract documents specify all work to be done.
- Locate, to the best of your ability, all site obstructions before bidding.

- Don't expect the contractor or the architect and engineer to read your mind.

#### 10. Termination - 7%

Dismissal from the project for convenience or default.

#### Examples

- The section of the project is no longer needed and is removed from the contract.
- The contractor is behind schedule.
- The contractor's performance is unsatisfactory.
- The owner doesn't like the way the superintendent talks back to him.
- The contractor doesn't manage submittals promptly and accurately.

#### **Advice**

- Be certain the cause for dismissal is legitimate and well defined.
- Don't dismiss for minor reasons. Dismissal is serious business.
- If dismissing, be certain proper notice is given.
- Insure the contract documents give you the right to dismiss.

# **QUESTIONS TO CONSIDER**

# Guides to Ethical Decision Making

- 1. Is my decision legal?
  - Does it violate civil law or company policy?

# 2. Is my decision balanced?

• Is it fair to all concerned in the short and long term situation. Does it avoid sum zero situations?

# 3. How will my decision make me feel about myself?

- Will it make me proud?
- Will I feel good if it is published in the newspaper?
- Will I feel good if my family finds out about it?

Adapted from "The Power of Ethical Management" by Kenneth Blanchard & Norman Vincent Peale

# HOW TO SPRING THE TIME TRAP

Adapted from R. Alec Mackenzie's book "The Time Trap"

### A. Time waster

<u>1. Possible causes</u> a. Solutions

### A. Lack of planning

- 1. Failure to see the benefit
  - a. Recognize that planning takes time but saves time in the end
- 2. Action orientation
  - a. Emphasize results, not activity
- 3. Success without it
  - a. Recognize that success is usually enhanced by planning

## **B.** Lack of priorities

- 1. Lack of goals and objectives
  - a. Write out goals and objectives
  - b. Discuss priorities with subordinates

## C. Over commitment

- 1. Wide span of interests
  - a. Say no
- 2. Confusion in priorities
  - a. Put first things first
- 3. Failure to set priorities
  - a. Develop a personal philosophy of time
  - b. Relate priorities to a schedule of events

## D. Management by crisis

- 1. Lack of planning
  - a. Apply the same solution as for lack of planning (see A above)
- 2. Unrealistic time estimates
  - a. Allow more time
  - b. Allow for interruptions
- 3. Problem orientation

- a. Be opportunity oriented
- 4. Reluctance of subordinates to break bad news

a. Encourage fast flow of important information as essential for timely corrective action

## E. Haste

- 1. Impatience with detail
  - a. Take time to get it right. Save the time required to do it again
- 2. Responding to the urgent
  - a. Distinguish between the urgent and the important
- 3. Lack of planning ahead
  - a. Take time to plan. It repays itself many times over
- 4. Attempting too much in too little time
  - a. Attempt less
  - b. Delegate more

## F. Paperwork and reading

- 1. Knowledge explosion
  - a. Read selectively
  - b. Learn speed reading
- 2. Computeritis
  - a. Manage computer data by exception
- 3. Failure to screen material
  - a. Remember Pareto's law
  - b. Delegate reading to subordinates

## G. Routine and trivia

- 1. Lack of setting and adhering to priorities
  - a. Set and concentrate upon goals and objectives
  - b. Delegate non essentials
- 2. Over surveillance of subordinates
  - a. Delegate; then give subordinates their head
  - b. Look to results, not details or methods
- 3. Refusal to delegate

a. Recognize that without delegation nothing can get done through others

## H. Visitors

- 1. Enjoyment of socializing
  - a. Do it elsewhere

- b. Meet visitors outside
- c. Suggest lunch if necessary
- d. Hold stand up conferences
- 2. Inability to say no
  - a. Screen
  - b. Say no
  - c. Be unavailable
  - d. Modify your open door policy

## I. Telephone

- 1. Lack of self discipline
  - a. Screen and group calls
  - b. Be brief
- 2. Desire to be informed and involved
  - a. Stay uninvolved with all but essentials
  - b. Manage by exception

## J. Meetings

- 1. Fear of responsibility for decisions
  - a. Make decisions without meetings
- 2. Indecision
  - a. Make decisions even when some facts are missing
- 3. Over communication
  - a. Discourage unnecessary meetings
  - b. Convene only those people needed for matters at hand
- 4. Poor leadership
  - a. Use agendas
  - b. Stick to the subject
  - c. Prepare and distribute minutes immediately after the meeting

## K. Indecision

- 1. Lack of confidence in the facts
  - a. Improve fact finding
  - b. Improve validating procedures
- 2. Insistence on all the facts paralysis by analysis
  - a. Accept risks as inevitable
  - b. Decide without all the facts
- 3. Fear of the consequences of a mistake
  - a. Delegate the right to be wrong
  - b. Use mistakes as a learning process

- 4. Lack of a rational decision making process
  - a. Get facts
  - b. Set goals and objectives
  - c. Check alternatives
  - d. Check negative consequences
  - e. Make decision
  - f. Implement decision

## L. Lack of delegation

- 1. Fear of subordinate inadequacy
  - a. Train
  - b. Allow for mistakes
  - c. Replace if necessary
- 2. Fear of subordinates' competence
  - a. Delegate fully, but within the subordinate's competence
  - b. Give credit
  - c. Plan corporate growth to maintain challenge
- 3. Work overload on subordinates
  - a. Balance workloads
  - b. Staff up
  - c. Reorder priorities

# **Documentation Degree**

The degree of needed documentation on any project is determined by the current or potential level of difficulty perceived.

One method of setting documentation degree (dd) is by use of a scale of one to ten, one being a minimum amount consistent with good practice and ten indicating a maximum amount needed to protect those involved from current or potential problems.

Expressed another way, level 1 documentation signifies an absolute minimum is being used. Level 10 documentation indicates the project is being fully documented.

The approximate ranges shown below are reference guidelines for selecting and preparing documentation systems:

- Levels 1 & 2	Informal job structure - no planned documentation
- Levels 3 & 4	Normal job - documentation as specified
- Levels 5 & 6	Claim prone jobs on which trouble is conjectural
- Level 7	Claim prone jobs on which trouble is very likely
- Levels 8 to 10	Claim prone jobs on which trouble is a reality

Usually the degree of documentation index indicates an opinion as to how much trouble can be expected on the project.

A brief description of job conditions which may be encountered corresponding to a need for the degrees of documentation indicated is given below.

## Documentation degree #1 to 2 (dd 1-2) - no planned documentation

At these levels the project usually is informally organized, with full trust by all parties of all other parties. Most instructions and requests are oral. Revisions and cost commitments are made on a full confidence basis relative to scope, expected payment and resolution. The project team understands and communicates well internally and externally, and all on the team exhibit a high degree of honesty, competence and integrity. Usually meetings are held on an as needed basis only. It should be cautioned that a low dd does not mean the project will not encounter difficulties. The number merely indicates a recommended level of documentation being maintained as of a given point in time.

Documentation degree #3 to 4 (dd 3-4) - normal job with formal documentation as needed: minimal documentation level well defined by contract

In a dd 3-4 project the usual procedures for processing work during programming, planning, design and construction are well defined and followed carefully by all parties to the contracts. Usually the project contract documents have been carefully prepared and checked thoroughly. This helps assure that the scope of work is clear and the project is constructible.

Documentation at dd 3-4 during the process of design and construction is maintained at a minimum level consistent with program and contract requirements. An audit trail of approvals, issues, money flow, revisions and quality of construction in place should be able to be followed easily from the system.

An important characteristic of the good level 3 & 4 documentation system is that it must be of a nature that case be increased to a higher level at any time without extensive backtracking and historical research. The fundamental needs of higher level dd's should be able to be easily achieved from the basic work accomplished in a dd 3-4 system. The reason is that the enormous expense and reduced accuracy of later historical research on a troubled construction program should be avoided by setting a good information filing and retrieval system at lower documentation degree level.

# Documentation degree #5 & 6 (dd 5-6) - claim prone jobs on which trouble potential is conjectural

Documentation degrees of 5 or 6 should be set early on projects that show potential for claim, but on which no dominant reasons for such problems have yet appeared. For instance a project may be proceeding well despite having a large number of allowance items, several separate prime contractors, and a general trades contractor noted for his sloppy paper work. These are all indicators of potential difficulties but do not necessarily mean trouble. In a dd 5-6 the level is set high to permit those involved to more quickly react to sudden project difficulties than on a normal project. To reemphasize, the dd level is set by the nature of the project and is only raised or lowered when sufficient justification for a change is noticed.

# Documentation degree #7 (dd 7) - claim prone jobs on which trouble potential is very likely

On a dd 7 project, comments for dd 5-6 apply, with the qualification that a yet higher dd level requirement than 7 is highly probable. In other words if the job is claim prone and some of the claim prone characteristics are causing actual problems, the documentation level of 7 indicates a movement into higher levels is near at hand.

An example of this might be a claim prone project dd level of 6 as established by a high spread in proposal prices, poor specialty contractor reputations and an architect/engineer who is slow in submittal turnaround , which upon moving into the field, promptly runs into late submittals by the questionable subs and a reactionary slowness by the a/e in processing submittals. This combination might be cause to move the dd to 7, with a good chance it could go even higher within the next month or so. The dd 7 could be looked at as a holding plateau which might be lowered by prompt corrective action or might increase as negative positions harden and remain unresolved.

# **Documentation degree #8 to 10 (dd 8-10)** - claim prone jobs on which trouble is a reality

Projects requiring a dd level of 8 to 10 can be considered to be in trouble and subject to present or future third party action resolution. Usually the project that has moved to a dd 8-10 level has done so over a period of time during which the problem levels have progressively intensified. If such a project is encountered, the files for third party resolution action should be built as the work proceeds.

If dd 8-10 needs are met on a day to day basis as the documentation is sent or received, the cost will be much less than if it is done later. In addition the analysis will be fresher and more accurate. In addition, the knowledge that such a high level file is being built often acts to dampen the conflict and difficulty and may even lead to quick resolution of the difficulties. As a general help in documentation a brief resume of procedures for preparing project documentation is given below. These steps may vary from situation to situation but can be summarized within seven basic documentation actions taken to respond to various dd levels.

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<u>Step 1</u> - Prepare and arrange the document file material - Document copies are arranged, usually chronologically, for future entrance into a single number filing system.

<u>Step 2</u> - Month number the the documents - Each document is uniquely identified with a number that relates to the month in which the document was prepared.

**Step 3** - Day number the documents - When the document has been assigned its month number it is further numbered sequentially by the date within the month. This system is called a single number filing system, since all documents are now uniquely numbered. For instance there would only be one document 04245, a document prepared in the 4th month from the base date, and being the 245th document chronologically entered in that 4th month.

<u>Step 4</u> - Build the document control file format - with the document uniquely identified, the document copy of the original is coded and a data base retrieval system established. Code fields to be used might include:

Document control number Document type Date document prepared Date document received Organization from Organization to Individual from Individual to Subject codes Others as needed

\*

<u>Step 5</u> - Enter the document data in the document control file - If justified and required, document data is now entered into the data base file for

page 7.18

storage and retrieval in whatever manner required.

**Step 6** - Prepare the project history - A project history is prepared in the form of a chronological narrative summarizing the entire project from the document control file. Each major document is reviewed, if appropriate, and entered as a brief unit description of an event, or of events, occurring within a given time period.

**Step 7** - Prepare project problem tracking histories - Specific problems causing contested claims, say unexpected artesian water, are identified and the document control files and project history files are searched. The material found is used to build special chronological files for each problem area. These are then analyzed to determine the course of settlement action to be taken.

Rough guidelines for the relation of <u>dd level</u> to <u>documentation steps</u> as outlined above might be as follows:

• dd levels 1 & 2 - totally informal - no planned documentation - No special provisions made for preparing and arranging documents

• dd levels 3 & 4 - normal job - Take steps 1 and possibly 2

• dd levels 5 & 6 - claim prone jobs on which trouble potential is conjectured - Take steps 1, 2, 3 and possibly 4

• dd level 7 - Claim prone jobs on which trouble potential is very likely - Take steps 1, 2, 3, 4 and 5

• dd levels 8 to 10 - Claim prone jobs on which trouble is a reality - Take steps 1 through 6 and possibly 7 as required

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## Section 08 - Setting the project organization

- 8.01 8.02 Forerunner & conservatively managed companies
- 8.03 Bengst corporation expansion
- 8.04 Bengst organization blank
- 8.05 Bengst a/e case study
- 8.07 8.08 Where do we go from here? U of Q case study
- 8.09 Owner and separate primes

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# Notes on Forerunner & Conservatively Managed Companies

• What are alternative names to forerunner and conservatively managed companies? Proactive & reactive, positive & negative, front & back, do & wait, high risk & low risk, maximum & minimum, go & no go, try & no try, run & walk.

• The forerunner managed company tries to optimize the probability of being right.

• The conservatively managed company tries to minimize the probability of being wrong.

• It is critical to understand that both types of companies can be, and often are successful or unsuccessful. The style of forerunner or conservative is merely an indication of the way the organization achieves success or goes through the twinges of failure.

• Some characteristics of the forerunner vs the conservative company are:

#### Forerunner

- Aggressive in their field of work
- Young
- High risk takers
- High leveraging of all resources
- Good morale
- General absence of recognizable management structure
- Healthy cooperation among lower management
- Strong competitive drive at all levels of management
- Strong sensing (not necessarily knowledge) of total purpose about
  - Financial return on investment
  - Social obligation Professional integrity Technical excellence Ethical behavior
- Provision of sense of worth to projects
- Provision of sense of exciting flux to staff
- Maintenance of an exciting environment
- Constant forging ahead in their business arena
- Desire & ability to adapt to positive change
- Desire & ability to institute change
- Desire & ability to accommodate change
- Medium to low levels of incompetence tolerance
- Strong leaning toward high individual performance levels
- Low level of interest in business planning
- Often learn by mistakes

### **Conservative**

- Usually well managed from top down
- Moderately well managed from bottom up
- Tends toward paternalistic management
- Major decision making centered in top management
- Good financial strength, if mature
- Dependable
- Predictable
- Closely controlled employee training
- Modest salary structure
- Good standard employee financial benefits
- Usually stress hygiene as opposed to motivational drive
- High levels of employee loyalty in those who like the system
- Provision of employee security
- Generally pretest decisions at executive management levels

## **The Bengst Corporation Expansion**

Bengst Corporation has been in the computer hardware and software manufacturing business for about 15 years. It occupies two principal facilities. One is a modest one story remote testing lab of 40,000 square feet in Tarry, Montana. The second is the main office and plant in Billings, Montana, about 150 miles from Tarry. The Billings complex contains nearly 25,000 square feet of office space and an adjoining manufacturing plant of 150,000 square feet.

The Tarry lab is visited frequently by Bengst middle and top managers. Many of them have shown a liking for the small community, and it has been tentatively decided by Mr. Bengst to gradually shift Bengst headquarters to Tarry.

Bengst has been successful in developing and manufacturing quality medical computer hardware, and have now begun to design and market related software programs for technical, business and home computer use. Their products have been well received and the Tarry building will be expanded to take care of some of the temporary design space needs being experienced. The cost of the program has been established from carefully prepared pro forma information.

The Tarry facility is located on a beautiful 160 acre parcel of land bought several years ago by Mr. Bengst. The existing building is a one story structure with a steel frame and an attractive masonry and curtain wall exterior skin. It was designed by a Philadelphia architectural/engineering firm, who also designed the Billings plant and office.

Bengst Corporation wants to add one story of similar construction to the building and to concurrently develop a master plan for the entire site. Ultimately most major design and production facilities of the company are intended to be moved to Tarry. In two years the volume of business done by the software division is expected to increase 300%. The hardware division is expecting a 200% expansion within the next five years.

The president of the company, Mr. Steel Bengst, is very active in the expansion program and will watch the expansion work carefully. He has appointed a young systems engineer at the Tarry plant, Karl Jong, to be the owner's project manager. Mr. Jong is 28 years old, has advanced degrees in electrical engineering and business. He is considered one of the bright stars of the emerging manager group at Bengst. (end)

Please note any questions you may have about the above information in the space below.



## The Bengst Corporation Expansion - Situation AE

Your firm Jonquil & Associates, designed the original lab building eight years ago, but have done no work for Bengst in the intervening period.

You are to be the Jonquil project manager for the Bengst program if your firm is awarded the contract. You met Mr. Bengst during one of the regular marketing tours required of Jonquil project managers each year. However he is not well known to you, nor you to him.

Jonquil has been asked by Mr. Bengst to meet with him and Karl Jong to discuss designing the lab expansion, along with doing the master planning for the Tarry site. You have been asked by the president of Jonquil to outline your approach to planning, organizing, designing, and launching the expansion plan, completing the move in on time, and meeting the quality standards of Bengst and your firm.

Some of the questions you will be expected to answer include:

1. How will you organize to do the building design and the master site planning?

2. Will Bengst be able to occupy the building while the second floor addition is being built?

3. What is the time frame within which design and construction will occur?

4. What is the best method of letting construction contracts?

5. What organizational and decision making structure do you desire the owner to establish?

6. What ownership arrangement is best for Bengst of the new facility as well as their existing facilities in Billings? Ready operating capital is essential to Bengst.

7. What pattern do you wish Jonquil's future relations with Bengst to take?

8. As an internal question, what steps will you take to insure that Jonquil's future relations with this client will remain as you wish them to be?

9. What level of staff talent will you assign to the job?

10. The home office of Jonquil is in Philadelphia. What local Tarry affiliations, if any, would you try to establish for the project work?

11. What are your comments on the Tarry and Billings locations relative to Bengst's long range planning?

# WHERE DO WE GO FROM HERE?

Qitain University, a small private engineering, science, liberal arts school in the northwest United States city of Qitain, is about to embark on a major (for them) expansion plan. It involves the planning, design, and construction of a new university activities building, a modest athletic facility having a gym and indoor pool, along with support facilities, and a small combined library and book store.

The expansion program has been written, the desired planners, architect, and engineers have been selected, and the Board of Regents of the school has given the project a go ahead.

An organizational meeting is in progress with the following people in attendance:

- Frank Carlton Vice President for University Planning and Operations
- James Tea Program consultant for the university

• <u>Fred Link</u> - President of the planning/architectural firm of Link and Associates, the possible architects of record for the entire project

• <u>Charles Redrock</u> - Associate, chief architect, and project manager on the project for Link and Associates

• <u>Robert Hagel</u> - President of Hagel Mechanical Engineering Company, the possible mechanical engineers for the project

• <u>Stan Weissman</u> - President of Weissman Electric, the possible electrical engineers for the project

• <u>Richard Goldmark</u> - A wealthy alumnus and key mover in assembling the total funding for the program

The site of the new building group extends across two city public rights of way (ROW), Francis Avenue and Fourth Avenue. Preliminary negotiations have been conducted with the City of Qitain by Mr. Carlton, of the University, and with the city manager, <u>George Dell</u>. It appears that vacation of the ROW's can be accomplished on a reasonable basis. Several live utilities are known to be in the two streets but exact sizes and locations have not yet been determined.

The discussion has generated several questions now being addressed. Some of these include:

1. The only available survey map of the area is an in-house student survey prepared ten years ago as a semester project. A new survey has not been budgeted and might be challenged as an excessive cost by the Board of Regents.

Should a new survey be made?

Why?

What should a new survey contain?

2. Should the University retain a construction manager?

If not, why?

If yes, why?

**3.** How should the project be organized and what should be the role of the various parties involved?

4. Who should be the ULTIMATE DECISION MAKER (udm) on the project?

5. Should the University appoint a staff representative to the project?

If so, what should be his title, authority, responsibilities and his activities?

6. The contract for architectural, mechanical, and electrical design services are not yet awarded, but all agree that the three firms at the meeting are the ones to do the job. With whom should the architectural, mechanical and electrical engineering contracts be executed?

7. How do answers to the above question affect the claim potential for the project?

**8.** If you were an alumnus, and a local general contractor serving on the Board of Regents of the University, and acting as an ex officio advisor to the program group, how would you have answered questions 1 through 7 so as to maximize the potential for claim avoidance (cav)?

9. What role would you recommend Mr. Goldmark be requested to play in the project?

# THE CASE OF THE CONCERNED OWNER AND HIS SEPARATE PRIME CONTRACTORS

A management case study in working well with owners and other prime contractors

Your firm, the Oldenberg Construction Company, has just negotiated a time and material upset price contract for the architectural and structural construction work on a large local hotel. The other contracts for plumbing, heating, ventilation and air conditioning, fire protection, electrical, security systems, food service equipment and fixtures, furnishings & equipment (FFE) are to be awarded as prime contracts to local, well qualified contractors. None of these except yours have been awarded as yet.

The owner's representative, Stanley Wozniak has asked your opinion of how the entire project could best be delivered and how you would organize the job if you were in his position. Mr. Wozniak has had about 5 years of experience constructing shopping centers for your client He is somewhat uneasy about this job since at \$27 million it is the largest job he has worked on to date, and it is a new type of project for him.

Although you know that most of the primes perform well, the mechanical and electrical contractors traditionally are known to underman their work whenever they sense a project is going poorly in trades other than their own.

Please answer these questions in as much detail as possible

1.) What factors will influence your answer to Mr. Wozniak?

2.) What kind of planning and scheduling would you expect to do on job like this?

3.) What can you do to help Mr. Wozniak in his decisions?

4.) What type of contract would you have used if you were the owner on the project?

5.) What is your response to Mr. Wozniak questions?
WEX AIA Project Management Seminar Chicago, Illinois Ralph J. Stephenson, P.E. Consulting Engineer

~ 5

# Section 09 - The importance of properly closing out the project

- 9.01 9.06 Retentions, collections & final payment
- 9.07 9.10 Closing out a construction project

date printed: 10/18/99

# **Retentions, Collections and Final Payment**

# I. Introduction - Payment as a lifeline

Lifeline has many definitions but one in particular strikes me as being most appropriate to the construction profession; "A lifeline is a line or rope for saving life".

Payment or money flow on a construction project can be just that - a line of strength that can preserve the life, vigor and integrity of a project, or a line of weakness that can cast the project adrift.

Successful firms are not often heard complaining about payment. This oddity bears close examination from those seeking to emulate them.

# II. General nature of cash flow in the construction industry

# A. Legal background for progress payments

1. Governed by the doctrine of conditions

Doctrine of conditions says that a party should not have to perform its promise without obtaining the other party's promised performance. The principle is central to any discussion of progress payments..

- 2. Who is required to perform first?
- Common law requires that performance of services precede payment.

# B. Role and obligations of the payer

- 1. To maintain strong financial position that allows prompt payment when deserved
  - a) Makes people want to work for you
  - b) Improves potential for future reductions in proposal prices
- 2. To pay promptly and within the context of the contract

# C. Role and obligations of the payee

- 1. To perform well and in accordance with your contract
- 2. To bill accurately and promptly
- 3. To follow the ground rules by which payments are to be made
- 4. Frequently the payee holds the key to successful payment for the work
- 5. Points for the payee to consider

Too often we in the construction industry blame everyone but ourselves for not being paid what we think is owed us promptly.

Many times the cause of slow or reduced payment lies with the payee, not the payer.

# III. Conditions surrounding collections and payments

#### A. Unsuccessful collections & payments often result from

- 1. Mistrust Inability to work honestly with unwritten standards
- 2. Cupidity Inordinate desire to get something for nothing
- 3. Doubtful risk taking A high risk has a corresponding high penalty
- 4. Ultra conservatism Excites suspicion and slows cash flow
- 5. Incompetence Produces a lack of desire to pay or work no incentive
- 6. Claim prone environment

The contested claim brings out the worst in everyone, and most particularly makes the payer reluctant to pay.

Understanding how to reduce the dust, noise and confusion that surround contested claims often can encourage prompt payment even in difficult conflicts.

- a) Common causes of contested claims and their frequency are
  - (1) Directed change 48%
  - (2) Constructive change 42%
  - (3) Defective or deficient contract documents 41%
  - (4) Delays 41%
  - (5) Constructive acceleration 35%
  - (6) Maladministration 33%
  - (7) Differing site conditions 31%
  - (8) Impossibility of performance 18%
  - (9) Superior knowledge 18%
  - (10) Termination 7%
- 7. Stubbornness A balky mule cannot be depended on to pull the wagon
- 8. Dishonesty Destroys incentives to play fair and pay promptly!

#### B. Successful collections & payments

1. Trustful relations

Construction is a give and take situation. By the end of the job the gives and takes must balance out. The construction machinery is lubricated by the exchange of small favors.

2. Honesty

Honest people select their business associates carefully. Those who pay for services rendered generally recognize honesty in a company or an individual if they themselves are honest.

3. Competence

Competent people recognize competence in others. On most jobs, given the presence of a reasonable number of high value factors, the competent payee will be compensated fairly and promptly. Financial check and balance systems ask too many "why" questions to allow competent parties to remain unrewarded.

4. A willingness to give and take

All taking and no giving by either the payer or the payee will sink a project in a swamp of paper and a sea of red ink. The mistrust that results from this lack of informal give and take will grow to a monster unless it is replaced by a mutual confidence by the parties to the situation.

#### **IV. Retentions**

# A. Often used for doubtful reasons

- 1. As a club to assure proper completion
- 2. To save interest payments for 10% of the job cost
- 3. To insure construction damage to completed work is repaired
- 4. To pay for anticipated contested claims
- B. The problems of retention are old and will probably remain problems until
  - 1. Properly addressed by the parties involved
  - 2. There is agreement among like parties as to its impact
  - 3. All parties to a contract behave according to their contract

#### C. Attitudes and realities about retention

- 1. In 1976 a survey was made of the American Subcontractors Association (ASA)
  - a) Showed average retention among members was \$200,000
  - b) Members said would reduce bid price 3.7% if retention was eliminated

page 9.02

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- 2. A recent survey of the American Subcontractors Association indicates
  - a) Subcontractors are willing to give lower bids to generals who
    - (1) Pay them promptly
    - (2) Offer them a fair and equitable contract
  - b) Of 200 respondents
    - (1) 89% said they give better bids to generals regularly or occasionally
    - (2) 90% did so because the general had prompt payment policies
    - (3) 91% said not paid within 3 days of billings
    - (4) 69% said not paid within 7 days of billings
- 3. Policies on retention
  - a) Recent AGC, ASC and ASA policy calls for payment within 7 days of billing
  - b) In 1974 GSA went to zero retention
  - c) At one time Department of Defense eliminated retentions
  - d) EPA once wrote retention requirements out of its grants
  - e) About 1984 Michigan Dept. of Msm. & Budget adopted zero retention
    - (1) Was required by the legislature
    - (2) Department had 2 choices
      - (a) Put money in escrow
        - i) Problem couldn't use state treasury for holding vehicle
        - ii) Problem private holding would have too complicated
          - (1) Would have thousands of accounts
        - (2) Prohibitively expensive and cumbersome
        - (b) Adopt a policy of total payment for completed line items
          - i) Each line item was to be explicit
            - (1) On recent \$2,000,000 job
              - (a) Had about 1100 line items
              - (b) Listed on 27 pages
              - (c) Ranged in cost from \$100 to nearly \$70,000
    - (3) Adopted zero retention route
      - (a) Some state officials like it, some hate it
      - (b) Some contractors like it, some hate it
  - f) In 1983 the Office of Federal Procurement Policy decided that
    - (1) A uniform government wide policy should be implemented
    - (2) Retainage was not to be used as a substitute for good contract management
    - (3) An agency cannot withhold funds without good cause
    - (4) Determinations on retainage are to be made on the basis of
      - (a) Contractor's past performance
      - (b) Likelihood that such performance will continue in the future
    - (5) Suggested that
      - (a) Retainage not exceed 10%
      - (b) That it be adjusted downwards as the contract approaches completion
      - (c) When contract is complete all retainage be paid promptly
- 4. Summary there is no single attitude or reality re retentions!

# V. Collections, or better yet, payments

- A. Direct payment from the owner
  - 1. Conventional method on self financed projects
  - 2. Success of method depends on the integrity and competence of the owner

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#### B. Direct payment from another contractor

- 1. Evolved when general contractor did most of their own work
- 2. The secondary payment process may be used as a club rather than a tool

#### C. Direct payment from another party

- 1. Usually called the title company method
  - a) Steps in the title company disbursement method
    - (1) A. Monthly draw requests received from the contractors
    - (2) B. Supporting documents reviewed by the appropriate tier of contractor
    - (3) C. Job inspected by inspecting architect retained by payer
    - (4) D. Payment made to the contractors directly
      - (a) Sometimes direct to subs
      - (b) Sometimes to general contractor for disbursement to subs
  - b) Advantages
    - (1) Insures prompt payment to contractors
    - (2) Provides third party evaluation to gage performance
    - (3) Gives financing source full control of the money flow
    - (4) Tends to diminish tendency to front load or unbalance billings
  - c) Disadvantages
    - (1) Removes some of prime contractor's leverage to get work done
    - (2) Creates excessive dependency on attitudes of financing source
    - (3) Owner plays secondary role in motivating performance
    - (4) Poorly qualified inspecting architect can create havoc
      - (a) Bad attitude toward contractors
      - (b) Jealousy between architect of record and inspecting architect

#### VI. Final payment

#### A. Elements of record used in closing out the job

- 1. The punch list and the certificate of occupancy
  - a) Usually these provide the rationale behind final payment being made
  - b) You should decide early how the job is to be punched out
    - (1) Who is to do it?
    - (2) When is it to be done?
    - (3) What standards of performance are to be used to measure acceptability
    - (4) When is the contractor's punch list to be prepared?
    - (5) When is the owner's punch list to be prepared?
- 2. The operating and maintenance manuals
  - a) Inadequate OMM submittals may be cause for non payment
  - b) Get them done and get them submitted!

### VII. Where successful collections and payment start

#### A. The agreement

The starting point for cash flow success is preparation and execution of a well understood agreement up front.

1. Often contractors take jobs that specify impossible performance

Leads to getting into a position where the owner, or the architect engineer feel they can withhold payment for personal, subjective reasons, using the impossible clause as a legal reason.

Example: the withholding of payment because the contractor did not submit a

page 9.04

acceptable schedule within a given period of time - usually an unreasonable time frame for preparation of a good plan of work and schedule.

- a) Infeasible schedules
- b) Inadequate contract documents
- c) Unworkable contract agreements
  - (1) Multiple primes
  - (2) Installation of unknown systems
  - (3) Undefined responsibility patterns

#### B. The client - either owner or contractor

Most payment-successful contractors profile a prospect before proposing on a job. This is done with any new client, and sometimes on previous clients with doubtful records.

- 1. Profiling a client should follows a basic pattern
- 2. What factors describe how a client will pay?
  - a) Personal integrity
  - b) Business integrity
  - c) Past payment record with you
  - d) Past payment record with others
  - e) Current financial strength
  - f) Nature of assembled project financing
  - g) Process used for approving payment and releasing funds
  - h) Attitudes of the architect/engineer toward you and paying
  - i) Methods of closing out jobs
- C. The project

As with the client, the project must also be profiled. Not every job is for everyone. Be very selective so as to optimize your opportunities for success.

- 1. What factors describe a good pay project for you
  - a) Your past experience in building such facilities
  - b) The client's past experience in building such facilities
  - c) Funding sources
    - (1) Individuals
    - (2) Syndicates
    - (3) Trust funds
    - (4) Pension funds
    - (5) Political entities
  - d) Payment method
    - (1) Direct payment
    - (2) Title company payment
    - (3) Inspecting architect
    - (4) Payment method specified to be used for sub contractors
    - (5) Retention specified
- D. Evaluating the job

Once the client and project factors are identified, it is necessary to analyze them for a decision as to whether the job is potentially a good job or a bad job. Good and bad is evaluated as to the risk and the return on investment.

- 1. A. Weigh each factor
  - a) Weight each from one to ten as to its importance to you
    - (1) One totally unimportant to being paid
    - (2) Ten most critical to being paid

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- 2. B. Assign values to the client and the project which you are proposing upon
  - a) Values should be from one to ten
    - (1) One Client and project produce worst pay potential situation for factor
  - (2) Ten Client and project produce best pay potential situation for factor
- 3. C. Multiply the factor weight by the value to get a profile number
- 4. Example of profiling

How you might profile the payment potential of a new prospect.

# Factor weights multiplied by value for client Jones

- Honesty in business  $10 \times 08 = 80$
- Past payment record with you  $10 \times 06 = 60$
- Past payment record with others  $07 \times 03 = 21$
- Current financial strength 07 x 05 = 35
- Nature of assembled financing 05 x 07 = 35
- Process for approving payment and releasing funds 08 x 09 = 72
- Attitudes of the architect/engineer 06 x 06 = 36
- Method of closing out jobs  $07 \times 05 = 35$

# Factor weights multiplied by value for Jones project

- Your past experience in building such facilities 05 x 08 = 40
- Client past experience in building such facilities 04 x 04 = 16
- Funding sources  $08 \times 08 = 64$
- Payment method 07 x 05 = 35

Total = 529 out of a total possible of 740, or a 71% potential for good payment relationship.

# VIII. Rules for getting paid promptly

- A. Be certain of your agreement and understand what it says
- B. Be honest in your dealings and your intent
- C. Fulfill your contract
- D. Avoid legal entanglements and threats
- E. Be willing to use the lubricating oil of small favors exchanged
- IX. If you aren't entitled to it don't try to get it!
- X. ho 259 Oct 1998

# Closing Out A Construction Project

#### A random summary of close out guidelines for owners, architects, engineers and contractors

The process of closing out a construction project has emerged as one of the most important sequences of events a project team may encounter during the course of the project. Reasons for this are:

• The close out process usually results in a formal and legal acceptance of the facility by the owner or occupant. Thus responsibility for the correctness of the work passes from the design and construction team to the owner. The transition must be clear and indisputable to avoid contested claims and residual obligations.

• The conditions imposed by the warranties on workmanship, systems and equipment must be clearly defined and accepted by all concerned if adequate guarantees of performance are to be placed in force.

• The design and construction team must have a definitive point in time where their contractual obligations have been fulfilled and they can consider their legal relations closed out so far as project design and construction administration and operations are concerned.

• The owner must have a specific point in time where he can consider the project legally his without any hang over potential encumbrances from the design or construction team.

• The design and construction team must be able to use the project as a facility which they have no hesitation in describing or showing to prospects and current clients.

• A well closed project is insurance of future good relations with specialty contractors on the job as subcontractors of the prime contractors.

• The properly closed project makes no unreasonable or unpredictable demands on the design and construction staff subsequent to the close out.

The close out process does not start as the construction phase is being completed but long before. Closing out is an ongoing action. Throughout all phases of the job the experienced construction team studies the documents and the work so as to set how each element can best be turned over to the owner in accordance with the contract.

Some of the many steps to be taken to properly close out a project are given below. The list is for all parties to the contract, since most are involved in the close out phase. Parties indicated in () are those most concerned with the item. Where multiple parties are indicated it does not necessarily indicate the parties must participate together in the action.

The list is at random. (Note: This list will be arranged by categories as items are added)

1. Prepare a construction record package. This set of documents was formerly called the as built drawing set. (contractor)

2. Obtain, where appropriate, a certificate of occupancy, or equivalent document, from the local building department, or other regulatory and enforcement agency. (owner, architect/engineer, contractor)

3. Prepare, distribute and have approved by the owner, the architect/engineer and the contractors, a punch out procedure. (contractor, architect/engineer, owner)

4. Punch out the project and complete the punch list requirements within an agreed upon time frame. (architect/engineer, contractor, owner)

5. Prepare, submit and accept the operating and maintenance manuals for the total project. (contractor, owner)

6. Clear final payments on the project and obtain proper waivers of lien. (contractor, owner)

7. Provide the owner with a proper set of construction documents for reference use. (contractor, owner)

8. Collect and store job logs, diaries, daily reports, test reports and all other documentation generated by the job activities. (contractor, owner, architect/engineer)

9. Bring all meeting minutes and record files up to date so as to permit easy use and retrieval of needed information. (contractor, owner, architect/engineer)

10. Collect and bind all official and unofficial project photos. (contractor, owner, architect/engineer)

**11**. Collect and record all project network plans, schedules and bar charts by issue number, subject and date. (contractor, owner)

12. Close out and store all correspondence and other record files. (contractor, owner, architect/engineer)

13. Assemble and properly store all shop drawings and other job related submittals. (contractor, owner, architect/engineer)

14. Request the architect/engineer of record to make an inspection resulting in the granting of a certificate of substantial completion. This may be required to to obtain a certificate of occupancy. (contractor, owner)

**15.** Plan and implement grand opening or preview festivities for major team members, company principals and others contributing to the planning, design and construction of the facility. (owner, contractor)

16. Each party should conduct their own job critique during which responsible parties to the project meet and identify points of strength and weaknesses in carrying out the job. One major product of this critique should be a set of recommendations for improvement of future performance, and documentation of the problems encountered and how they were resolved. (contractor, owner, architect/engineer)

17. Relinquish, or account for, all client owned tools, spare parts, and extra stocks of materials, rightfully the property of the owner. (contractor, owner)

18. Provide the owner copies of all releases, including final inspection certificates, occupancy permits, operating certificates, health department approvals and permits, and all other similar documents to allow the owner to occupy the building under full understanding of the conditions of the turnover. (contractor, owner, architect/engineer)

**19.** Label all electrical panel boxes, plumbing lines, valves and equipment as required for proper operation and maintenance. (contractor)

20. Provide all keys and keying schedules. (contractor, owner)

**21**. Submit a final statement of accounting, as required, to the owner and the architect/engineer. (owner, contractor, architect/engineer)

22. Obtain, prepare or issue a final change order reflecting adjustments to the contract sums not previously

ho 323 - Oct 98

made by change orders. (contractor, architect/engineer, owner)

23. Send sincere thank you letters as appropriate to the owner, to the design team and to various contractors involved on the job. (contractor, architect/engineer)

24. Provide the owner a complete list of contractors and vendors participating in the job and indicating their installation responsibilities. (contractor)

**25**. Insure the owner is placed on the marketing call list, mailing list and other action tickler files as appropriate. (contractor, architect/engineer)

26. Arrange for such open house activities as may be desired or required (owner, contractor, architect/engineer)

27. Insure that your company identification is shown somewhere in the building if permitted. (owner, a/e and contractor)

**28**. Insure the project is as clean or better than called for in the specifications when your staff moves off the job. Don't lose the good will of the owner by leaving him a dirty job. (contractor)

**29**. Properly train and turn over the facility to the owner's representatives. Depending on the size and complexity of the project, the training process should begin from one to three months before occupancy. (owner, contractor)

**30**. Establish and approve the start of all warranty and guarantee periods for all material and equipment on the job prior to owner making the facility operative. (owner, contractor, architect/engineer)

**31**. Prepare and submit to the owner a Construction Record Package. This package should contain the following: (contractor)

- a. The construction record set referred to above.
- b. Specific warranties required by the specifications
- c. Workmanship or maintenance bonds required
- d. Maintenance agreements called for by the specifications
- e. Damage and settlement surveys of the site and the facilities
- f. Final property surveys of the site.

**32**. Submit a final billing to the owner containing a list of all incomplete items and a properly assigned cost to each item. (contractor)

33. Advise the owner of any insurance changes over existing or past requirements or dates. (contractor, architect/engineer)

34. Complete all pre start up testing, run in and instruction along with submission of operating and maintenance manuals. (contractor, owner)

<u>Note</u>: All pre start up and start up requirements should be fully described in the contract documents and clearly referenced to the warranty period.

35. Submit final meter readings for utilities, and measured records of stored fuel at the time of substantial completion. (contractor)

36. Submit to owner, the consent of surety to final payment if required. (contractor)

**37.** Have final inspection made by an experienced exterminator to rid the job of rodents, insects or other pests. (contractor, owner)

38. Read the full contract document requirements (drawings, specifications, and contract) for closing out the job. (contractor, owner, architect/engineer)

**39**. Provide the owner a certification as to the building area calculations including gross square footage leasable square footage, and area use assignments.

WEX AIA Project Management Seminar Chicago, Illinois

# Section 10 - Reference information

- 10.01 10.33 Glossary of terms
- 10.34 10.36 Bibliography
- 10.37 Scope of design work phasing
- 10.38 10.40 Kinds of estimates
- 10.41 10 42 What is partnering?
- 10.43 Partnering components
- 10.44 Dispute resolution steps
- 10.45 10.52 ADR & partnering
- 10.53 10.54 Problem listing
- 10.55 10.56 Project management software

.

- Definitions ho 309
  - Project management definitions ho 309 d129
  - Ralph J. Stephenson PE
  - <u>Definitions</u> project management
    - **Definitions** project management glossary
      - Abatement

The process of correcting a perceived and/or hazardous condition at a geographic location. For instance the removal of a hazardous spill of toxic chemicals.

The question of hazard or not, required correction or not, the appropriateness or not of the abatement action required is often in dispute.

• Acceleration

Contract work performed in a time period shorter than that originally contemplated by the contract; or contract work performed on time when the contractor is entitled to an extension of time for his performance.

• Administration

Those activities considered to be supportive of the ex'e'cutive operations in an organization. Administrative costs may be considered the cost of management.

Administrative operations

Actions performed by those persons who provide the support services which make possible the production of products or performance of services by the line operations staff of an organization or business.

• Administrative settlement

A resolution of a dispute through discussion between the disputing parties and agreement upon a mutually satisfactory settlement.

• Adversarial

Taking the position of an opponent or enemy. Opposing one's interests or desires.

• Advisory arbitration

An abbreviated hearing before a neutral expert or a group of neutral experts acting as arbitrators. The neutral arbitrator or arbitrators issues an advisory award and renders prediction of the ultimate outcome if the matter is adjudicated.

Advisory opinion

An abbreviated hearing before a neutral expert or a group of neutral experts acting as advisors. The neutrals render an advisory opinion and often predict the ultimate outcome if the matter is moved to binding resolution.

# Advisory relations

The interaction of parties related to each other by an obligation, either contractual or informal, where the service performed is of an advisory nature only.

• Agency authority

A relation in which one person or organization acts on behalf of another with the other person's or organization's formal authority.

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• Agent

A person or firm whose acts are asserted by the third party to bind the principal.

• Agreement - partially qualified

An agreement made based on a moderately broad range of measuring values used somewhat consistently by the principal. The selection of an agent or contractor is normally made with some or full visible competition.

• Agreement - totally negotiated

An agreement made based on a very broad range of measuring values applied as desired by the principal. The selection of an agent or contractor is usually made with very little visible competition.

• Agreement - totally qualified

An agreement made based on very narrow range of measuring values, i.e. price, but used consistently by the principal. The selection of a agent or contractor is normally made with full visible competition.

• Alternative dispute resolution - adr

In its generic form, is a method of resolving disputed construction claims outside the courtroom.

Includes systems of resolving disputes in planning, design and construction by cooperative, internal, or third party assistance methods that are alternatives to conventional dispute resolution methods currently in common use. Conventional methods are usually considered to be litigation and binding arbitration.

Alternative dispute resolution may make use of non traditional combinations of conventional dispute methods.

# • Apparent authority

A situation in which one person or organization acts on behalf of another person or organization without the other person's or organization's formal authority.

Approval

An official or formal consent, confirmation, or sanction.

#### • Arbitration

A method for settling disputes whereby an officially designated third party (usually one to three people) hears and considers arguments and determines an equitable settlement. Usually considered binding upon the parties.

• Architect, engineer ruling

The ruling of the architect or engineer in an issue or dispute on a construction project on which he or she is the design professional of record. Where specified the ruling may be binding if accepted as specified in the contract.

• Articulate

To express oneself easily in clear and effective language

• As-builts

See construction record documents

## Assigned contractual relations

The interconnection of those parties bound by subsequent assignment of a contract to other than the initial parties.

• At-risk

A position or action that puts an individual or organization in the position of possibly suffering harm, loss, or danger. Often the hazard poses an uncertain but potential danger.

## At-risk construction manager

A manager of a construction program who takes the responsibility for paying for the construction of the project and then collecting his costs from his client under a contract with the client.

# • Audit - as applied to projects

Inspect, analyze & evaluate project status, management and health against criteria established as a standard of performance for any give point in time. The audit encompasses such measurements as:

- Physical condition of project
- Project progress
- Procurement status relative to needs
- Project management techniques in use as reflected by project health
- Project team performance as reflected in project health
- Where appropriate, progress measured against expected money flow
- Resources allocation
- Status of interrelations between major parties to the project
- Trends in project progress
- Trends toward or away from claim prone status

Each auditing situation is unique and the scope of the audit should be determined as specially fits each individual project and project team. All, or a part of the above measurements might be used to make the audit.

Auditing usually is done through the following steps, listed in general sequence.

- Make pre inspection review of measurement standards to be used
- Inspect project
- Discuss inspection observations & perceived project status with key project staff

• Evaluate current interrelation between procurement and field installation needs

- · Identify areas of administrative (supportive) operational difficulty & strength
- Identify areas of line (ex'e'cutive) operational difficulty & strength
- Prepare monitoring documents from current network issues
- Evaluate need for project plan update
- Update current network models as may be appropriate or required
- Prepare & submit report of project audit

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# • Authority

The prerogatives, either vested or acquired over a long period of time, that allows an individual to carry out their responsibilities and duties. This includes the right to determine, adjudicate, or otherwise settle issues or disputes; the right to control, command, or determine.

## • Basic contractual relations

The interconnection of those parties bound by the initial contract to perform in a certain manner for certain considerations to be paid.

• Bench trial

A trial before a judge without the benefit of a jury.

• Binding arbitration

A process in which opposing parties submit disputes to binding determinations by a neutral third person or panel.

• Binding resolution

A third-party imposed solution to a contested claim in which the conditions are legally binding on the parties.

• Breach of contract

Failure to perform all or part of a contract where there is no legal excuse for such failure.

# • Building components

The basic units into which most building construction projects can be divided. Usually the components represent distinct construction & construction related actions that have common characteristics.

• Design work (des)

Project related work that concerns production and issuing of contract documents

- Exterior skin (esk)
  - All elements required to close the building to weather.
- Front end work (few)

All non construction project related work concerning real estate, financing and pre construction leasing.

• Interior finish work (ifw)

All interior building components that must be protected totally or in part from weather.

• Interior rough work (irw)

All interior building components that can be exposed totally or in part to weather.

• Off site work (ofs)

All work outside the property or hoarding line that is included in the project contract scope of work.

• On site work (osi)

All project work outside the building line and inside the property or hoarding (contract boundary) line.

• Procurement (pro)

Work related to solicitation of proposals, award of subcontracts, preparation of submittals, approval of submittals, and fabrication and delivery of materials & equipment to the job site.

page 10.04

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• Substructure work(sbw)

All foundation work upon which the superstructure bears directly or indirectly. Also includes site preparation for start of field work on the building area.

• Superstructure work (ssw)

All major structural load carrying components that bear on the substructure directly or indirectly.

• Unit systems work (usy)

All work that can be installed as a unit & is somewhat isolated during construction from other components of the building

Bulletin

An official notice that a change is being considered and that it is desired that those affected parties to the contract provide an estimate of the cost of the proposed change. The bulletin is often given other names such as change estimate request, request for proposal, or proposed change notice.

# • Business model

A graphic depiction of the elements which make up a business entity. The model usually identifies premises, objectives, and implementation. It recognizes basic business functions, business activities and manager activities.

Cardinal change

A change that is outside the scope of the contract.

# • Centralized project management

The concentration of project management authority and responsibility under one control.

• Change

Any revisions to the contract documents that alter the scope of work agreed to.

Change order

An official notice that the changes specified in the change order are to be done. A properly executed change order is a revision to the scope of work and the contract documents.

• Charter

A document prepared and agreed to, by the project partnering stakeholders and containing a set of informal guidelines to successful performance in the execution of noncontract project matters. The charter is normally signed by the stakeholders and is used in conjunction with a mission statement from which the guidelines are derived, a partnering evaluation system by which noncontract practices are periodically evaluated, and an issue resolution system containing guidelines to the settlement of contested disputes about project matters.

# • Claim

A demand for something as due; an assertion of a right or an alleged right. In construction generally a demand for something as due, or in which the demand is disputed.

Claim avoidance

A technique and procedure for generation of situations in which the demand for what is due as a result of a contract agreement is honored without formal dispute, or in which the dispute is settled by an administrative settlement. • Claim potential

The measure of potential that any project has to encounter disputes during its implementation.

• Claim prone job

A design and construction project that has a relatively high potential for the generation of contested claims by or against any of the at risk parties to the project.

• Close out

The process of completing a construction project. Usually extends from the start of preparing the contractor's punch list through receipt of final payment to the designers and constructors. May occasionally extend through the warranty period.

• Closed shop

A work area in which only union workers can be employed on the job.

• Closed system

A system in which there is no import or export of information or physical materials, and in which, therefore, there is no change of components.

- Color coding
  - Green Activity on time currently not past earliest possible finish date.

• <u>Orange</u> - Activity on time - currently past earliest possible finish date, but will make or better scheduled or latest possible finish date.

- Blue Task behind will not make scheduled or latest allowable finish date
- Yellow Task behind currently past latest allowable finish date
- Commissioning

An inspection and testing system designed to independently evaluate a facility mechanical or electrical system to insure that its installation and performance is in conformance with the requirements of the contract documents.

Commitment

The state of giving a tangible or intangible benefit in a trusting and honorable manner. The act of pledging oneself.

#### Committed costs

Committed costs are promised funds for purposes, that if such purposes are aborted a penalty must be paid, and a loss is often incurred.

Penalties and losses may include such items as:

- Option costs
- Right of first refusal costs
- Legal fees
- Early engineering fees
- Legal fees
- Early planning fees
- Displeasure of political entities
- Staff time expenditure lost

- Loss of credibility
- Loss of opportunity
- Communicate

To convey information about, to make known or to impart knowledge, ideas, or thoughts.

Competition

The rivalry between two or more organizations to secure the patronage of prospective clients

Competitive

The act of being able to engage in competition with a reasonable probability of winning the prize awarded for being successful.

• Conceive and communicate

To mentally form and develop an idea for construction of a facility, to initiate the effort to provide resources needed for design and construction of the facility, and to translate the concept of the facility into a common language from which the project can proceed through to completion and occupancy.

Conceivers

Those who conceive the idea and provide the wherewithal to bring the environmental program to a successful conclusion. The conceiver may be the owner but it might also be a governmental agency, a financial source, an architect, an engineer, a contractor, a vendor or a potential tenant looking for space. We identify the conceiver since he usually is the key person driving the project on to completion.

• Conflict

A state of disagreement and disharmony.

Construct

To convert a concept and its related plans and specifications into an actual physical environment.

Construction advisor

one who provides, as required & on request, the teaching, coaching, and guidance needed by those who manage the actual construction process from conception through programming, approval, design, construction, turnover, operation and maintenance.

# Construction consultant

one who provides on an ongoing contract basis for the life of the project, the teaching, coaching, and guidance needed by those who manage the actual construction process from conception through programming, approval, design, construction, turnover, operation and maintenance.

# Construction management

A system of attempting to better manage the construction process by providing expert construction knowledge and resources throughout all phases of the project. The goal of the process is to make available to the participants, information best provided by an expert skilled in construction practices, so that when the project moves into the field the managers can provide the owner with the highest potential for project success.

Construction manager

one who provides a system of managing the construction process by providing expert construction knowledge and resources throughout all phases of the project. The goal of the process is to make available to the participants, information best provided by an expert skilled in construction practices, so that when the project moves into the field the managers can provide the owner with the highest potential for project success. Services can be for construction at risk or on a services management basis only. The construction manager is responsible for delivering the project to his client.

## Construction record documents

A set of annotated contract documents showing the as-constructed sizes and locations of all elements of the project which differ from the original, and subsequently issued contract documents. As-built drawings are generally called construction record drawings or documents.

#### • Construction services contract

A legally enforceable oral or written agreement between two or more parties specifying construction-related services to be provided by one or more of the parties to other contract parties. The services generally relate to services that directly concern the relation, nature, cost, performance, or installation of specified work into specific facilities construction.

#### Constructive change

An owner's action or inaction that has the same effect as a written directive.

#### Constructors

Those who interpret the construction language and convert it to an actual physical environment. Occupying this role are general contractors, specialty contractors, vendors, suppliers, manufacturers, artists and others who actually put the materials into place in the field.

#### Consulting services contract

A legally enforceable oral or written agreement between two or more parties specifying design and construction related services to be provided by one or more of the parties to other contract parties.

#### Contested claim

A demand or claim in which the demand is disputed.

Contingency

A program of action set out against the possibility that an unlikely or unintended event may occur.

#### Continuous

Uninterrupted in time; without cessation.

Continuum

A continuous or ongoing series of actions, normally uninterrupted.

• Contract

A legally enforceable oral or written agreement between two or more parties specifying goods or services to be provided by one or more of the parties to others of the contract parties.

#### • Contract document matrix

A two dimensional grid in which the rows contain action items for the various project components and the columns usually designate the geographic location of the item. At the intersection of a row and a column is inserted the designation of the contract document package in which the information is contained.

#### Contract documents

Usually considered to be the construction documents which provide the full definition of the scope of work for which the parties are legally responsible. Could include the agreement, the drawings, the specifications, instructions to bidders, addendum, and any other material included by mutual agreement and clearly identified as part of the contract.

#### Contract services

specialized services provided on demand or by request to clients by individuals or groups within the company to individuals and groups outside the company. These are provided by contract with the client.

#### Contractor

The party, where there is a principal and a contractor, who agrees to the doing or not doing of some definite thing for a stipulated sum.

#### Control

Maintaining firm, competent managerial direction of any given situation. Controlling leads to achievement. It is usually accomplished by the invisible use of leverage.

#### Coordinate

To harmonize in a common action or effort. Many design and construction consultants recommend the word not be used in contracts since it has indistinct meanings as related to management in design and construction.

#### • Core ethic

the fundamental value statement upon which the company is built, managed and does business.

#### Cost growth

An increase in project costs from the expected costs, and occurring during the planning, design, construction, and occupancy phases of the line of action.

## Cost/benefit

A comparative measure of benefits to be gained at a cost. A cost/benefit analysis usually establishes standards by which the benefits are given a value, and standards by which value-added is measured against what is desired, and what can be afforded. This allows the highest benefit/cost ratios to be identified within the standards adopted.

#### • Credentials

A formal certification for a qualified person to do something for which special talents, training and education is required.

#### • Critical path method

A mathematical modeling technique which allows the user to establish ranges within which resources can or must be used.

#### Critical transition point

The point in a project delivery system at which the responsibility and authority for the work passes from the supportive group to the ex'e'cutive group.

#### Culture - business

A way of doing business that has been generated by a group of human beings and is passed along from one business generation to another, generally by unstructured communication.

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• Cuts

Excerpts from catalogs, drawings, or flyers that depict a configuration to be used in the construction process.

## · Daily reports

Daily technical reports about the project containing data on manpower, weather, major activities, equipment on job, and other job related statistical information. Usually the daily report form is preprinted and in loose leaf form.

- Decentralize
  - To undo the centralization of management and decision making.
- Decision table

A tabular display of information depicting a defined situation which permits alternative courses of action to be evaluated by yes or no answers to explicit questions.

# • Decision tree

A graphic device showing alternate courses of action from beginning a given situation point. The decision tree is used to graphically show the impact of various possible decisions at any given point in the decision process. It can be quantified or unquantified.

# • Decision-to-action time span

The amount of time required from the point at which a decision is made to the point where the decision is implemented. In a management structure it is important to insure that the full span of time from decision to action is covered, from shortest to longest.

## Defective or deficient contract documents

Contract documents which do not adequately portray the true scope of work to be done under the contract.

• Delay

A problem or situation beyond the control of the contractor, and not resulting from the fault or negligence of the contractor, which prevents him from proceeding with part or all of the work.

- Delegate
  - To commit powers or functions to another as one's agent or substitute.
- Deposition

A written record of sworn testimony, made before a public officer for purposes of a court action. Usually the deposition is in the form of answers to questions posed by a lawyer. Depositions are used for the discovery of information, or as evidence at a trial.

• Design

Generically, to conceive in the mind, to form a plan for, and to create in an artistic and highly skilled manner.

Design/build

A method of providing total design and construction services under one cost and liability umbrella. Usually a design/build contract is based on a scope of work performance specification prepared by the owner or user. The ultimate aim of the design and build system is to provide a single source management and liability for the total facility program.

# • Destructive conflict

Animosity or disagreement which results in lowering the potential for an individual or organization to succeed.

# • Development

A business operation in which the primary goal is to locate and produce profitable and marketable real estate assets.

• Diary

Similar to a log but dealing more with personal observations of the individual writing it relative to his feelings about the job and the people.

• Differing site conditions

Where actual site conditions differ materially from those indicated in the contract documents; or where unknown physical conditions at the site differ materially from those ordinarily expected to be encountered in work of the nature contemplated by the contract.

# • Direct negotiations

Conflict in which the matter in dispute is taken immediately to those that have the authority to make a final binding decision in any project related matter. These are called the ultimate decision makers.

• Directed change

A written or verbal change that falls within the scope of the contract. The owner has the responsibility of paying for the change.

Discovery

The act of disclosing or being compelled to disclose data or documents that a party to a legal action is compelled to disclose to another party, often an unfriendly one, either prior to or during a legal proceeding.

# • Discrete

Consisting of, or characterized by distinct or individual parts; discontinuous.

# • Disincentive

A penalty imposed on a contract party for less-than-satisfactory performance on a project. The disincentive is usually coupled to a bonus or incentive.

• Dispute

To engage in argument or discussion. To quarrel or fight about.

# Dispute resolution board - drb

A method of dispute resolution where project participants establish procedures, by contract, to proactively settle disputes as they arise during the course of the project.

drb's seek to anticipate problems and get the parties to resolve them before the problems harden into formal claims.

# Document control system

A method of receiving, classifying, marketing, storing, and retrieving documents received and sent on a project.

Documentation

An organized collection of historical records that describe the events comprising a project or program. Also the act of preparing or supplying documents or supporting references in a project or program for future reference.

#### Dysfunction - organizational

An organizational problem that hinders or prevents achieving objectives. May be temporary or permanent.

#### • Early finish (EF)

The earliest possible date by which a task can finish in a network model if it has been started at its early start date.

#### • Early start (ES)

The earliest possible date at which a task can begin in a network model if all tasks immediately preceding it have been completed by their early finish dates.

#### Education

The teaching and learning process by which the principles of doing things are conveyed to the learner.

#### • Effective

Of a nature that achieves identifiable goals and objectives in accordance with an action plan, and achieves worthwhile peripheral goals through intermediate accomplishments. To do the right things.

# • Efficient

Exhibiting a high ratio of output to input. To do things right.

#### Elapsed duration

The estimated or actual amount of calendar or clock time an activity requires to accomplish, considering all direct and indirect influences upon the task's activities. Includes temporary work delays and stoppage due to influencing actions on the task.

#### Empathy

Identification with and understanding of another's situation, feelings, and motives.

#### Engineer or architect of record

The legally licensed architect or engineer who oversees the production of drawings and specifications from which something is to be built. The architect or engineer of record is usually required to sign and seal the documents and is liable for their correctness.

#### Enrichment

Adding to the scope of work originally contracted for with the intent to avoid being charged or paying for the extra work. Often seen in as-noted remarks on submittals, or on inadequate identification of scope of work in a bulletin or change order.

#### Ethical

In accordance with the accepted principles of right and wrong that govern the conduct of individuals in a profession and in their relationships with others.

#### Everyone-must-know communications

An organizational communications system based on the managerial belief that if everyone in the organization knows what all or most other people in the organization are doing and working on, the organization's overall output quality will be superior.

#### • Ex'-e cutive

The executing arm of the organization closest to the flow of expense and income experienced in achieving the organization's prime objectives. Closely related to line operations.

#### Executive

Of, relating to, capable of, or suited for carrying out or executing. The executing arm of the organization is that closest to the flow of expense and income experienced in achieving the organization's prime objectives. Closely related to line operations.

#### Feedback loop

The loop of communication around a project through which information is conveyed to and through the various components of the project.

#### • Field order

An official notice that the actions or changes described in the field order are to be done. The field order is usually issued only in emergency situations where the time between decision and action does not permit issuance of a bulletin followed by a change order. A method of payment is usually specified in the field order.

• Financing

Providing the funding either or both interim and permanent for planning, designing, and constructing a facility.

• Force majeure

An unexpected or uncontrollable event.

#### • Free enterprise system

An economic system under which the means of production, distribution and exchange are in large measure privately owned and directed.

# • Functional - as related to continuous management

Designed or adapted to perform some specialized activity or duties, usually concerned with the continuous operation of the company.

#### • Functional component

A group designed or adapted to perform some specialized activity or duties, usually concerned with the continuous operation of the company.

#### • Functional operations

Management and staff direction of the application of resources to accomplish each specialized activity. Usually defined as a department or division of the company. Usually concerned with continuous operations of the organization. Contrasts with project operations.

#### Functionally diversified operations

Services that provide many specialized activities offered under one or more management organizational structures.

#### General conditions

The portion of the contract agreement that contains contractural-legal requirements for the work.

#### • General requirements

The portion of the contract agreement that contains overall technical support specifications governing work on the job.

# Generic construction

The field of business practice that encompasses all phases of the construction industry, including programming, planning, designing, building, operating, and maintaining facilities. Described best as the full set of activities shown in the line of action. (See line of action.)

# • Geographically diversified operations

Services that provide specialized activities offered under one or more management organizational structures located in different physical locations.

Goals

The unquantified desires of an organization or individual expressed without time or other resources assigned. (See objectives for related definitions.)

# • Grapevine

The communication line for informal transmission of information, gossip, or rumor from person to person. The grapevine is often more accurate and rapid than formal transmission lines.

# • Graphics oriented data processing

Data processing in which the majority of the information is entered or gained by the use of a joy stick, mouse or other control which gives direct hand related movement and entry onto a console screen.

# • Growth measures

The measurable factors which account for increased business activity of an organization. In the architectual - engineering - planning business these growth factors may include

- Competitive forces
- Dollar volume
- Fee levels
- Number of offices
- Organizational structure
- Productivity
- Profit levels
- Resource availability
- Services offered diversity
- Staff diversity
- Staff size

# • Guaranteed maximum price (GMP)

The price for a specified scope of work to be provided by a contractor that contractually binds his performance to a specified guaranteed maximum price. Often the guaranteed maximum price is tied to a time and material performance with the price not to exceed the agreed upon maximum.

• Hard-money

A total price agreed to for the entire work, and to be paid in a mutually satisfactory schedule of payments.

Histogram

A graph showing a quantity on the vertical axis measured against equal intervals of time shown on the horizontal axis. In construction, often a depiction of the resources required per day over a period of time.

# • Horizontal growth (Integration)

A management system that emphasizes diversifying by expanding existing functions by classes. For instance a design office could accomplish horizontal integration through dividing their operations into various kinds of projects such as commercial, institutional and industrial. These all use the same or similar functional disciplines but the organization is divided into separate groups that concentrate mainly on one of the three main building types.

• Hygiene

The elements in an organizational situation that are acceptable to an individual but do not necessarily motivate him. These same elements, if unacceptable to the individual, may act as negative influences.

In-house work

Relating to activities that are managed and directed by a permanent staff of an organization.

• Incentive

A bonus paid to a contract party for performing its work in a superior manner to that specified. The incentive is usually coupled to a penalty or disincentive.

# • Incentive-disincentive system

A payment system used in construction to pay a bonus or incentive to a contract party for performing their work in a superior manner to that specified. The bonus may relate to cost, time, quality, safety, or other such measurable component of the total job performance. If the standards set are not reached by a measurable point on the project, a disincentive is triggered where the contract party is penalized for inferior performance on the project.

# • Independent advisory opinion

An opinion rendered by a qualified neutral of what outcomes can be expected if certain courses of action are followed.

# Industrial revolution

A complex of socioeconomic changes, such as the ones that took place in America in the 19th century and which were brought about by extensive mechanization of production systems and the use of large-scale factory production.

# • Interfaces

Points at which different but related activities exert direct influences upon each other. Interfaces are often the points where direct objective activities contact dependent objective activities. Poor management of interface situations usually causes problems and dysfunctions.

# • Isoquant line

A line drawn on a network model and connecting some or all equal date or resource points on the activities shown. The date isoquant line is the equivalent of a straight line in a time scaled bar chart.

#### Issue

A point or matter of discussion, debate, or dispute.

Issue resolution

A method of reaching agreement and closing out disputes and problems at the lowest possible management level, in the shortest possible time, and with the lowest potential for residual hard feelings. • Judicial system

Of, relating to, or proper to courts of law or to the administration of justice. Decreed by or proceeding from a court of justice which is vested with the authority for such action by a set of legally dictated processes established by laws enacted by a legislature.

• Jury trial

A trial before a jury.

• Late finish (LF)

The latest allowable date by which a task can be completed in a network model without forcing those tasks that follow past their latest allowable start dates.

• Late start (LS)

The latest allowable date by which a task can be started in a network model without forcing those tasks that follow past their latest allowable starting dates.

Laundry list

A list of items, usually at random, that are to be classified, rearranged and used to build specifically sequenced tabulations, network models, narrative schedules or other systems of which the items in the laundry list are a component.

• Law

The actions or processes by which the rules of a society are enforced and through which redress for grievances is obtained

• Leadership

The process of persuasion or example by which an individual induces a group to pursue objectives held by the leader or shared by the leader and his or her followers. - John W. Gardner

"The art of getting someone else to do something you want done because he wants to do it" - Dwight D. Eisenhower

• Leverage

The effective use of vested and earned authority to solve problems and achieve goals and objectives.

• Liable

Legally obligated or responsible.

Life cycle cost

The total cost of a system over its entire defined life.

• Limited agent

The individual or organization acting as an agent and authorized to do only what is specified or what is reasonable to believe the principal wants done. A contract can be used to define the amount of authority to be granted an agent.

• Line activities

Those activities that are most closely identified with the flow of basic expense and income related to the prime objectives of an organization.

Line of action

A sequential statement of activities necessary to conceive, design, build and operate an environment. Related to the generic (G) construction process.

• Liquidated damages

The amount established by the parties to a contract which must be paid, by one or either of the parties, in the event of a default or a breach. Is related to the

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damages suffered by late performance.

# Litigation

The process of contending in court, either as a plaintiff or a defendant.

Log

A permanently bound, dated, hand written record of job related events that have occurred on a project. The log is usually in ink, and is maintained by an individual in responsible charge of the work with which the record deals.

• Long list

The initial list of those participants offering professional planning, design, and construction services for a particular project. This list is usually prepared by the conceiver of a proposed project from those having qualifications to do the job. The long list is narrowed to a short list from which the final selection is made. (See short list.)

# • Luck

Preparation meeting opportunity

# Macro matrix elements

The individual elements or components of a three dimensional matrix that defines the actions needed, the skills that must be applied to do the action, and those who must take the action.

# Maladministration

The interference of the owner in the right of the contractor to develop and enjoy the benefits of least cost performance.

# • Manage

To define, assemble and direct the application of resources to achieve specific goals and objectives.

# Management

The act and manner of defining, assembling and directing the application of resources to achieve specific goals and objectives.

# Management by exception

A measuring and monitoring system that sounds an alarm to the manager when problems have appeared or are about to appear, and remains silent when there are no problems. The system identifies the problem area, thus permitting the effective manager to manage the exception while leaving the smoothly running operations to continue running smoothly.

# Manager

One who defines, assembles and directs the application of resources to achieve specific goals and objectives

# Managerial grid

A numerical grid which positions a manager in a matrix by defining his concern for people as compared to his concern for production. This grid has been highly developed by Blake and Mouton and is useful in establishing managerial systems that are desirable and needed.

# Marketing

The process of conceiving, formulating and implementing a process by which the ultimate service or product of an organization can be successfully sold.

Matrix

A two or more dimensional display of related data.

#### Matrix management

A management technique that employs a multiple command system. Usually results in one employee having two or more bosses on a time to time basis.

• Mediation

An attempt to effect a settlement between disputing parties through the unbiased efforts of an objective third party, usually well known to those in dispute and acceptable to them. Mediation differs from arbitration in that it generally involves a single individual as the ruling party, is less formal, and is generally not binding. (This definition of mediation varies with the degree of legal significance attached the resolution of disputes, and the dispute location.)

• Mentor

A wise and trusted counselor, coach, or teacher.

[Mentor - a tutor in Homer's Odyssey]

Merit shop

A work area in which the workers may be either union or not, and in which there are no major jurisdictional boundaries governing assignment of work.

• Minitrial

A private process where opposing parties present condensed versions of their cases, both to designated executive representatives, and to an impartial advisor, and then negotiate.

The executives hear both sides, thus gaining a first hand perspective of the parties positions. The impartial advisor then points out possible outcomes an helps the parties to settle, if possible. Minitrials provide a structure to negotiate and ground rules to facilitate settlement.

#### • Mission

A statement of the most important result to be achieved by the project being successfully completed.

Mockup

A full-sized scale model of a structure, used for viewing, demonstration, study, or testing. Usually used in construction to obtain approval of a system, materials or a product.

# • Money flow

The flow of income and expense measured against time.

Monitoring

Measurement of current project conditions and position against the standards of performance set for the job.

• Motivation

The elements of a given situation that encourage and make effective, successful and meaningful, the activities of those engaged in the situation.

• Multiplier

A number usually applied to a direct cost by someone providing a service. The product of the multiplier and the direct cost determines the actual charge to be billed for the service. The multiplier adds the overhead and profit to the direct cost.

## • Must list

Those items that must be included in the scope of work to make the project a go. If any of the items in the must list are not able to be included the project is a no-go.

# Need-to-know communications

An organizational communications system based on the managerial belief that information should only be offered and provided to those who truly need it and can use it to add value to the product they are responsible for producing.

# Negotiated contract

A contract obtained through offering multi-value benefits in addition to cost benefits to the prospective client. Usually conditions of the final contract are negotiated after an offer has been conditionally accepted.

# Network

A system of interconnected, interacting components. Usually a part of an open system.

# Network plan

A graphic statement of the action standard of performance to be used in achieving project objectives.

# Network planning

A graphic technique of showing necessary and desired actions needed to achieve end, intermediate and peripheral objectives.

• Neutral

An unbiased outside expert capable of objectively listening, analyzing, and evaluating construction-related demands or claims which are in dispute and rendering an opinion or decision as to its disposition.

# • Nonbinding arbitration

Involves an evidentiary hearing before one or more third parties who draw conclusions regarding issues in dispute. The presentations may be condensed, as in a minitrial. The third renders a decision, but the decision is not binding on the parties. The intent is to predict the probable adjudicated outcome of the case as an stimulus to a settlement.

# • Nonbinding resolution

A suggested solution to a contested claim or problem in which the conditions are not legally binding on the parties but are an expert's recommendations for resolution.

# • Objectives

Quantified targets derived from established goals (see goals). The most commonly used resources in converting goals to objectives are money, time, human abilities, human actions, equipment, and space.

# • Objectives - dependent

Objectives to be achieved that are affected by major influences beyond the manager's direct control. The dependent goal may be predictable or unpredictable.

Dependent goals, while usually beyond the manager's control, may well be within the company's ability to reach. Lack of correlation between company and individual effort to achieve a manager's goals that are affected by others, may cause severe dysfunctions.

# • Objectives - direct

Objectives that can be achieved by managing conditions within the manager's direct influence.

• Objectives - end

Objectives realized from and upon total completion of the defined project work.

• Objectives - intermediate

Objectives achieved at specific and identifiable stages of the project, i.e. partial occupancy of a building, turnover of a mechanical system for temporary heat, or completion and issuance of foundation plans for early start of construction.

Objectives - peripheral

Objectives realized on an ongoing basis through the life of the project and achieved as an indirect result of project activities. Peripheral objectives may be personal, professional, technical, financial or social. Peripheral objectives might include staff promotion, profitable subcontractor operations, specialized experience, or achievement of design excellence in a special field.

• Off-site

Located outside the contract site boundaries.

• On-site

Located within the contract site boundaries.

• Ongoing organization

The arrangement and interrelationships of people charged with providing supportive action on an ongoing basis within the company. Examples of functions contained within the ongoing design or construction organization are estimating, administration, legal, marketing, sales, purchasing, and accounting.

# • Open shop

A work area in which both union and non union workers can be employed on similar tasks.

Open system

A system which exchanges energy, information and physical components with its environments.

• Operators

Those who operate and maintain the completed physical environment on a continuing basis. Usually the party responsible for this function is an owner or tenant working through a plant or facilities manager.

# • Organization

The arrangement of resources (talent, skill, money, time, space, people, et al) that has evolved, or been selected, to accomplish the functions, activities, and management, and goals and achieve the objectives of a business or institution.

# • Organizational structure

The categories of parties to the planning/design/construction/operation process and how they are organized for the work. The organizational structure is shown by a set of relations between the parties that identifies the responsibility and authority lines along which the project is to be implemented.

• Over-the-wall management

A management style which subscribes to the actions of participants completing their work responsibilities and duties, and then passing the work product along to others (or throwing it over the wall) without adequate briefing for the successors to do their work effectively. Often identified by statements such as "We did our job and now they can do theirs", or, "That's not my job."

Overhead

That portion of an organization's cost that cannot properly and accurately be allocated to any specific operation on any specific project.

• Owner furnished items

Those items furnished by the owner according to the contract documents.

• Par

An amount or a level considered to be average; a standard.

Par performance

A rating, usually numerical, that expresses the level of performance that will be accepted as the normal degree of competence expected of an individual or organization in the performance of an action.

• Partnering - a base statement

A method of conducting business in the planning, design, and construction profession without the need for unnecessary, excessive and/or debilitating external party involvement.

Partnering - Associated General Contractors

A way of achieving an optimum relationship between a customer and a supplier. A method of doing business in which a person's word is their bond, and where people accept responsibility for their actions.

Partnering is not a business contract, but a recognition that every business contract includes an implied covenant of good faith.

#### • Partnering - Construction Industry Institute

A long term commitment between two or more organizations for the purpose of achieving specific business objectives by maximizing the effectiveness of each participant's resources.

This requires changing traditional relationships to a shared culture without regard to organizational boundaries. The relationship is based upon trust, dedication to common goals, and an understanding of each other's individual expectations and values. Expected benefits include improved efficiency and cost effectiveness, increased opportunity for innovation, and the continuous improvement of quality products and services.

#### • Partnering - organizational

The application of partnering systems and methods to the ongoing work and staff activities of an organization. An internal partnering system within an organization as applied to the internal work effort of the company staff.

• Partnering - project or tactical

A method of applying project-specific management in the planning, design, and construction profession without the need for unnecessary, excessive and/or debilitating external party involvement.

• Partnering - strategic

A formal partnering relationship that is designed to enhance the success of multi-project experiences on a long term basis.

As each individual project must be maintained, a strategic partnership must

ho 309 - Oct 98

also be maintained by periodic review of all projects currently being performed - Ida B. Brooker 1994 WEX

#### • Partnering charter

The basic manual for operating a partnering system. Contains at a minimum, the mission of the project team, and their objectives for the project. Usually is signed by those writing the document.

The charter is an agreement in principle and must not supersede or supplant the design and construction contracts in place or to be written.

#### • Peer review

A partial or full audit evaluation of the project done by objectively based individuals or organizations outside those owning, designing, building or operating the facility.

#### Percentage fee

A fee determined ultimately by a percentage of project cost, all as specified by the contract.

## • Perception

The process of becoming aware of something through any of the senses. To become aware of in one's mind; to achieve an understanding of.

#### • Performance document

A document which provides information as to the performance desired and the amount that is to be spent.

Compare to prescriptive -oriented documents which provides detailed information as to the methods and means by which something is to be done or produced.

### • Planning

Establishing and arranging necessary and desired actions leading to end, intermediate and peripheral objectives.

#### • Planning - in the management sense

Establishing and arranging necessary and desired actions leading to end, intermediate and peripheral objectives.

#### • Plant Engineering Retainer Services

Services offered by professional architects, engineers, planners and constructors to small and medium size industries and designed to keep the organizations facility records up-to-date, and to provide on-call assistance and advice to those organizations who do not have nor can afford to maintain a full-time plant engineering staff.

#### Positive conflict

Hostility that is managed so that its resolution raises the potential for individuals or organizations to succeed at being excellent.

#### • Prepare and publish

A phrase often inserted into the partnering charter to direct the stakeholders to write and implement a policy, procedure, or guideline for accomplishing a performance that may be required by contract but whose detailed nature is not specified. An example of such a charter provision might be--"Prepare and publish invoicing procedures for all levels of project operations."
#### • Prescriptive document

A document which provides detailed information as to the methods and means by which something is to be done or produced. The document explicitly identifies the material and equipment components of the finished product.

Compare to performance-oriented documents which describe the performance desired and the amount that is to be spent to achieve the performance in the finished product.

#### Preventive law

A technique for minimizing contract problems in the construction industry.

#### Prime contractor

A contractor whose business agreement is directly with the organization providing primary financing for the project.

#### Principal

A person who authorizes another to act as his agent, or a person primarily liable for an obligation.

Problem

A deviation from an accepted and/or approved standard of performance.

#### Production management

The action of defining, assembling and directing the application of resources to achieve design production goals and objectives. These goals and objectives are set for producing the end product of a design effort - usually a set of documents that define the construction of an environmental improvement.

#### Professional

Having great skill or experience in a special contributive field of work.

## • Profiling

The preparation and use of a selective, flexible and tailored systems of screening projects for potential participation.

#### • Profit - educational & training

Fulfillment of learning and teaching goals held by individuals and their companies.

#### Profit - financial

Fundamentally, the difference between organizational cash income and organizational cash expense. Further definitions of financial profit are complex and often unique to an organization or project.

#### Profit - self actualization

Personal fulfillment realized after basic needs of shelter, safety, protection, love and freedom from hunger are achieved.

#### • Profit - socio economic

Company, group or individual achievement of social objectives within a financially profitable set of activities.

#### • Profit - value system

Company and project fulfillment of personal, professional, technical, social and financial values held important by individuals and groups related to the company.

#### • Profit plan

A management tool for formalizing the firm's financial objectives in order to establish yearly financial goals, and to provide intermediate financial targets throughout the year. (adapted from Howard C. Birnberg - Project Management for Building Designers and Owners)

• Profitability plateau

The leveling off of profit over a period of time due to a need for increased overhead caused by an increase in operations costs. These operations cost increases are often generated by an increased work load and the resulting added management staff required without a corresponding increase in production or direct cost income.

• Proforma - in real estate development

A financial model **unusually** built early in a construction program to show by projecting income and expenses, how the money flow to and from the project will occur. It is often used to establish the capital amount to be allocated to a project based on simulated operating conditions. The term pro forma means according to form.

• Program - as defining a step in the design process

A narrative oriented statement of the needs and character of the proposed user operation, the requirements of the user and owner, the nature of the environment to be planned, designed and built, and the corresponding characteristics of the space that will satisfy these needs and requirements. Sometimes called the brief.

• Program - as defining a generic construction effort

A major planning, design, construction, and operational construction effort made up of several projects

- Programmed construction
  - a project management system which provides:
  - A proactive team atmosphere
  - A strong and trustful relation between project parties
  - A high profit potential
  - Strong and continuous emphasis on good project planning & scheduling
  - Encouragement to develop full project team participation
- Project as a set of work actions

A set of work actions having identifiable objectives, and a beginning and an end.

Project - as related to management

A specific management assignment to achieve a set of objectives by accomplishing a group of related, discrete operations which have a defined beginning & end.

• Project component - as related to management

Project component - as related to management A group established to achieve a set of objectives by accomplishing a set of related, discrete operations which have a defined beginning & end.

• Project delivery system

A method of assembling, grouping, organizing & managing project resources so as to best achieve project goals & objectives.

#### Project director

The individual responsible for implementation of several projects upon which his company is engaged.

#### • Project history

A tabulation of the major events on the job, chronologically arranged for easy reference. Subjects included in the history should be:

- The plan or schedule governing the sub period of the history.
- A brief recap of the major activities having an impact on the job.

• A reference to the documents in which the activities referred to are shown in detail.

- A summary of important job related conferences.
- Notes regarding points that may help resolve potential problems.

• Problems impacting on the job including reasons why the problems prevented proper progress.

The purpose of the project history is to give a quick, accurate look at past job events in a glance. The degree of detail is dictated by the potential for trouble that exists.

#### Project management

The art, science and profession of defining, assembling and directing the application of resources so as to profitably execute a work effort that has identifiable objectives, and a well defined beginning and end.

#### Project manager

One who helps establish objectives generated by a need, plans how these objectives are to be reached through a set of work actions, and then assembles and directs the application of available resources to achieve the objectives on one or more projects.

Usually the project manager is most concerned with supportive actions which bring resources to the point of effective use.

#### Project operations

Management and staff direction of resources to accomplish overall project activities. Contrasts with functional operations.

#### Project organization

The arrangement and interrelations of people charged with actually achieving project objectives. (See organizational structure.)

#### • Project schedule report

A narrative listing of network activities and the corresponding data re each action. The project schedule report is normally developed in a data base format from which selective reports and arrays can be prepared.

#### • Project stages

The groupings of actions that make up the entire project work sequence.

#### Project superintendent

The manager involved in the actual construction process and most directly responsible for the expenditure of funds to carry out the project. Usually the superintendent is responsible for field execution of the work.

• Question - closed

Questions that can be answered with a yes or no, or with a simple statement of fact.

• Question - direct

Asked with strong indication as to who or whom should answer.

• Question - open

Questions that cannot be answered with a yes or no, or a simple statement of fact.

• Question - overhead

Asked of a group without indication as to who or whom is to answer.

Question - relay

Passed along to someone else by the party originally asked.

• Question - reverse

Returned to the questioner by rephrasing or rewording the original question.

Record

Any retained information that can be effectively used in the future.

Regulators

Those who fill a review & inspection position to help insure protection of the health, safety, & welfare of the people. This is usually done by enforcing regulations written and adopted by qualified public or private bodies. Examples of regulators include those who work for building departments, departments of natural resources, public health agencies, fire prevention organizations, technical societies and other such groups.

#### • Relations - formal functional

Organizational connections that concern distribution and use of data, information and decisions that flow along formally defined transmission lines. Formal functional communications are usually written and are normally both from and to individuals and groups.

Formal relations are precisely defined and most day to day business is accomplished within the formal relation framework. The line expressing a formal functional relation usually has an arrowhead at each end to show a mutual exchange of responsibility and authority. If there is a higher authority to be implied a single arrowhead can be used pointing to the superior party.

#### • Relations - informal

The natural channels along which organizationally related material is most easily and comfortably transmitted. The informal relation exists by mutual consent of the parties to the relation, and is stimulated to maximum effectiveness by a mutual profit gained from the relation.

Little, if any, authority normally is expressed in informal relations. Communications are usually oral and one to one. Often informal relations define the hidden organization structure. A line defining an informal relation is usually shown dotted with an arrowhead at each end.

#### • Relations - reporting

The official channels through which each individual conveys, or is given raises, appraisals and evaluations; is fired, assigned or is provided professional, vocational and personal identity in the organization. The true organizational

superior of an employee is usually that individual with whom he maintains a reporting relation. The line expressing reporting relations has an arrowhead at one end pointing to the superior.

#### • Relations - staff

The business patterns through which a person or group provides consulting services necessary to achieve goals and objectives. Staff personnel usually have little or no authority over those outside the staff group. The line expressing staff relations has an arrowhead at each end.

#### Relations - temporary

Those relations created when extraordinary or unusual management demands must be met. The temporary relation is usually unstable and should be kept active for only short periods of time. The line expressing a temporary relation can have an arrowhead at one or both ends depending on the nature of the relations.

Extensive use of temporary relations creates business dysfunctions, breaks down morale and causes internal tensions.

#### Resolution

A course of action determined or decided upon that can result in clearing conflict or dispute.

• Resolve

To find and implement a solution to a problem, a dysfunction or an issue of conflict.

#### Resource allocation

The assignment of project resources such as money, time, space, people and equipment to activities that must be done to achieve project objectives. Usually resource allocation is done to achieve effectiveness in project work measures such as profitability, timely completion and quality of work.

#### Resource leveling

The use of resource allocation to even out the use of resources within a given set of time, money, space, people or equipment conditions. Resource leveling is a special form of resource allocation with its prime use being to maintain a nearly equal assignment of resources to activities and projects for their entire duration.

#### Resources

The tools of the supportive and ex'e'cutive manager. Resources include time, talent, tools, equipment, time, money, experience, space, materials, as well as intangibles, such as enthusiasm, morale and leverage.

#### Responsibility

The assignment, spoken or understood, that a person in an organization has as his part in maintaining the organization's health and vitality.

#### • Revisiting

When applied to the partnering charter, revisiting means the current project decision makers are assembled, and the present charter is reviewed, revised, and reissued as might be called for by changed project conditions.

Risk

Any exposure to the possibility of harm, danger, loss or damage to people, property, or other interest. To expose to a chance of loss or damage.

• Risk management

The management and conservation of a firm's assets and earning power against the occurrence of accidental loss.

Safety and drug testing

the provision of testing, coaching, training and monitoring required to maintain a safe and legal work site.

• Schedule

A graphic or written tabulation of project activities showing where the activities are to start and finish. The schedule is derived from the plan of action and the network model by locking the tasks and the resources they require into a specific time position.

• Selling

Establishing and implementing the strategy of achieving the objectives of the marketing plan. The physical process of closing the negotiation for services and products for a consideration.

• Shared savings

An arrangement by which a construction contractor and its client share in any savings realized by building a facility for a lower cost than the guaranteed maximum cost.

Shop drawing

A submittal in the form of a drawing, usually made specially for the application shown. Shop drawings usually show details of fabrication and installation.

Short list

The final selection list of those participants offering professional planning, design, and construction services, usually to the conceiver of a proposed project. Usually the final selection is made from the short list. (See long list.)

• Situational thinking

The ability to accurately evaluate a set of project influences by mentally moving from a long overview (macro) of them to a detailed picture (micro) and back, and being able to stop anywhere in between to consider other scale pictures of these influences and their relationships.

• Span of control

The number of organizationally related individuals a manager directly controls on a one to one basis.

• Specialized construction

The field of business practice that encompasses single phases of the construction profession. Examples of "5" construction organizations are architectural/engineering offices, mechanical contractors, plastering contractors, and planning consultants, among others. Includes nearly any single organizational unit active in design, planning, construction or related fields.

• Specification

A narrative description of the various materials and systems to be incorporated in the work. The specification concentrates on identifying quality of materials, source of materials, allowable practices, and general requirements and conditions of the contract performance.

• Sponsor - partnering

In the partnering context, a person or organization that strongly supports or champions an activity and assumes responsibility for its implementation. • Staff

A supportive unit of any organization in which the basic function is usually advisory in nature. Staff functions are occasionally defined as overhead or non production. They are considered to be the organizational partner of line operations. (See staff relations and line activities.)

#### Stakeholders

The parties at risk financially and legally or in an extended sense, those affected and potentially put at risk during the execution of a planning, design, or construction contract. Stakeholders are also those who participate in writing a partnering charter and are a signatory to the charter.

#### • Standard of performance

A well defined, explicitly stated, approved and accepted statement of the measurements to be used as a gage of performance, and goal and objective achievement.

#### • Standing neutral

A technically trained, educated, and credentialed professional who is active in the planning, design, and construction disciplines. The standing neutral must be capable of objectively listening, analyzing, and evaluating construction related demands or claims which are in dispute.

#### • Standing neutral system

A process where neutral third parties are available to assist with resolution of all disputes arising during the course of a contractual relationship. The intent which includes dispute review boards and standing neutrals is to have one or more individuals on call to address disputes as they arise. It usually requires the neutral to render a nonbinding determination of the issues in dispute, although in some cases, and upon request, the neutral can act as a binding arbitrator.

#### • Strategy

Applies to the management skills required to attain an macro result. Strategy is sometimes considered the action take to plan, direct, and implement larger and longer range programs, particularly in the military.

#### • Sub contractor

A contractor whose business agreement is directly with a prime contractor

#### Submittal

Any document submitted by contracting parties to the owner's agents for review for accuracy, responsibility of design, general arrangement, and approval. Submittals are used by the fabricator and the installer to show adequate details so the intent of the contract documents can be achieved. There is a mild ongoing professional controversy as to whether approved submittals are contract documents. Generally they are not considered contract documents, but aids to better fabrication and installation procedures.

#### • Sum zero game

A situation in which there is a winner and a loser. The loser often will lose what the winner wins.

#### Superior knowledge

The owner's withholding specific data on matters of substance not known to contracting parties during the pre contract period.

#### • Supportive

The administrative group of the project organization which is responsible for bringing resources to the point of use by the ex'e'cutive project group.

• Surety

One who has contracted to be responsible for another, especially one who assumes responsibilities or debts in the event of default.

• Suspension

An owner's or owner's agent action of stopping all or a part of the work.

• Synergism

The action of two or more substances, organs, or organisms to achieve an effect of which each is individually incapable.

#### • System

An assemblage or combination of things or parts forming a complex or unitary whole.

• Tactics

Applies to the management skills required to attain a micro or current result. Tactics may be considered the actions taken to plan, direct, and implement the day-to-day action itself.

Talent

A capacity for achieving identifiable success. Usually talent is considered an abstract resource.

• Task force

A temporary grouping of individuals and resources who are responsible for accomplishing a specific objective.

Technography

The action of preparing meeting notes and related material on electronic equipment as the notes and materials are generated. Often the recorded material is projected on a screen for viewing by those in the meeting.

Tenant coordinator

The title usually given to developer's owner representative. The tenant coordinator is responsible for integrating and directing the lease execution, construction process, tenant move in, and operational start up of tenant spaces in the base building.

Tenant work

Work done by the landlord inside a tenant space, and paid for by an allowance negotiated by the landlord with the tenant when preparing and executing the lease for the space.

Termination

The dismissal of a contractor, from a project, for convenience, resulting from factors beyond the contractor's control, or for default when the contractor's performance is not acceptable.

Text oriented data processing

Data processing in which the majority of information is entered or gained by the use of a key operated control panel such as a keyboard. The signals are usually

entered in discrete elements.

Third party

A party to a contract or agency agreement other than the principal or agent.

Also refers to an individual or group that is not primarily engaged in facilities programming, design, construction, or operations.

#### • Time and material contract

An agreement in which payment for services and material is made only for those services and materials actually furnished. There may, or may not, be imposed a not-to-exceed amount on the total cost.

• Total float (TF)

The amount of discretionary time available to a task. The total float is the difference between the early and late starts or finishes. Formally, it is defined as the duration of the task, subtracted from the difference between the late finish (LF) and the early start (ES): i.e. (LF-ES)-DURATION=TF.

#### • Total quality management

The managing process which helps insure that the quality of all components, and of the final product in the planning, design and construction of any facility is maintained at a level which meets the client's program performance requirements.

• Traditional

Pertaining to those qualities of an organization, civilization or other culture that are handed down from generation to generation. Usually the transfer is by word of mouth or by practice.

• Training

The teaching and learning process by which specific, explicit methods and systems of doing something, usually by rote, are conveyed to the learner.

• Translation

Recasting standard of performance information and data into graphic, narrative, mental, oral or other forms, to insure optimum use by those involved.

Translators

Those who translate the environmental program into construction language. Traditionally we think of the architect/engineer as the translator. However careful consideration of this matter shows there are many others who translate the conceiver's fundamental ideas into understandable, workable construction language. Subcontractors, suppliers, vendors, manufacturers, contractors, and the conceiver may all play a role in translating.

• Trust

Reliance on an organizational or individual or integrity, justice, fairness, good judgment, and other relational qualities that give confidence in the performance of the duties demanded of the organization or the individual.

• Turn key

A project delivery system in which a single contractor is given the total responsibility to plan, design, construct, and turn the key over to the owner upon its completion. Often, a turnkey contractor will provide land and financing, and in some cases, operate the facility for a specified time after construction.

#### Turnaround time

The amount of time required to process submittals.

#### • Turnover cycle

In the construction or fabrication of several similar units, the amount of time required from the completion of one unit to the completion of the succeeding unit.

#### • Ultimate decision maker (UDM)

The individual or group at the lowest management level that has the authority to make a final binding decision in any job related matter.

#### • Unilateral meetings

A decision meeting at which only a portion of the parties affected are invited to participate.

#### • Union shop

A geographic work area in which all labor classified participants are required to belong to a specified union.

#### • Updating

The process of revising and reissuing a project network model to bring it into conformance with a current desired and necessary plan of action. Updating often, but not always, results from monitoring and evaluating the project. Usually the updating is done when it is found that the current plan of work does not adequately depict the actual conditions under which the project is being executed.

#### • Upset price

A guaranteed maximum price agreed to in a time and material contract. (See time and material contract.)

• User

Those who occupy and use the completed facility to conduct their work, their recreation, their domestic living, or other activities for which the facility was specifically designed and built.

#### • Value

The increase in worth of an open system to which an item of value has been added. Often multiplied by the weight of a factor to give the weight & value rating of a factor to help determine a choice of alternatives.

#### • Value added

The improvement in the worth of anything that results from the efforts, contribution and involvement of specific people, processes, materials and ideas.

#### • Value engineering

An engineering and architectural cost analysis process designed to achieve minimum total cost while maintaining maximum product quality within the price constraints.

#### • Vertical growth (integration)

A management system that encourages diversifying by adding new functions to existing functions. New functions added usually bear an organizational relation to the existing. An example of vertical integration is incorporating real estate control, building design, financing, construction, leasing and asset management into a single development operation.

#### • Vested authority

The endowing of privileges, strength and leverage from a superior, usually to a subordinate. Generally gained quickly, rather than being earned by long and proven service in a related field within the organization.

• Want list

Those items that are wanted and can be included in the scope of work, over and above the must list items, since they provide a definable and acceptable rate of return on their cost.

• Warranty

A legally enforceable assurance of the duration of satisfactory performance or quality of a product, a piece of equipment, or of work performed. Often the warranty period begins when the installation is turned over to the owner.

• Weight

The relative importance of a factor being used to help evaluate a choice. The importance is frequently measured by a numeric scale from 1 to 10, in which a very high positive influence is indicated by a rating of 10. A very low influence is indicated by a rating of 01.

Degrees of importance between the highest and the lowest are indicated by number ratings from 02 through 09. The weight of a factor multiplied by the value added by the decision choice being considered gives a weight & value rating of a factor to help determine a choice of alternatives.

• Win - win

A situation in which there are no losers. Usually some parties win more than other parties win.

• Wish list

Those items that the owner and the user wish they could include but might not be able to due to budgetary or other reasons. Wish list items are best added, not deleted, as the project moves into construction.

Working drawings

The set of contract drawings that pictorially show the intended appearance of a job when complete.

World of nonwords

The world in which we live by our physical actions.

World of words

The world in which we live by simulating actions through words and other symbols what might happen in the world of nonwords.

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## Suggested Bibliography of Management Related Books

a starter list for the project manager's library

<ul> <li>Managing Yourself Creatively Hawthorn Books, Inc.</li> <li>260 Madison Avenue New York, New York</li> </ul>	Ted Pollock
<ul> <li>The Nine Master Keys of Management McGraw Hill Book Company 330 West 42nd Street New York, New York</li> </ul>	Lester Bittel
• It All Depends University of Alabama Press University of Alabama	Harvey Sherman
<ul> <li>Management - Tasks, Responsibilities, Practices Harper &amp; Row, Publishers, Inc.</li> <li>10 East 53rd Street New York, New York 1002</li> </ul>	Peter F. Drucker
• <b>The Managerial Grid</b> The Gulf Publishing Company Houston, Texas 77001	Blake & Mouton
• Top Management Planning The MacMillan Company 866 Third Avenue New York, New York 10022	George R. Steiner
• Management by Exception McGraw Hill Book Company 330 West 42nd Street New York, New York 10036	Lester R. Bittel
• Critical Path Method Cahners Publishing Company Boston, Massachusetts 02116	Radcliff, Kawal, Stephenson
• Effective Psychology for Managers Prentice Hall, Inc. Englewood Cliffs, New Jersey	Mortimer R. Feinberg

<u>.</u>.

• The Time Trap Amacon 135 W. 50th Street New York, New York 10020	R. Alec MacKenzie
• Management - Theory and Practice McGraw-Hill Book Company 330 West 42nd Street New York, New York 10036	Ernest Dale
<ul> <li>An Introduction to Decision Logic Tables John Wiley &amp; Sons, Inc. 605 Third Avenue New York, New York 10016</li> </ul>	Herman McDaniel
• Management by Objective Pitman Publishing Company 20 East 46th Street New York, New York 10017	George S. Odiorne
<ul> <li>How to Attract Good Luck         <ul> <li>Cornerstone Library</li> <li>Divison of Pocket Books, Inc</li> <li>Rockerfeller Center</li> <li>670 Fifth Avenue</li> <li>New York, New York 10020</li> </ul> </li> </ul>	A.H.Z Carr
• Synectics Harper & Row Publishers, Inc 49 East 33rd Street New York, New York 10016	William J. J. Gordon
• The Speech Writing Guide John Wiley & Sons, Inc 605 Third Avenue New York, New York 10016	James J. Welsh
• The Executive Deskbook Van Nostrand Reinhold Company 450 West 33rd Street New York, New York 10001	Auren Uris
• Formal Organization - a systems approach Irwin - Dorsey Press Homewood, Illinois	Carzo & Yanouzas

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<ul> <li>Managing Architectural Projects         The American Institute of Architects             1735 New York Avenue NW             Washington, DC 20006         </li> </ul>	David Haviland
• Before You Build Her Majesty's Stationery Office Government Bookshops, England	
• A Professional Guide for Young Engineers Engineers Council for Professional Development	William E. Wickenden
• Legal Apects of Architecture, Engineering and the Const Justin Sweet West Publishing Company St. Paul, Minnesota	ruction Process
<ul> <li>Managing in Turbulent Times Harper &amp; Row, Publishers, Inc.</li> <li>10 East 53rd Street New York, New York 10022</li> </ul>	Peter F. Drucker
• Effective Meetings for Busy People McGraw Hill, Inc. New York, New York	William T. Carnes
• Give & Take Thomas Y. Crowell Company New York	Chester L. Karrass
• Smart Questions McGraw Hill Book Company New York, New York	Dorothy Leeds
• Managing Organizational Conflict Prentice Hall, Inc. Englewood Cliffs, New Jersey	Stephen P Robbins
• Project Partnering for the Design and Construction Indus Ralph J. Stephenson, P.E. John Wiley and Sons, Inc. New York, New York	try
• Project Management for Building Designers and Owners Association for Project Managers CRC Press, Boca Raton, Florida	Howard G. Birnberg

## SCOPE OF DESIGN WORK PHASING

The following list is a commonly used combination of design document phases for preparation and processing of construction contract documents. Other phases may be added to, or substituted for those listed depending on the needs of the project, the owner, the user, and the project team. Further modifications may also be made to suit special requirements of the project delivery system being used.

• **PROGRAM PHASE** - A narrative statement of the project requirements, characteristics, and allowable costs. During the program phase rough estimates of total cost may be made by various costing techniques.

• <u>SCHEMATIC DESIGN PHASE</u> - The conceptual development of the project in accordance with the program requirements. Usually review and approval of schematics in part or completely, allows design development work to begin. During schematic design the rough program phase estimates are refined to a level of detail consistent with the information available. These kinds of estimates may be known as order-of-magnitude estimates.

• **DESIGN DEVELOPMENT PHASE** - The program and schematics are used to fully develop preliminary architectural and engineering details of the facility. Approval in part or fully of design development documents allows preparation of construction documents, or working drawing to begin.

Estimates may now be refined to a point where early stages of construction, such as site preparation, mass excavation, grading, foundations may be moved into final construction document design. Occasionally the design development phase documents can be used for providing a guaranteed maximum proposal for selected portions of the project.

• <u>CONSTRUCTION DOCUMENT PHASE</u> - The full set of construction contract documents are prepared in such detail to allow the project construction contracts to be awarded and field work to begin. At the point where part or all of the construction documents are completed, hard money proposals, or fixed cost proposals may be solicited. The type of project delivery system selected determines how the work is to be awarded.

• <u>CONSTRUCTION ADMINISTRATION PHASE</u> - The contractor or subcontractor construction proposals are evaluated, contracts are let and submittals on items to be used in the project are made, reviewed, checked, and approved. During this period the design firm of record usually provides an inspection or review presence on the project site. This may be for part or full time depending on the nature of the project, and the requirements of the owner, user, and contractor. The delivery system selected also influences the amount of construction administration required.

## Kinds of estimates

- Estimating can be defined as an approximate statement of what would be charged for certain work to be done submitted by one ready to undertake the work. Other definitions have been proposed but they all lead to the conclusion that <u>estimating is fundamentally the art and science of predicting what the total cost actually will be</u>. This estimate classification system takes into account the functional characteristics of the specific estimate to be made. It considers ten elements.
  - 1. Point in time at which estimate is prepared
  - 2. Scale of detail required
  - 3. Estimating methodology
  - 4. Life span covered by costing
  - 5. Data available
  - 6. Ultimate use of estimate
  - 7. Number of elements estimated relative to total
  - 8. Competitive situation
  - 9. Role of estimate in setting final cost
  - 10. Control position
- 2. A meaningful classification system results if we assign values or weights to identify the requirements of the specific estimating situation.
  - 1. Point in time at which estimate is prepared.
    - 1. Conceive
    - 2. Program
    - 3. Articulate
    - 4. Approve
    - 5. Design
    - 6. Construct
    - 7. Turnover
    - 8. Operate
    - 9. Maintain

## 2. Scale of detail required

- 1. Very rough detail, using general rules of thumb
- 2. Generalized combination system in rough detail
- 3. Moderate detail by unit or component modified with general historical and current data
- 4. Great detail modified with specific historical and detail current data.

## 3. Estimating methodology

1. Replacement or appraisal technique

## Ralph J. Stephenson, P.E., P.C.

Consulting Engineer

- 2. Historical unit area or volume figures indexed for current use
- 3. Major component costing and assembly indexed for current use
- 4. Detailed time and material estimates of elemental units (individually assembled at time of estimating) The fundamental difference between component costing and costing from elemental units is that in the first the elemental units are pre-assembled and pre-estimated so that they are not evaluated each time the component is encountered in the project.

## 4. Life span covered by costing

- 1. Cost of initial installation only
- 2. Cost of installation, and short operating and maintenance cycle
- 3. Cost of installation, and long operation and maintenance cycle
- 4. Cost of installation, and total operation and maintenance over life of investment.

## 5. Data available

- 1. Very little
- 2. Moderately adequate with supplementary research
- 3. Generally adequate
- 4. As much as required

#### 6. Ultimate use of estimate

- 1. Conceptualizing to gain basic idea of scope usually very rough figures
- 2. Comparative evaluation to measure on an equal basis several elements or combinations, all relative to a common datum
- 3. Budgeting to provide a basis for allocating capital funds, maintenance or operating costs or other expenditures on a given program prior to its final design but after its conception
- 4. Competitive to give the ultimate decision-maker in an environmental design and construction program comparable, firm values by which he can select all elements of the program to optimize its effectiveness

## 7. Number of elements estimated relative to total

- 1. Small part of total
- 2. Moderate part of total
- 3. Major part of total
- 4. Most or all of total

#### 8. Competitive situation

- 1. No competition
- 2. Moderate multi value competition

page 10.39

3. Heavy single value competition

Multi value competition is a relative evaluation based upon several factors such as size, quality of management, experience, present work load and financial strength.

In single value competition, all of these reduced to a lone bid. Such is the case on public projects where the only requirement to be on the bidding list is that an adequate bond be available

## 9. Role of estimate in setting final cost

- 1. to set capital costs only
- 2. To set financing, operating and maintenance cost only
- 3. To set all project costs through a specified period of time

## 10. Control position occupied

- 1. No control exerted
- 2. Minor controls possible
- 3. Major controls possible
- 4. Total control of program

Much elaboration is possible on control positions. the code suggested is a simplistic approach and in actual use might be modified to reflect to what the control is applied. Control position may extend to labor, material, land, money, design, construction or sub contractors among others.

# WHAT IS PARTNERING?

• 1. Partnering is a **system of conducting business** that maximizes the potential for:

- a) Achievement of project intent.
- b) Obtaining specified **quality**.
- c) Encouraging healthy, ethical customer/supplier <u>relationships</u>.
- d) Adding value.
- e) Improving <u>communication</u>.

f) Providing methods of project condition <u>measurement & feedback</u>.

g) Providing methods of quickly **resolving conflicts** by non destructive means at optimal levels of management.

• 2. Partnering provides the basis for **preventive** methods of **dispute resolution**.

• 3. Partnering is an agreement in **principle**, and **must not supersede** or supplant the planning, design, and construction **contracts** in place or to be written and executed.

# THE COMPONENTS OF A PARTNERING SYSTEM ARE:

• 1. A project mission statement.

• 2. A set of **specific goals and objectives** to be achieved within the requirements of the project contract documents.

• 3. An <u>evaluation system</u> that encourages and permits regular, well based evaluations of how well the project team is achieving the mission, the goals, and the objectives defined in the charter.

• 4. An **issue resolution system** that encourages agreement and the closing out of disputes promptly, at the lowest possible management level, and with little, if any, potential for damage to the parties.



## Alternative Dispute Resolution and Partnering - an overview

#### I. Definitions

A. Alternative dispute resolution.

In broadest terms, ADR is a method of resolving disputed design and construction claims outside the courtroom.

B. Neutral.

A technically trained, educated and credentialed professional who is active in the planning, design, and construction disciplines. The neutral must be capable of objectively listening, analyzing, and evaluating construction related demands or claims which are in dispute.

The product of the neutral's work is usually a recommendation as to a course of action to be followed based on the neutral's opinion as to the outcome of the action. Neutral's recommendations are generally not considered binding.

#### C. Partnering

A way of achieving an optimum relationship between a customer and a supplier. A method of doing business in which a person's word is their bond, and where people accept responsibility for their actions.

Partnering is not a business contract, but a recognition that every business contract includes an implied covenant of good faith.

D. Project partnering.

A method of conducting business in the planning, design, and construction profession without the need for unnecessary, excessive and/or debilitating external party involvement.

E. Resolution

A course of action determined or decided upon that can result in clearing conflict or dispute.

F. Strategic partnering.

A formal partnering relationship that is designed to enhance the success of multi-project experiences on a long term basis.

As each individual project must be maintained, a strategic partnership must also be maintained by periodic review of all projects currently being performed - Ida B. Brooker 1994 WEX

- II. Alternative dispute resolution (ADR) systems and their application in construction.
  - A. Some resolution methods available
    - 1. Non binding

a) Prevention methods - produces maximum harmony - usually least cost.

- (1) Intelligent and proper risk allocation
  - (a) Risk should be assigned to the parties that can best manage or control the risk, i.e.
    - i) The owner, if the architect/engineer is expected to assemble and write the program.

page 10.45

- ii) The architect/engineer, if the owner has prepared a well conceived and clearly stated program.
- iii) The owner, where construction is expected to begin before construction documents are complete.
- iv) The contractor, where full, well prepared, and checked construction documents are available prior to the start of construction.
- (b) Attempts to shift risks to architects, engineers or contractors not able to absorb these risks is not cost-effective
  - i) Reduces competition
  - ii) Increases costs due to greater contingency allowances.
  - iii) Increases costs and reduces effectiveness because of the potential for increased numbers and intensity of design & construction project disputes.
- (2) Incentives for cooperation
  - (a) Incentives or bonus provisions
  - (b) Disincentives or penalty provisions
- (3) Partnering
  - (a) Stresses good faith agreements
  - (b) Emphasizes teamwork
  - (c) Encourages good communications
- b) Internal negotiation methods parties involved conduct negotiations requires consensus relatively cost free.
  - (1) Direct negotiations (often starts at UDM level)
  - (2) Step negotiations (starts at dispute originating level)
- c) Informal external neutral methods preselected external neutral serves as a informal dispute-resolver relatively low cost.
  - (1) Architect/engineer rulings
    - (a) May be respected even though not legally binding.
    - (b) Must be impartial
  - (2) Dispute resolution board
    - (a) One member selected by owner and approved by contractor; one by the contractor and approved by the owner; a third by the first two members. Third selection usually acts as chairman.
    - (b) Those selected should be from the design & construction industry.
    - (c) Must have no conflict of interest.
    - (d) Conduct investigations and hearings on disputes and publish prompt opinions re the dispute.
  - (3) Independent advisory opinion.
    - (a) Mutually agreed upon neutral expert meets informally with interested parties, obtains information from both, and render prediction as to the ultimate outcome if not resolved at meeting level.
- d) Formal external neutral method preselected external neutral(s) serves as formal dispute resolver - relatively low cost - usually requires considerable preparation, and may require legal assistance.
  - (1) Mediation settlement conferences and informal hearings conducted by a neutral third party.

page 10.46

- (2) Minitrial private settlement method usually initiated by an agreement between the parties less formal than mediation.
- (3) Advisory opinion neutral expert meets with both parties, obtains information from both, and render prediction as to the ultimate outcome if adjudicated.
- (4) Advisory arbitration abbreviated hearing before neutral expert(s). Arbitrator(s) issue advisory award, and render prediction as to ultimate outcome if adjudicated.
- 2. Binding
  - a) Outside of courtroom dispute given to knowledgeable third party moderate cost may require legal assistance.
    - (1) Binding arbitration
    - (2) Private judge
  - b) Inside of courtroom most expensive usually requires legal assistance.
    - (1) Bench trial before a judge
    - (2) Jury trial before a jury
- B. To achieve successful dispute resolution requires:
  - 1. A desire for a win win result;
  - 2. A desire for a fair settlement;
  - 3. People in charge who want a fair resolution;
  - 4. A negotiation technique that is acceptable to those involved;
  - 5. Knowledge of how to arrive at a resolution system that can produce a decision;
  - 6. Understanding that unresolved conflict and disputes often requires that a neutral view be considered as a tool for positive change;
  - 7. A belief that if you aren't entitled to it don't try to get it!
- III. Partnering is a system of conducting business with minimal destructive conflict.
  - A. Other names for partnering
    - 1. A gentleman's agreement
    - 2. "Let's look at the drawings a bit more closely."
    - 3. "Let's tally up the favor score?"
    - 4. "Let's settle this over a beer."
    - 5. A handshake agreement.
- IV. Why is partnering applicable in today's construction industry?
  - A. What value is added by partnering?
    - 1. Lower costs to resolve conflicts.
    - 2. Quicker settlement of conflicts.
    - 3. Knowledgeable professionals make the resolution decisions.
    - 4. Decision makers are closer to the resolution process.
    - 5. Nature of decisions rendered lessen the probability of appeal.
    - 6. Participants gain privacy in the resolution process.
    - 7. Probability of fair resolution is increased by more timely consideration of the dispute.
    - 8. Helps cross critical transition points by setting the ground rules for the crossing
  - B. Where and why has partnering been successful?
    - 1. Comments on partnering from the Albuquerque District Corps of Engineers staff in a guide to partnering dated February, 1991

"Our experience is positive based on six contracts with four of them substantially

page 10.47

#### complete." Benefits include:

- a) Disputes reduced no formal claims.
- b) Common objectives achieved (schedule, safety, etc.).
- c) Increased responsiveness.
- d) Higher trust levels.
- e) Improved communication.
- f) Excellent cooperation & teamwork.
- g) Increased value engineering proposals.
- h) Developed expedited process for tracking and resolving open items.
- 2. Comments on partnering by Colonel Charles E. Cowen Commander Portland District Corps of Engineers in a strategy for partnering in the public sector - April 15, 1991
  - a) 80 to 100 % reduction in cost growth over the life of major contracts.
  - b) Time growth in schedules virtually eliminated.
  - c) Paper work reduced by 66%.
  - d) All project engineering goals met or exceeded.
  - e) Completion with no outstanding claims or litigation.
  - f) Safety records significantly improved.
  - g) Pleasure put back in the process for all participants.
- Combination partnering relationships surveyed & studied by the Construction Industry Institute and reported in the publication ("In Search of Partnering Excellence" - July 1991).
  - a) Shell Oil/SIP Engineering 1984.
  - b) DuPont/Fluor Daniel 1986.
  - c) Proctor & Gamble/Fluor Daniel 1986.
  - d) Proctor & Gamble/BGP 1986.
  - e) Shell Oil/Bechtel 1987.
  - f) DuPont/MK Ferguson 1987.
  - g) Shell Oil/The Ralph M. Parsons Company 1987.
  - h) Alcan/Fluor Daniel 1988.
  - i) Union Carbide/Bechtel 1988.
  - j) DuPont/Day & Zimmerman 1988.
  - k) Great Northern Nekoosa/Rust International 1988.
  - l) Pillsbury/Fluor Daniel 1989.
  - m) Hoffman-LaRoche/Day & Zimmerman 1989.
  - n) Chevron/Bechtel 1989.
  - o) Bethlehem Steel/United Engineers & Constructors 1989.
  - p) Proctor & Gamble/M. W. Kellogg 1989.
  - q) Chevron/Besteel 1990.
  - r) DuPont/H. B. Zachry.
- C. Situations in which partnering may be difficult to use
  - 1. Where the parties intend to pay lip service only to the partnering effort.
  - 2. Where individuals in key technical or management positions choose to resist intelligent discussion and fair decision making.
  - Where early commitments by the owner have made made good intercontract relationships difficult or impossible to maintain.
  - 4. Where construction contracts are let as the documents are being released for field use.

page 10.48

- Where several parties to the contract prefer to resolve disputes by contested claiming & binding resolution.
- 6. Where poor contract documents are made the basis of the partnering effort.
- 7. Where excessive, one sided conditions are placed on sub contractors by prime contractors.
- 8. Where unfair or obscure payment processing systems are specified and enforced.
- 9. Where risk has been poorly defined and unfairly allocated.
- V. What are some of the ingredients of a successful partnering effort plan?
  - A. Develop and maintain a strong desire to achieve project success for all.
  - B. Make intelligent commitments.
  - C. Avoid accepting or imposing unreasonable risk.
  - D. Work and act ethically, morally, and with integrity.
  - E. Work and act from a position of fairness rather than a position of power.
  - F. Suppress greed.
  - G. Try to establish an honest feeling of trust among participants.
  - H. Assign experience, competent people to responsible management positions.
  - I. Have empathy.
  - J. Prepare a good charter, a good partnership evaluation system, and a good issue resolution process.
- VI. Experiences and applications of the partnering concept.
  - A. What actions do others engage in that create problems for us, or do we engage in that create problems for others? (sample responses from an actual charter meeting.)
    - 1. Giving directions to proceed without a timely change order.
    - 2. Failing to establish clear chain of command.
    - 3. General contractor covering general conditions costs by charging subs.
    - 4. Lack of timely acceptance of work.
    - 5. Lack of timely responses to
      - a) RFI's.
      - b) Approval of shop drawings.
      - c) Site activity restrictions.
      - d) Change orders.
      - e) Value engineering.
      - f) Acceptance of work.
    - 6. Improper passing of general conditions responsibility to subs.
    - 7. Lack of forum to evaluate and resolve open issues.
    - 8. Slow submittal turn around.
    - 9. Unreasonable punch lists.
    - 10. Failure to recognize impact of changes on ongoing work.
    - 11. Late submission of proposals.
    - Untimely submission of as-builts, operating & maintenance manuals, and training of user personnel.
    - 13. Failure to maintain clean efficient, safe working conditions.
    - 14. Do your own punchlists.
    - 15. Pretest special systems equipment start-up.
    - 16. Untimely delivery of owner equipment.
    - 17. Slow payment.
    - 18. Design errors and omissions.
    - 19. Resistance to solving problems perceived as contractor problems.

page 10.49

- 20. Changes issued in incomplete form (sketches & narrative).
- 21. Slow owner response to concurrent reviews & changes.
- 22. Pass through attitude by general contractor.
- 23. Bid shopping.
- B. Recommendations to help resolve some of the problems we or others cause. (samples from an actual charter meeting.)
  - 1. Better communications.
  - 2. Less defensiveness/more openness.
  - 3. Fast dispute resolution.
  - 4. Don't take issues personally.
  - 5. Contractor review requests for information & submittals before processing.
  - 6. Be willing to propose/suggest solutions.
  - 7. Submittal schedule provided.
  - 8. Prioritization of submittals.
  - 9. Complete/thorough questions.
  - 10. Positive attitude.
  - 11. Recognition of owner's need to eventually occupy, operate and maintain facility/systems.
  - 12. Recognition of importance of paper work.
  - 13. Allowing necessary contract time for training.
- VII. Guidelines for the application and use of partnering concepts.
  - A. Determine the need for a partnering system.
  - B. Set goals and objectives to be gained from a partnering system.
  - C. Obtain management commitment for use of a partnering system.
  - D. Develop a partnering plan of action (the charter).
  - E. Obtain management commitment to a partnering plan.
  - F. Train and educate project participants in the partnering concept.
  - G. Create and implement an issue resolution system.
  - H. Create and implement a partnering review and evaluation process.
- VIII. Charters provided by courtesy of project management and staff noted
  - A. Veteran's Administration Medical Center Replacement Hospital Detroit, Michigan
    - 1. Mission statement

• We the undersigned recognize that we all have common objectives. We therefore agree to strive together to construct the Detroit VAMC safely, on time and within budget to the highest quality standards commensurate with its mission of serving veterans and the community.

- To achieve our mission we believe in the following principles
  - Commitment
  - Mutual trust
  - Integrity
  - Personal pride
- 2. Charter objectives
  - a) 01. Maintain open lines of communications.
    - (1) a. Recognize the need for quality information
    - (2) b. Minimize submittal and response times in all matters

page 10.50

- b) 02. Keep paper and administrative work to a minimum.
- c) 03. Develop and implement an alternative conflict resolution system.
  - (1) a. Prompt resolution of conflicts at lowest possible level
  - (2) b. Eliminate need for Contracting Officer decisions
  - (3) c. Fair interpretation of ambiguities
  - (4) d. Be proactive (not reactive) in problem solving
  - (5) e. Maintain objective attitude toward constructability and practicality
  - (6) f. Accept responsibility for your actions or inactions
  - (7) g. Have empathy in all matters
  - (8) h. Clearly describe changes to contract work
- d) 04. Limit cost growth.
  - (1) a. Develop cost effective measures
- e) 05. Maintain clean, efficient, secure work site.
  - (1) a. No lost time due to accidents
  - (2) b. Properly staff project
  - (3) c. Be a good neighbor
- f) 06. Seek to maintain good job morale and attitudes.
  - (1) a. Promotion of partnering attitudes at all levels of contract administration
  - (2) b. Have fun
  - (3) c. Have pride in your product
- g) 07. Commit to quality control in all project related matters.
  - (1) a. Do it right the first time
  - (2) b. Maintain proper work sequence
  - (3) c. Meet design intent
  - (4) d. Recognize owner's needs in occupation and operation of the facility
- h) 08. Close out job in proper and timely manner.
- i) 09. Maintain and implement a partnering evaluation system.
- B. Michigan Millers Mutual Insurance Addition & Renovation Lansing, Michigan
  - 1. Mission
    - a) We the Project Team commit to construct a quality facility, on time and within budget, maximizing safety, communication, & cooperation so that all participants can be proud and profitable in their accomplishments.
  - <u>Objectives</u> to accomplish our mission we recognize a need to work to the following goals and objectives.
    - a) Submittals
      - (1) Clarify objectives and expectations of the submittal process.
      - (2) Minimize submittal and approval times.
      - (3) Provide accurate, prompt, clear, concise approvals.
    - b) Payments
      - (1) Make payments in accordance with the published flow chart process.
    - c) Information processing & paperwork
      - (1) Expedite all information and indicate desired response times .
      - (2) Maintain open lines of communication among Project Team members.
      - (3) Be available.
      - (4) Attempt to offer possible solutions to questions within a proper scope.
      - (5) Provide clear responses to requests for information.

- d) Legal matters
  - (1) No litigation.
  - (2) Settle disputes at originating level.
- e) Abatement
  - (1) Establish, approve and publish a plan of abatement.
  - (2) Abate promptly.
- f) Planning and scheduling
  - (1) Provide, obtain, and use accurate activity information.
  - (2) Clearly monitor the project against the plan and schedule.
  - (3) Commit to, and fulfill man hour projections.
- g) Decision making
  - (1) A/E team to regularly inspect work and advise compliance.
  - (2) Define and clearly communicate quality expectations.
  - (3) Properly empower those at all decision making levels.
- h) Policies and procedures
  - (1) Prepare, review, approve and publish policies and procedures that will serve as guidelines to manage the project.
- i) Site layout and management
  - (1) Formulate and publish a trash removal & parking plan.
  - (2) Properly establish and maintain bench marks and control lines.
- j) Processing revisions
  - (1) Provide written authorization prior to work proceeding.
  - (2) Respond to requests for information, bulletins and change orders promptly.
  - (3) Prepare, approve & publish a flow chart for processing revisions.
- k) Be a good partnering neighbor
  - (1) Commit to protecting your work and the work of others.
  - (2) Show all participants due respect and acknowledgement.
  - (3) Maintain proper work sequences.
- 1) Total quality management (TQM)
  - (1) Prepare, approve, publish, and commit to a TQM program.

## PROBLEM MENTIONS

Total assignments of problem types from 2,855 responses to the questions "What job difficulties are caused by us and by others?" Listed by frequency of appearance.

- 01. 1146 Job management.
- 02. 0984 Communicating with others.
- 03. 0684 Staff morale and attitudes.
- 04. 0593 Personnel quality and problems.
- 05. 0475 Being a good on-site neighbor.
- 06. 0467 Timely action.
- 07. 0396 Planning and scheduling.
- 08. 0371 Organization, authority, and responsibility.
- 09. 0288 Work site conditions.
- 10. 0268 Revision processing.
- 11. 0267 Construction document quality.
- 12. 0233 Program conditions.
- 13. 0205 Submittal processing.
- 14. 0166 Issue, conflict, and problem resolution.
- 15. 0166 User group interaction.
- 16. 0145 Equipment and material problems.
- 17. 0141 Documents and documentation.
- 18. 0133 Decision making.
- 19. 0125 Procurement of materials and equipment.
- 20. 0116 Project cost structure.
- 21. 0112 Closing out the project.
- 22. 0097 Contract interpretation.

- 23. 0097 Quality management.
- 24. 0095 Payment processing.
- 25. 0092 Paper and administrative work.
- 26. 0090 Approval processes.
- 27. 0088 Being a good off-site neighbor.
- 28. 0073 Time growth.
- 29. 0070 Policies and procedures.
- 30. 0069 Inspecting and testing.
- 31. 0069 Staffing and manpower.
- 32. 0064 Cost growth.
- 33. 0058 Substitutions and alternates.
- 34. 0052 Maintaining regular project evaluations.
- 35. 0052 Safety.
- 36. 0049 Regulatory agency matters.
- 37. 0022 Constructibility.
- 38. 0022 Training.
- 39. 0022 Value engineering.
- 40. 0014 Labor conditions.
- 41. 0014 Legal matters.
- 42. 0011 Backcharges.
- 43. 0011 Financial problems.
- 44. 0010 Weather conditions.
- 45. 0005 Warranty conditions

## Project Management Software Programs

## I. Data base

A. Flat file - Used for individual files not related to each other.

- 1. Claris Works
- 2. Filemaker Pro
- 3. Microsoft File
- 4. Microsoft Works

# **B.** Relational data base - Used where files must be interrelated. One entry appears in all related file locations.

1. 4D

- 2. Approach
- 3. D Base
- 4. Fox File
- 5. Helix
- 6. Microsoft Access
- 7. Paradox
- 8. Quatro
- 9. File maker Pro

## II. Estimating

1. Timberline

## III. <u>Graphics</u>

- 1. MacDraft Claris
- 2. MacDraw Claris
- 3. MacPaint
- 4. Auto Cad
- 5. Micro Station
- 6. Mini Cad
- 7. Intergraph
- 8. Corel Draw
- 9. Visio Technical
- 10. Paint Shop Pro
- 11. Adobe Photo Shop
- 12. Adobe Illustrator

## IV. Project planning

- 1. Harvard planner
- 2. MacProject Pro
- 3. Microsoft Project
- 4. Prima Vera
- 5 RPM
- 6. Scitor

- 7. Shur Track module of Prima Vera
- 8. Time Line
- 9. Visio
- 10. Prologue

## V. Project scheduling

- 1. Fast track 2.0 for bar charts
- 2. Many project planning programs have scheduling capabilities

## VI. Specialized word processors

- 1. MORE
- 2. Others are usually found on late versions of conventional word processors

## VII. Spread sheets

- 1. Claris Works
- 2. Excel
- 3. Fox Pro
- 4. Lotus 1, 2, 3
- 5. Microsoft Works
- 6. Quatro Pro

## VIII. <u>Word processors</u>

- 1. AMI Pro-Lotus
- 2. MacWrite Pro-Claris for MacIntosh
- 3. Microsoft Word Microsoft
- 4. Word Perfect
- 5. Word Star