Sorensen Gross Management Conference #5 index

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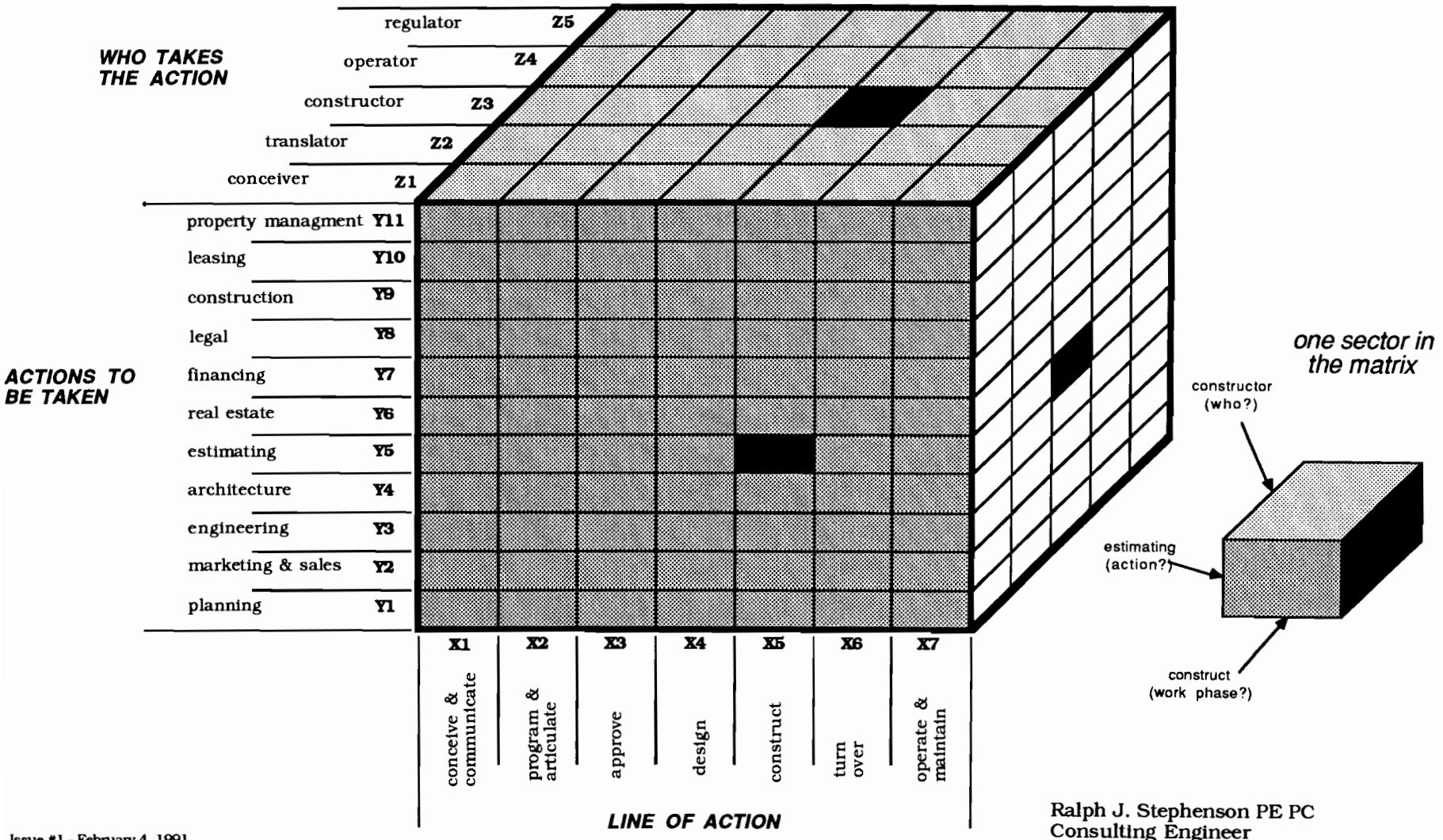
DS 2/4/72

LINE OF ACTION

MACRO MATRIX BOUNDARIES OF DESIGN & CONSTRUCTION



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Issue #1 - February 4, 1991
MM-2 - ho aspe 02

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.

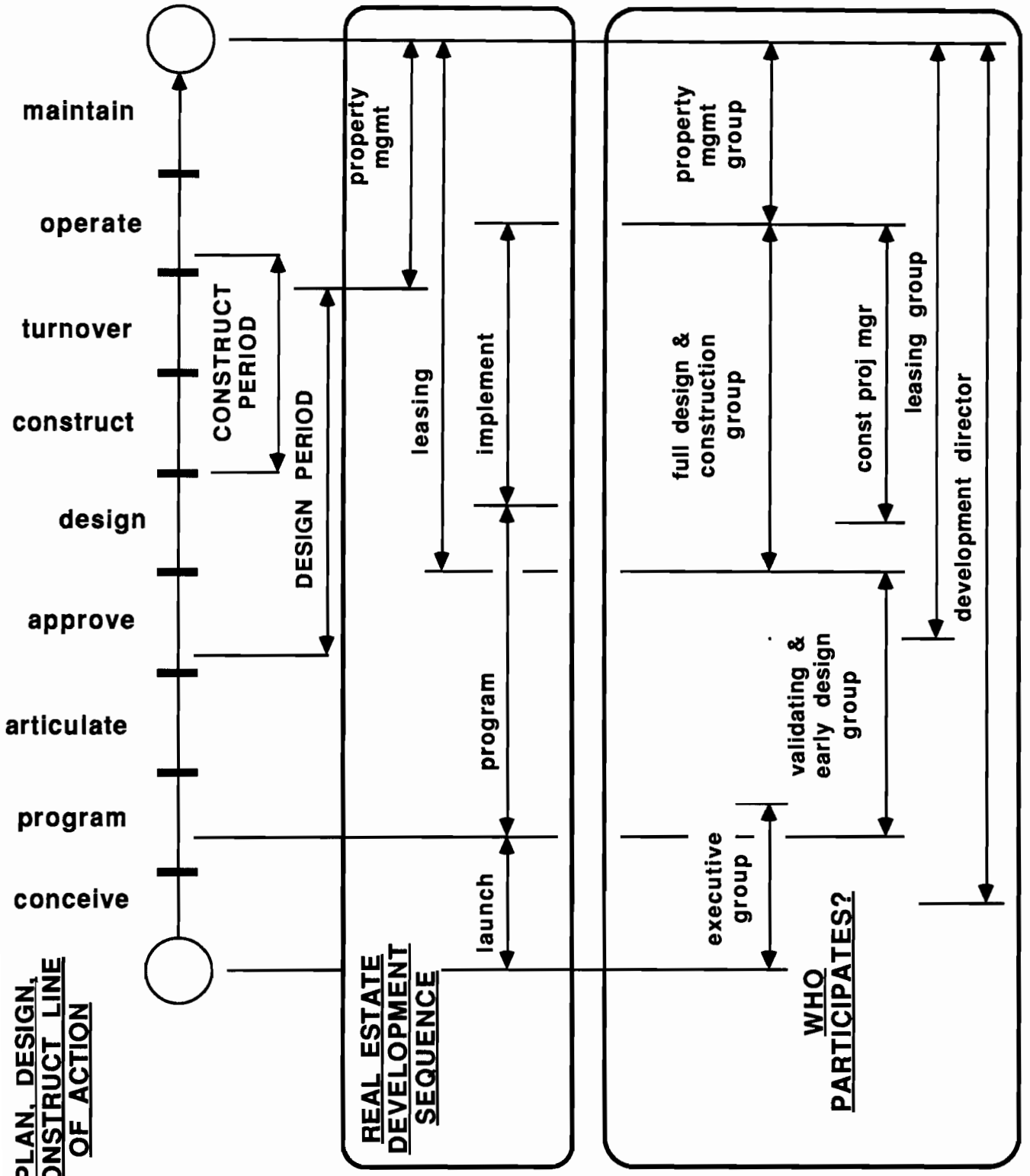
• **Five major participants in the design & construction process**

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 project
4. **Operators** - Those who operate the completed project
5. **Regulators** - Those who help assure project adherence to the cause of public good

• **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.



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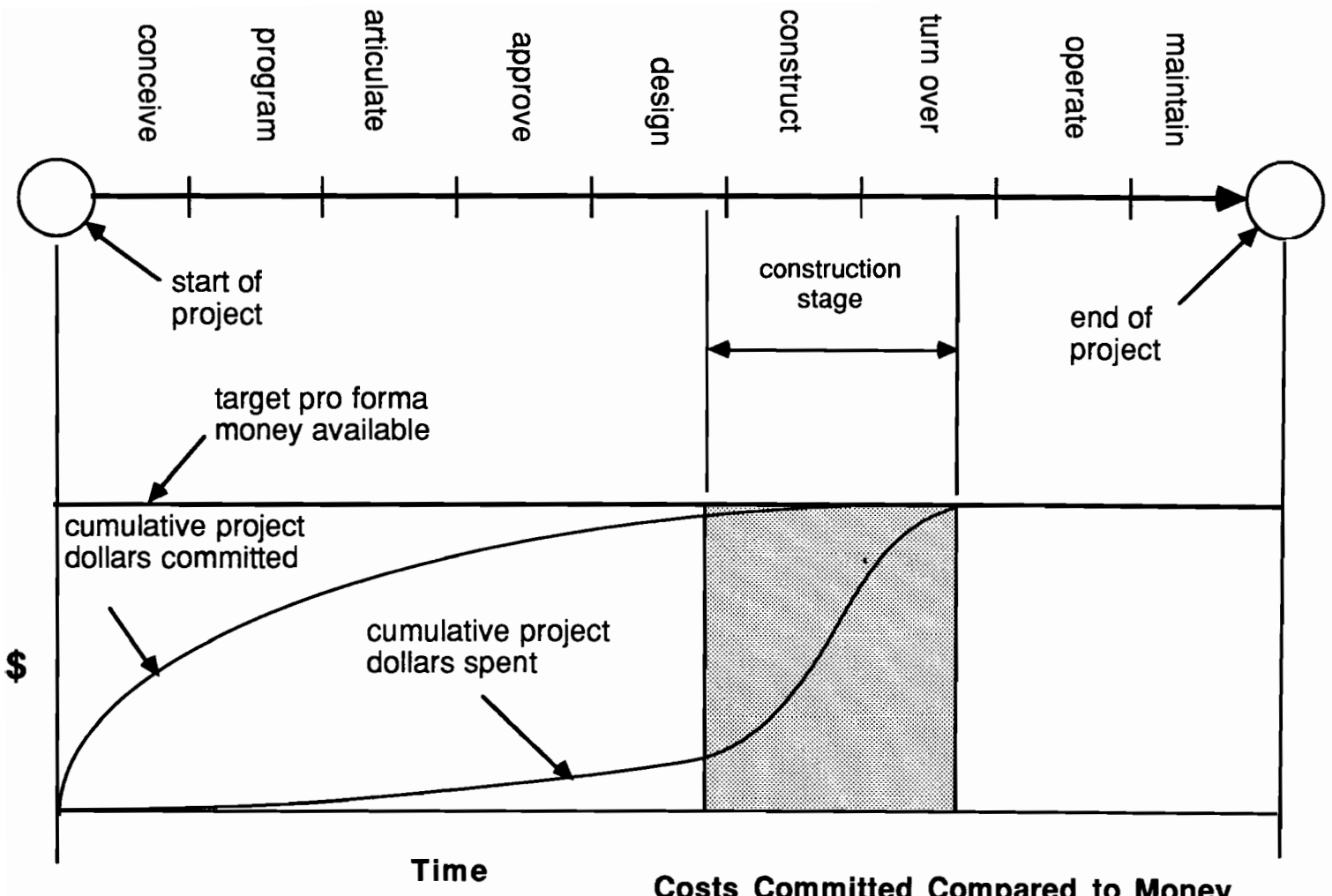
DEVELOPMENT CYCLE ACTIONS & ORGANIZATION Oct, 1988 - ho321



Costs Committed Compared to Money Spent on Construction Projects

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- **Development phases - Ralph J. Stephenson PE - ho 336**
  - **Phase A - Launching a project**

The launch phase of the work is concerned primarily with locating & nuturing 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, knowledgable & 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.

- **Phase B - Developing the project program**

The project program 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.

- **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 commited 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.

- **Phase D - Managing improved properties**

The property management group actually 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 see that the necessary field work is done.

- **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.

- **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 managment.

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 base or landlord design and construction. For this reason the design and construction of the

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

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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!

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PROFIT POTENTIAL LEVELS

LEVEL 1 - INCLUDE EVERYTHING

LEVEL 2 - PREPARE A GOOD WORK PLAN

LEVEL 3 - PREPARE A GOOD SCHEDULE

2. Professional Service Contract Characteristics

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A. Agreement premises

1. Totally negotiated - broad multivalue competition
2. Partially qualified - moderate multivalue competition
3. Totally qualified - narrow multivalue value competition

B. Authority limits

1. As agent
2. As limited agent
3. As contractor

C. Payment methods

1. Fixed total including payroll + overhead + profit + (expenses)
   a. Expenses included
   b. Expenses separate
2. (Payroll costs) x multiplier + fixed fee + expenses
   a. Limit on
   1.) Payroll hours
   2.) Expenses
   b. No limit on
   1.) Payroll hours
   2.) Expenses
3. (Payroll costs) x multiplier for payroll costs & overhead
   a. Expenses included
   b. Expenses separate
4. % of total construction cost
   a. Expenses included
   b. Expenses separate

D. Scope of services

1. Single responsibility
   a. All in house
   b. In house & outside consultants
2. Split responsibility
   a. In house, client & other prime consultants
   b. In house & other prime consultants
   c. In house & client

3. Construction Contract Characteristics

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A. Agreement premises

1. Totally negotiated - broad multivalue competition
2. Partially qualified - moderate multivalue competition
3. Totally qualified - narrow multi valuevalue competition

B. Authority limits

1. As full agent
2. As limited agent
3. As contractor

C. Payment methods

1. Fixed cost (hard money)
2. Time & material + fixed fee
   a. Limit on
      1.) Time & material (gmp) with no shared savings
      2.) Time & material (gmp) with shared savings
   b. No limit on time & material
3. Time & material + % fee
   a. Limit on
      1.) Time & material (gmp) with no shared savings
      2.) Time & material (gmp) with shared savings
   b. No limit on time & material
4. Conditional payments or penalties
   a. Incentive/disincentive
   b. Liquidated damages

D. Scope of services

1. Single responsibility - in house & subcontractors
   a. All trades
      1.) Provide management
      2.) Provide design
      3.) Provide construction labor
      4.) Provide construction materials
   b. Limited trades
      1.) Provide management
      2.) Provide design
      3.) Provide construction labor
      4.) Provide construction materials
2. Split responsibility - in house, subcontractors & other primes
   a. All trades in contract
      1.) Provide management
      2.) Provide design
      3.) Provide construction labor
      4.) Provide construction materials
   b. Limited trades in contract
      1.) Provide management
      2.) Provide design
      3.) Provide construction labor
      4.) Provide construction materials

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DESIGN/BUILD MATRIX

	Actions / Functions	01 Sales	02 Engineering	03 Architecture	04 Estimating	05 Real Estate	06 Finance	07 Legal	08 Graphics	09 Construction	10 Leasing	11 Property Mgmt
I	Maintain											
H	Operate											
G	Turn Over											
F	Construct											
E	Design											
D	Approve											
C	Articulate											
B	Program											
A	Conceive											

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Summary of the Nine Master Keys of Management

(Adapted from the Nine Master Keys of Management by Lester R. Bittel)

Three requirements of the good manager

A. Acquire a discerning (unique) point of view

B. Follow an effective mode of action

C. Employ a sensitive touch in interpersonal relationships

A Discerning Point of View

Action #1 - Apply situational thinking	Result #1 - Your decisions will be more objective and less impulsive
Action #2 - Identify vital targets	Result #2 - You'll quickly recognize turning points in critical situations
Action #3 - Prepare for the probable	Result #3 - You'll be less flappable in difficult situations

An Effective Mode of Action

Action #4 - Focus on performance criteria	Result #4 - You'll better satisfy yourself and your superiors
Action #5 - Act from a plan	Result #5 - You'll be able to get projects under way quickly and with certainty
Action #6 - Manage by exception	Result #6 - You'll accomplish more work than you ever thought possible

A Feeling for People

Action #7 - Develop your confidence in others	Result #7 - You'll find that people cooperate more freely
Action #8 - Employ the power of training	Result #8 - You'll find that employee attitudes improve
Action #9 - Know your true self	Result #9 - When you truly comprehend your whole self you'll find people responding to your ideas more directly and often more favorably

Remember: If you don't care who gets the credit, you can accomplish anything.

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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

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- 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

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NINE MAJOR STEPS TO EFFECTIVE PROJECT MANAGEMENT

DEFINITIONS

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

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

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

QUESTION

• 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.

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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.

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THE DIO/PDO/UDO INTERSECTION

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SUGGESTIONS ON SELLING TO DESIGN/BUILD CLIENTS

During a seminar several years ago, Dr. Harvey Thomas, a behavioral psychologist, outlined several suggestions as to how the designer/builder could best cope with customer motivation and pricing problems. The words of advice from Dr. Thomas are excellent, and are reproduced below for consideration in generic (G) construction sales situations where motivation and pricing are potential problems.

<u>To Increase Customer Motivation:</u>

1. Give the prospect or customer a role to play.

2. Make intangible benefits you are offering, real.

3. Eliminate or minimize distractions to your discussions.

4. Emphasize the advantages of what you are offering.

5. Allow catharsis of the prospect or customer's fears.

6. Stimulate the prospect or customer's discontent with anything less than what you are offering.

<u>To Deal with Pricing Problems:</u>

1. Investigate possible smokescreens.

2. Use sandwich technique (i.e. advantages vs. disadvantages).

3. Broaden the customer's perspective to all advantages of your suggestions.

4. Match his or her needs against your offering and its advantages.

5. Examine costs - item by item. Don't hesitate to show your pricing work sheets.

6. Don't negotiate on the basis of generosity.

7. Create favorable illusions (i.e., give the prospect or customer a throwaway if

appropriate).

8. Give the prospect or customer a less attractive choice.

9. Overstate the prospect or customer's objections.

10. Explore the cost of a bad decision or no decision.

Each point above should be examined and reviewed in detail. As quick reminders, they serve to emphasize the need to always be aware of what it is your prospects and customers require. Make sure you understand what motivates them; then always indicate and convey your desire to work with them to achieve the things that can be best obtained from you and you alone.

Note: If answer to any of the first 3 questions is no, don't propose on design/build basis.

		1	2	3	4	5
Q1	Negotiated or qualified arrangement possible?	Y	Y	Y	Y	Y
Q2	Private project?	Y	Y	Y	Y	Y
Q3	Do we have good a/e &all trade estimating services available	Y	Y	Y	Y	Y
Q4	Do we have time to prepare good d/b proposal?	Y	N	N	N	N
Q5	Do we control land & financing?	-	-	-	-	-
Q6	Is prospect engineering or management oriented?	-	Y	N	N	N
Q7	Have we built successfully for the prospect before?	-	-	Y	-	N
Q8	Have we built similar d/b projects previously?	-	-	Y	N	Y
A1	Propose on d/b delivery system	X	X	X		
A2	Don't propose on d/b delivery system				X	X

To Propose or Not on Design Build Delivery System

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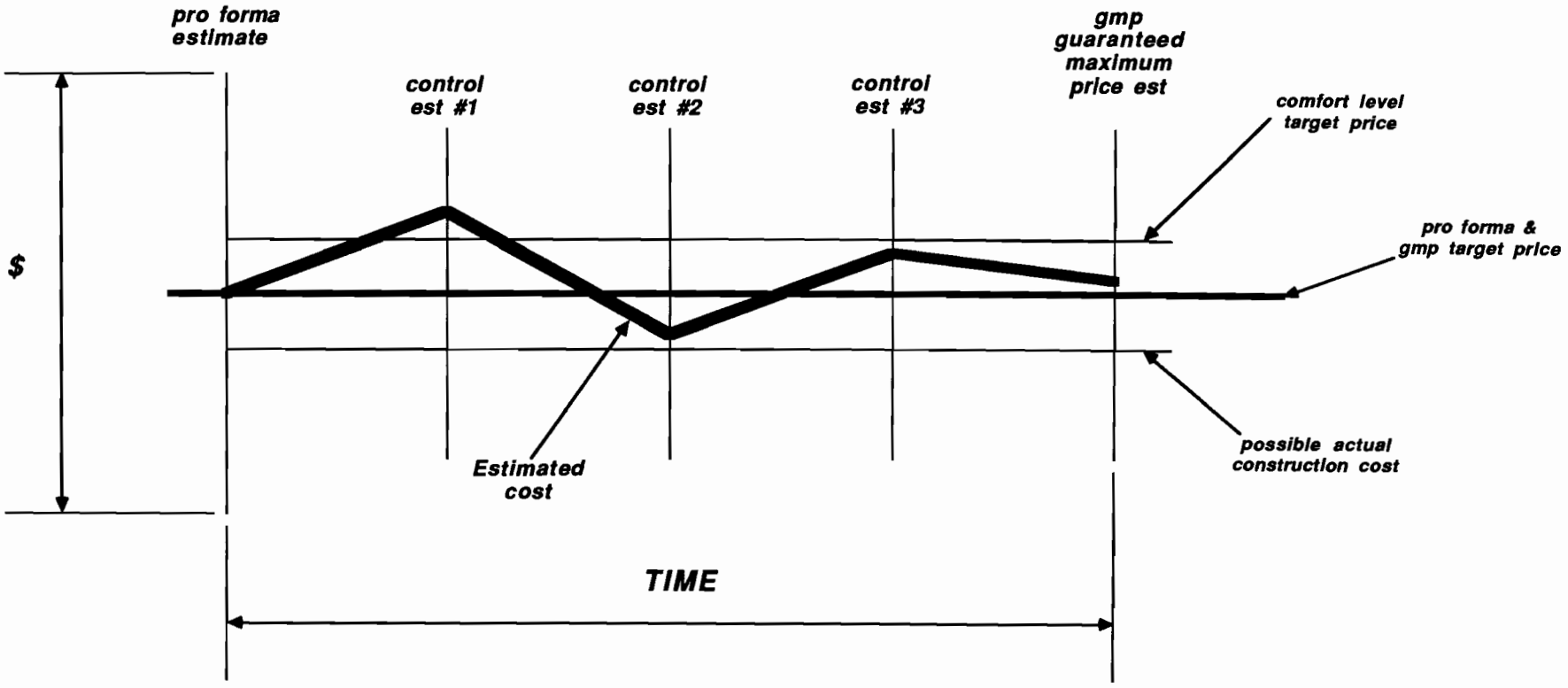
sheet
#DB1



THE ITERATIVE COSTING SEQUENCE

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IT1 - ho aspe 1.10

Sheet #IT1

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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

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PMI Thinking - from Mr. DeBono's book on thinking

Mr. DeBono, an expert in the analysis and improvement of thinking patterns and methods, suggests a simple method of improving your decision making by improving your thinking habits

Mr. DeBono calls his technique PMI. It involves a short pause period before answering a prime question, during which the decision maker examines three aspects of the question, its pluses (P), its minuses (M), and its interesting features. Use of PMI on a specific question should take only a
relatively short time. For practice exercises, Mr. DeBono suggests 3 to 5 minutes for the whole PMI process. However the time period will vary depending on the time available and the nature of the question.

PMI is not a decision making process; it is a thinking process to be combined with other decision tools to help improve your thought processes, and consequently make better decisions than you do now.

A point to be stressed before using PMI, according to Mr. DeBono is to think slower but think better! Most of us jump too rapidly to a position that must then be defended irrespective of our second thoughts on the conclusions reached. Thus are born the often destructive self fulfilling
prophecies. PMI can help reduce the probability of taking indefensible stands on critical issues.

To use PMI first frame the question or situation you are addressing in clear, easily understood terms. For instance in considering a project delivery system, let us assume there is a choice available between using traditional, hard money methods compared to non traditional dovetailed guaranteed maximum price methods.

Taking each method individually let us see how our thinking about the systems can be improved with PMI. Again to be stressed is that PMI is not a decision making technique; it is a thinking technique from which more effective decisions can result.

1.) Select one of the methods to consider first, say, the non traditional, hard money delivery method (method 1).

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2.) Visualize or write all of the good points (the pluses) you can think of about method 1. Keep your mind only on the positives. This is called directional thinking.

3.) Visualize or write all the negatives or detracting points of method 1. Keep your mind directed toward the negatives.

4.) Visualize or write all the interesting features about method 1 you can conjure up in a few minutes of thought. Mr. DeBono suggests you say to yourself. "It would be interesting in considering method 1, if....."

5.) Repeat the process with project delivery method 2.

6.) Make the decisions you are charged with using any of the decision making tools available to you.

Notice the stress in the above step by step procedure on **thinking** about the matter. It is thinking that encourages better use of the powerful scientific management tools available.

Think more slowly - think better!

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HOW TO SPRING THE TIME TRAP

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

Time waster
Possible causes
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 often in spite of, not because of planning

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

C. Overcommitment
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

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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. Oversurveillance 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 thru others

H. Visitors

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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. Overcommunication
   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

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   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

	Pri	Date	Activity	Phone #	Type	w
1	50	2/19/90	Assemble & return TL's educational material	614 296 9467	tac	m
2	25	12/6/90	Get handout made of systems drawing prepared by Frank Tobias		ho	m
3	35	11/21/90	Print out networks for teams A, C & E		run	d
4	90	11/27/89	Complete prepare Bornmouthe Company project manager check list		tac	m
5	69	2/28/90	Prepare cash flow on resource allocation for handout		ho	m
6	83	2/18/90	Bring courthouse construction notes up to date - see a:nts0211 epson file		tac	m
7	57	11/27/90	Write up planning, scheduling and monitoring procedures for Telequarry	258 2156	wrt	m
8	91	8/29/90	Write essay about ON A SCALE OF 1 TO 10		wrt	m
9	100	2/14/90	Write letter on preparing documentation to lb, at & bf		wrt	m
10	48	2/14/90	Send Paul T. material on organizational relations		tac	m
11	85	2/14/90	Write Stanton thank you for close out info		wrt	m
12	93	11/27/90	Write essay on information services		ho	m
13	60	6/28/90	Set breakfast with Jack C.	212 514 8272	mtg	m
14	63	7/12/90	Set meeting with Bob Franchot to see presentation	612 464 6710	mtg	m
15	53	11/1/90	Prepare superstruct network model for Drucker case study - ho258		ho	m
16	70	12/6/90	Review management balance profile for management time & cost		edc	m
17	80	2/28/90	Prepare ho re management principles for const proj mgrs & superintendents		top	m
18	95	4/17/90	Have new business photo taken		tac	m
19	80	11/21/90	Complete adding client abbreviations to master job list		tac	m
20	64	12/7/90	Get monitoring networks from Ben J		tac	m
21	98	12/7/90	Write or call Joe K & thank for procurement booklet		phn	m
22	86	2/18/90	Write procedures for converting MacProject to Micro File		tac	m
23	50	3/14/90	Send for Canadian Building Thesarus - see Phil B's book for reference data		tac	m
24	51	11/21/90	Have lunch or breakfast with Ollie S.	956 3420	mtg	d
25	90	5/9/90	Add legal abbreviations to list of abbreviations		tac	j
26	42	2/22/90	Get book or books by W. Edward Demming - recommended by Carl B.		tac	m
27	98	2/14/90	Get info on CSI/UCI codes from AGC or AIA and their history for efa class		tac	b
28	62	1/23/90	Respond to Mark's letter re possible law subjects from Curt's friend		rea	m

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Weights and values as a decision making tool

The weight-value decision making process

In a decision making process the selection is often best made by a multidimensional process based on situational characteristics and factors that are nominally variable.

The purpose of decision making for the responsible project manager is to insure that an objective recommendation is provided to his or her upper management. Upper management is then responsible for adjusting the objective decisions of the project manager to a decision in line with what upper management staff personally, politically, professionally, subjectively, and technically feel is the appropriate selection.

The area addressed in this essay is the application of an orderly procedure to objective decision making. The technique is called the weight-value or WV process.

The WV process is implemented by taking well defined steps necessary to reach project level decisions. These steps are:

1. Select, write down, and verify the various decisions possible. What courses of action are available?

2. Select the major factors of importance in making an objective selection of a best course of action. What are the items that are important to making a proper decision? It is recommended there be no more than ten of these. If you have selected more than ten try to combine factors having similar evaluation characteristics.

3. Assign a weight to each factor that describes numerically, to those to whom the recommendation will be made, how important the project manager and his team think this factor is in selection of a course of action. Factors should be given a weight of one to ten. One means the factor is of minimum importance in the evaluation. Ten indicates the factor is crucial to the evaluation.

It is essential to realize that the factors selected and screened for use must all be of relative importance and that the assignment of weights should spread from one to ten. A help in doing this properly is to determine the most important and critical of the factors and assign it a value of eight to ten. Next select the least important factor and give it a weight of from three to one. The remainder should fall somewhere in between. Remember more than one of the factors being weighed can receive the same number.

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You are not ranking the factors, you are weighing them.

4. Assign a value to each potential course of action or each decision possible for each of the factors selected and weighed. If there are three courses of action possible, and you have selected five factors by which these are to be judged, you will have to assign 3 x 5 = 15 values to the entire array. This can be seen in the following matrix example where alternative project delivery systems for constructing a warehouse are being considered.

The three delivery systems under consideration are an award of a hard money contract from a full set of contract documents, retention of a non liable construction manager to run the project, or use of a liable general contractor involved early as a construction consultant and providing iterative estimating help leading to submission and acceptance of a guaranteed maximum price.

Project delivery systems being considered & their value in satisfying the demands of each factor of importance - warehouse project

Factors	**Wts.**		**Values**	
		Hd money	Non liable cm	Prog pricing to gmp
1.Capital cost	08 x	08 = 064	04 = 032	06 = 048
2.Function	10 x	09 = 090	06 = 060	10 = 100
3.Appearance	02 x	06 = 012	04 = 008	07 = 014
4.Life cycle cost	04 x	06 = 024	03 = 012	08 = 032
5.In house staff reqmts	08 x	04 = 032	03 = 024	07 = 056
Totals		**222**	**136**	**250**

The selection analysis above indicates the best delivery method of the three being considered is a progressive pricing system leading to submission of a guaranteed maximum price for which the contractor will construct the project.

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EMPLOY THE POWER OF TRAINING

A manager multiples his or her's own knowledge and skills by teaching others. When considering a training, educational or coaching effort the following points might be helpful.

• 1. Educating is teaching and learning the generic principals of doing things. It is teaching principles that can be universally applied.

• 2. Training is teaching and learning the specific, explicit process of doing things. It is vocational and procedural.

• 3. Coaching is a limited one on one, or one on few teaching effort to educate, train, or to do both. It is personally guided dialogue between teacher and learner.

• 4. Unguided learning sometimes occurs naturally, but it may turn out to be random, inexact, wasteful and tend to encourage bad habits.

• 5. Good training, educating and coaching usually results in improved staff performance.

• 6. Good staff performance allows the manager to devote more of his time to concentrating upon, initiating action of, and directing and controlling the resources at his disposal.

• 7. The need for good training, educating & coaching is ongoing irrespective of how good or bad business & organizational times are.

• 8. The excellent manager will usually try to teach what he knows to those who wish to learn

• 9. The improvement cycle is an important element of effective training and education. Elements of the improvement cycle - inertia, initiative, insight and improvement (the four I's) - are defined as follows:

A. **Inertia** - resistance to change
   1.) Reasons for inertia
      a.) Fear for safety

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b.) Fear for security
c.) Concern for comfort
d.) Doubts about ability
f.) Dislike for schooling
g.) Preoccupation with other problems

2.) Overcoming inertia
a.) Use motivation to get going - habit to keep going
b.) Motivation must be mainly furnished by supervision
c.) Neutralize fear that accompanies inertia

(1.) Show that others in similar positions have benefited from learning.
(2.) Show that added skills give more, not less, security through added employee value.
(3.) Acknowledge doubts as to aptitude or potential.
(4.) Criticize constructively and express willingness to tolerate learning mistakes.
(5.) Show the employee that training will be truly relevant; that what he learns can be used now, for his and the company's benefit.
(6.) Plan the learning program so the participant is rewarded with some quick and simple success experiences.

B. **Initiative** - the removal of inertia as a barrier to learning. Once the reasons for inertia have been removed by the teacher the desire to learn will begin to appear. Initiative is then the responsibility of the learner.

C. **Insights** - the key elements of a subject that deal with the intellectual, the physical and the procedural requirements of learning. Insights are of different kinds:

1.) Intellectual insights - those that concern the whole concept of what is to be learned
2.) Physical insights - those that concern getting the physical feel of the process - the touch, tone, heft and smell of the job
3.) Procedural insights - those related to sequential demands of the operation

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D. **Improvement** - Accelerated learning gained by overcoming inertia, taking initiative, gaining insights. Is encouraged by:

1.) Applying learned principals through exercises
2.) Stepping up challenges by increasing levels of difficulty
3.) Accelerating flow of learning challenges until the rate of improvement levels off (this may constitute a return to the inertia plateau and signal the need for a new cycle)

• 10. The basic phases of a training program are planning, instruction, evaluation

A. **Planning**
1.) Survey and analyze needs
2.) Identify and analyze key learning need points
3.) Select training methods
4.) Prepare the training outline

B. **Instruction**
1.) Capture interest and arouse initiative
2.) Give insights
3.) Accelerate improvement

C. **Evaluation**
1.) Review progress
2.) Evaluate results
3.) Make plans to overcome the next inertia plateau

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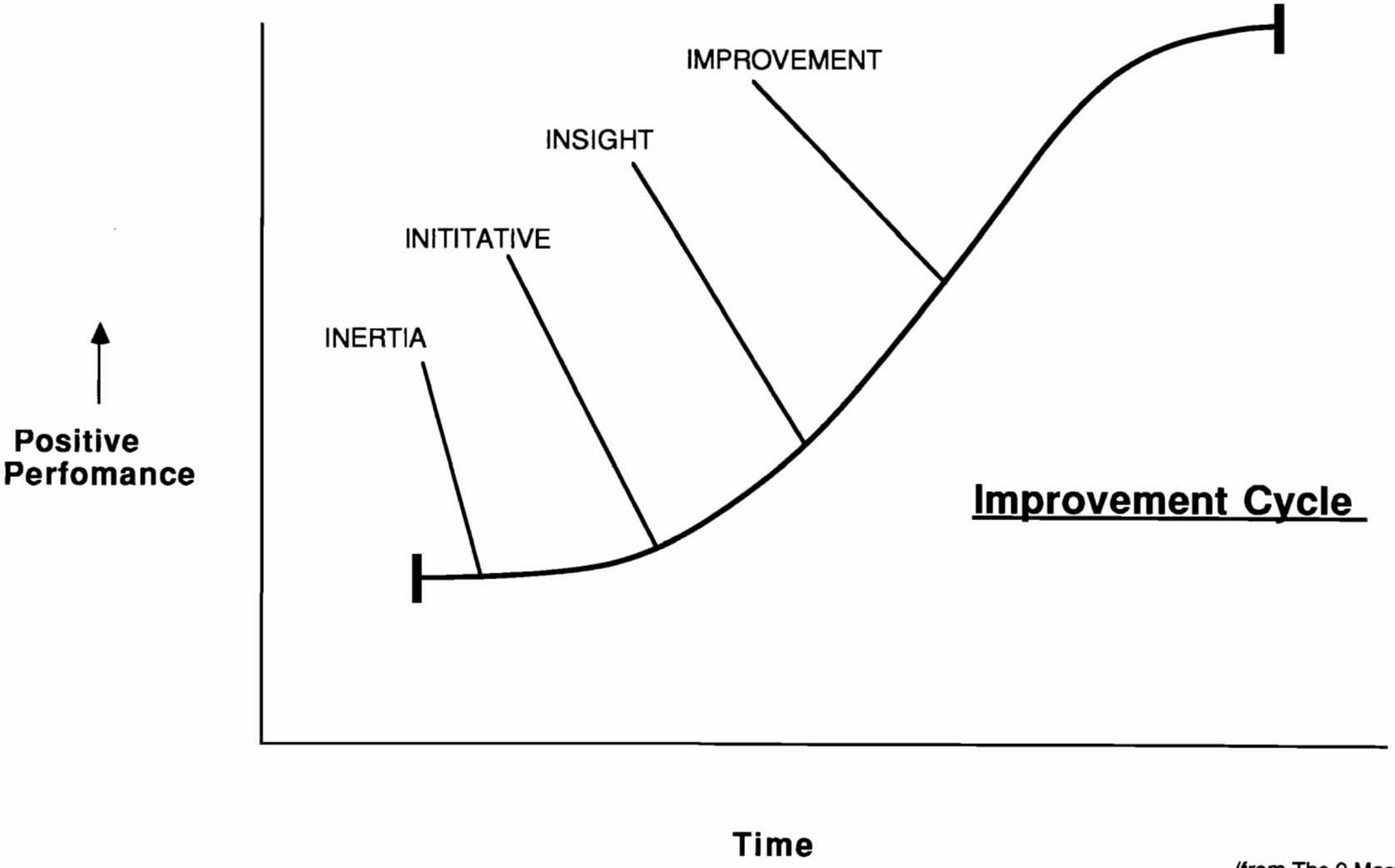

(from The 9 Master Keys to Management - Lester R. Bittlel)

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JOB PLANNING - WHAT IS IT ?

1. PLANNING is to formulate a sequence of actions leading to an end goal.

2. NETWORK PLANNING is to graphically depict this sequence of action.

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

PLAN VISIBLY !

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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.

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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 & D are complete.
F precedes G & H.
G Cannot begin until E is complete.
H, G, & I must precede J.
I follows E and precedes L.
K follows D.
L cannot begin until K is complete.
J & 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 & O are complete.

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Reserved Node Nos.

SOLUTION TO EXERCISE #1
ARROW DIAGRAM

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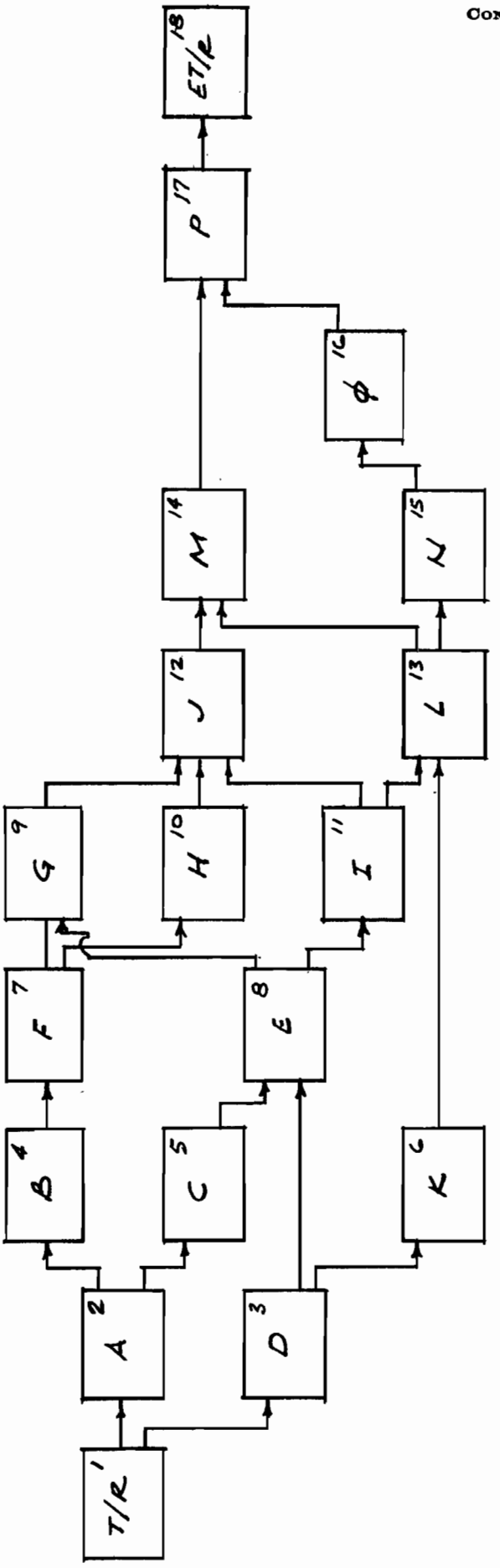

SOLUTION TO EXERCISE #1
PRECEDENCE DIAGRAM

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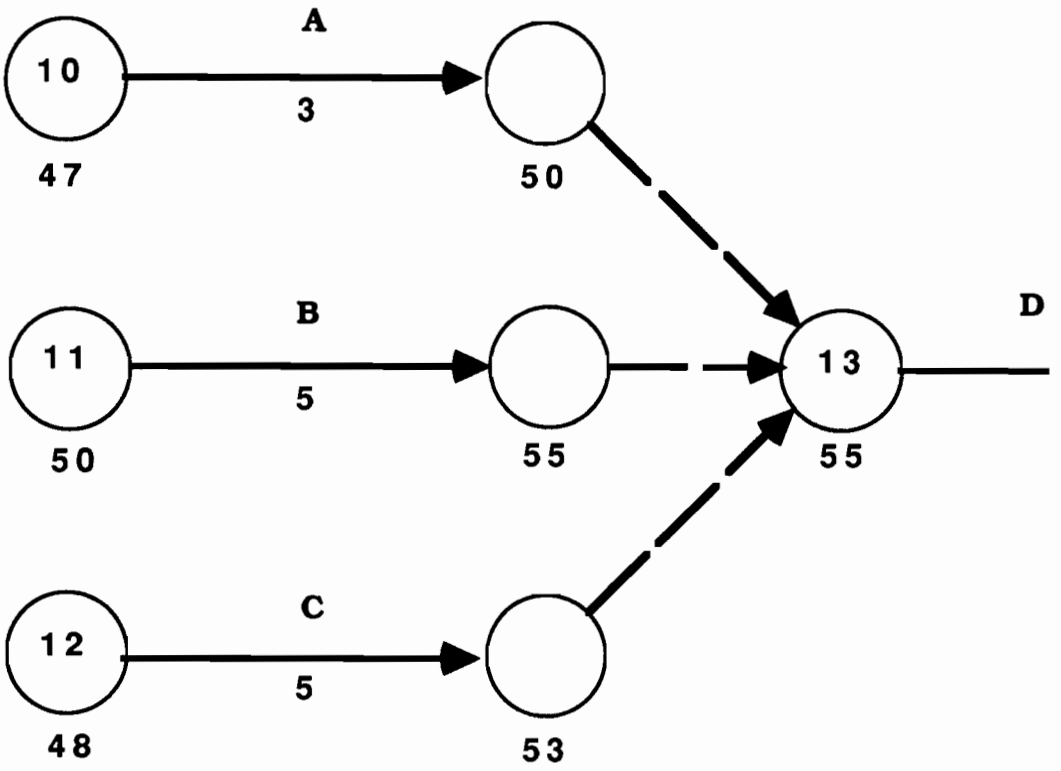
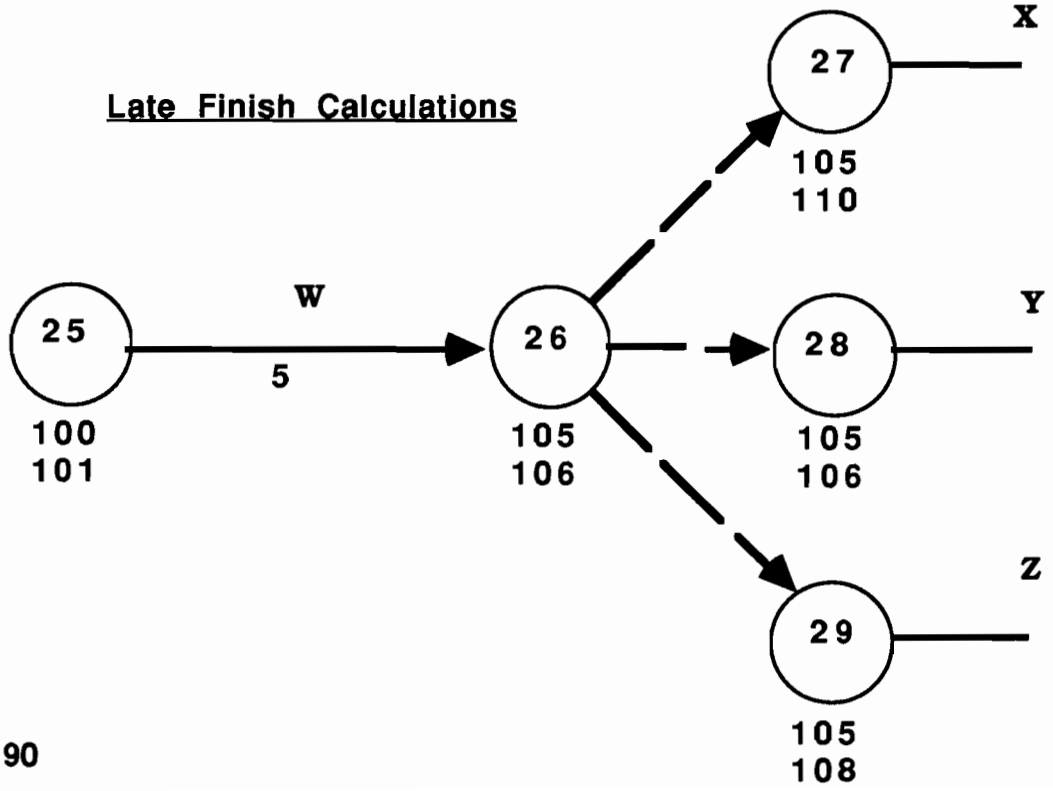
Early Start Calculations



Late Finish Calculations



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CONSTRUCTION CONTROL DOCUMENTS

• **WORKING DRAWING** - Graphically define the contract scope of work & show the appearance of the completed project.

• **SPECIFICATIONS** - Verbally describe the contract scope of work and define the qualitative standards to be maintained in the completed project.

• **CONTRACT DOCUMENTS** - Provide a full definition of the scope of project work to be built. Any item included as part of the contract documents becomes a condition of the contract.

• **ESTIMATES** - Verbally describe the quantitative standards to be achieved in the completed project.

• **PLANS & SCHEDULES** - Graphically define the sequences, procedures & amount of resources to be used to construct the project.

• **SHOP DRAWINGS** - Graphically show details of the fabrication, installation and final appearance of building components called for in the contract documents and accepted for use in the work.

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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 a 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 up in litigation or 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.

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Claim Prone Job Characteristics
(continued)

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.

l. 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.

(Note: This often occurs in public work where many non-project approvals and agencies are involved.)

v. Poor owner reputation.

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

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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.

Advice
- 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.

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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.

Advice
- 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.

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9. Superior knowledge - 18%

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

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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 can 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.

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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.

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

Step 2 - 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.

Step 4 - 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

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Step 5 - Enter the document data in the document control file - If justified and required, document data is now entered into the data base file for 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 **dd level** to **documentation steps** 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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Procedures for preparing project documentation

Project documentation is an essential and routine part of every project. However from time to time a project exhibits signs of difficulty which may demand a heavier than normal documentation effort. One way of classifying the level needed is to give it a rating degree from 1 (the lowest level of documentation) to 10 (the highest level of documentation).

A low level of documentation normally utilizes inexpensive and uncomplicated project communication and record keeping. Level 1 encompasses virtually no documentation at all, a situation not usually encountered. Conventional low level routine documentation on a well operating project is normally rated from 2 to 4.

This memo addresses the higher levels of documentation.

Selecting, designing and maintaining a correct documentation level is called document control. Good document control starts with an appropriate method of filing the large number of documents that flow to, from and within the project. Documents include letters, transmittals, bulletins, requests for information, change orders, field orders, shop drawings, change instructions and on & on infinitum. To file these by subject, by document type, by project, by company, or by any other classification system most helpful to those using them. is necessary & desirable in most cases. The project management and the project team must determine how the main filing system classification is to function.

For a document control system the basic classification system is much simpler. A document irrespective of type or classification is filed by a single nurnber assigned to it as it is received. This number is referenced to the date of its production and filed wherever possible in order according to that date. Thus a document dated July 30, 1987 is set earlier in the stack than one dated July 31, 1987 and receives a lower number in the sequence.

This is the fundamental classification system used in the project documentation system described in this discussion. The system is sometimes called a single number filing system.

The basic physical arrangement within the file system recommended here is in ascending order of date of document. Once consecutively numbered however, there

are many other criteria by which the documents might be arranged, the content identified and the document retrieved.

A brief step by step description of the total process is given below:

Step #1- Preparing and arranging the document control material

To start the process a single document control copy is made of all written material received, sent or circulated internally that pertain to the project. These are physically arranged chronologically by their official date (the date of the document).

The documents are next divided into time span packets, punched with an oversized punch and put in loose leaf binders. A packet period of one month has been found to work well in most cases.

Step #2 - Month numbering the documents

Each document is given a number that will identify it uniquely (the only document in the file that has that number). A workable system is to number by the month in which the document was prepared. Using this method a base month is selected and designated as month #1. Month #1 is preferably January of a year in advance of starting major work on the project. Succeeding months are numbered in ascending order. For example if the base date selected is January 1, 1987, then January, 1987 is considered period #1. February, 1987 is period #2, March, 1987 is period #3 and so on.

Thus a document written in June, 1987 and being filed in a document control system using a base date of 01 as January, 1987 will be assigned a document number starting with 06. When there are a large number of documents to be filed it is advisable to use a self advancing numbering stamp.

Step #3 - Day numbering the documents

Once the first two digits of the document identification number is assigned, the last three are then assigned. The remaining three digits reflect the approximate chronological position of the document within the month. If a letter is received dated March 20, 1987, with a control system base month #01 date of January, 1987, and it is the 102nd document entered chronologically in March, 1987, it will be assigned a document number 03102.

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Now, every document in the entire file has a unique number and will be identified by that number as to the month and the approximate position in the month it was dated. The name of the system, single number filing, is used since every document filed is identified with a single number irrespective of what type of document it is.

Step #4 - Building the document control file format

With the document identification method set & the documents arranged in ascending document number order, a document retrieval system file is designed and built.

A retrieval data base file should contain the following minimum fields:

1. Document control number (dcn)
2. Document type (dty) - letter (ltr), transmittal (trm), etc.
3. Date document prepared (the basic criteria of the order of the documents in the file) (ddp)
4. Date document received (ddr) - all incoming documents should be date stamped
5. Organization from (ofr)
6. Organization to (oto)
7. Individual from (ifr)
8. Individual to (ito)
9. Subject codes (sco) - Subject codes identify the content nature of the document. For instance a letter concerning mud sills (msi), forming (fmg), supported decks (sde) and building 148 (148) along with a request for information (rfi) would be assigned all the subject codes indicated.

Step #5 - Entering document data in the document control file

The document records (unit entries in a data base program) are next put into the data base file. Methods of entering data vary but the guidelines below should assist in setting the procedure.

a. Item 1 through 8 in step #4 above are entered directly as a routine data entry task, directly from the master document file material.
b. The subject codes, item #9 in step #4 above, are assigned to the chronological file document by someone familiar with the subject codes and capable of abstracting the subjects to be entered by reading the document. As

the documents are read, subject codes should be written directly on the document control copy.
c. Also as the files are read it is helpful to underline and annotate document control file copies to make subject identification as easy and rapid as possible.
d. Once a packet of material has been subject coded (probably one month's file) the subject codes should be entered in the master document control file. Usually the routine entries, items #1 through #8 are entered earlier and in larger batches. Subject codes will generally be assigned at a later date.

Step #6 - Preparing the project history

Let us assume the document file has been prepared for several months of document control records and you wish, or are required, to move to the next level of documentation by conditions encountered on the project.

This level of documentation usually involves preparing a project history from the master document file. The project history is an abstracted chronological narrative of important events on the job.

To prepare a project history, the master document file is read and annotated so each document (depending on relative importance) can be abstracted and put in some type of narrative. Often the annotation is completed in step #5 as subject codes are assigned.

The program selected to process the narrative should be a word processor of some type. For example Think Tank or More can be used by entering the document number number as a heading followed by the document date. Next, the main heading is exploded and a brief summary (under 30 words) of the document is entered in the exploded area. Thus when prepared properly, the information can be sorted by document number or date (whichever is typed first). In addition the abstracts can be searched for key words to build subject files for specialized uses.

The important pivot is the unique document control number which allows the document to be filed in ascending order of document number and to always be found in the file as a numbered file document, no matter how many subject codes it is assigned. For instance document number 09124 can always be found after 09123 and before 09125 in the master chronological file, no matter how many subjects are assigned or what the subject being sought.

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An extended use of the project history is to build special reference files for specific uses. For instance one such use is to search the data base subject codes for a set of documents, and then to call each of the project history abstracts of these documents from the file, and to print and assemble them into a subject file to be used for a deposition.

It is important to understand that not all related documents are abstracted in preparing a project history or the special use file. For instance a transmittal may have no impact on the project history and may not have to be made a part of the history. However the transmittal is still available for reference by a search of the data base file. It is simply not stored in the abstract file.

Step #7 - Preparing specific project problem tracking material

When the project history is partially or wholly available, the document control file can be used at a higher level by selecting major classifications of project problem areas. This selection is made on the basis of the strong positions the preparer of the claim feels he has.

Experience indicates it may be best to concentrate early on the strong positions and win them by good logic and sound documentation. However, additional strong points sometimes emerge by a combination of proper actions taken in a variety of smaller and apparently unimportant points and issues. The analyst must be able to discern and select what information is to be used in any given situation.

Problem areas on a job may cover a variety of situations. It is often of help to use a basic list of normal complaints (causes of contested claims) and to derive from these the specific complaints that are related. Let us take an example.

Presume a project has encountered apparent excessive interference of non liable parties acting as agents of the owner. In this hypothetical example, the agent, say a non liable construction manager, decides that the prime contractors under his control, should be working in a sequence that best suits the owner in the opinion of the non liable construction manager agent. Say further that the prime contractors have either individually or in concert given the non liable construction manager an intended plan of action, that in their opinion as liable parties to a contract arrangement with the owner (the ultimate decision maker), will satisfy the project contract they have with the owner,

their client. This plan conflicts with that of the non liable construction manager.

When the owner's agent, the non liable construction manager, pits his desires against those of the prime contractor's, relative to achieving project objectives, the conditions of the contract must be closely analyzed.

In a hard money, fixed time contract, use of time and money are generally the prerogative of the contractor so long as the ends are achieved. Any interference with how the contractor achieves these ends must be viewed as an interference with the contractor's right to enjoy an optimum profit derived from the job plan which he has signified as his intended plan of work.

Such interference is legally known as maladministration. It is a common occurrence and many times is a result of honest misunderstandings about the project. However the dangers of maladministration are felt when the owner and/or his agents, by their actions or inactions affect the potential for a contractor to make an expected profit, within the bounds of agreed upon performance standards. When owner interference occurs the contractor is entitled to reimbursement for the reduction in his ability to earn an intended profit, and to fully cover his costs on the job.

The proof in such situations is however often difficult to provide. But if the document control system is properly prepared, the subject coding accurately done and the project histories well written, it is a relatively simple matter to retrieve all documents relating to the problem and to build a special history for any specific delay or interference.

* * * * * *

Not all the above steps are taken in the preparation of project documentation. If the level of documentation called for is at 2 to 3, it is generally adequate to prepare a subject file of the documents and only take Step #1 above if specific minor problems are encountered in a well defined, limited time period.

If the problems mount on the job and a documentation level of 4 or 5 is indicated, Steps #1, 2, 3 might be advisable to implement. A higher level of project difficulty, say a level of 6 to 8 might call for Steps #4 and 5 to be put into work.

When the level of project difficulty is raised to 9 or 10 which indicates a job upon which very serious problems are being encountered, Steps #6 and 7 should be initiated.

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Hopefully a full Step #6 and 7 program will not be needed, but on especially troublesome jobs, may be necessary.

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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.

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The list is at random. (Note: This list will be arranged by categories as it is added to)

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)

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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 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)

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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)

Note: 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.

MIND PROBER

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Agree	Disagree	
		Talkative - chatty, always speaking
		Egotistic - self-centered, individualistic
		Empathetic - aware of another, compassionate
		Apprehensive - fearful, worried, afraid
		Unconventional - unusual, not the norm, rebellious
		Kind - gentle, considerate, warmhearted
		Rigid - still, unchanging, inflexible
		Impatient - excitable, unable to wait
		Sympathetic - comforting, understanding
		Reserved - restrained, self-controlled, shy
		Adventuresome - daring, willing to take chances
		Uncaring - lacking in warmth or sympathy
		Quiet - still, silent, not talkative
		Sarcastic - joking in a biting or cynical way
		Concerned - aware, caring, interested
		Distant - remote, inaccessible, removed
		Competitive - seeking to win, ambitious, achieving
		Apologetic - sorry, regretful, makes excuses
		Outgoing - sociable, friendly
		Independent - self-reliant, autonomous
		Sensitive - perceptive, touchy, nervous
		Meek - humble, submissive, patient
		Meticulous - extremely careful, scrupulous
		Suspicious - doubtful, distrust, uncertainty
		Fun-loving - playful, carefree, spontaneous
		Help-seeking - looking for assistance or comfort
		Charitable - generous, kind, giving
		Neighborly - friendly, amicable, familiar
		Achieving - accomplishing, persevering, striving
		Approval-seeking - wanting acceptance and praise
		Self-blaming - guilt, fault finding
		Precise - clearly defined, exact
		Guarded - kept safe, protected, watched over
		Carefree - free of worry or responsibilities
		Dependent - needing aid or assistance
		Comforting - soothing, relieved, consoling

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MIND PROBER

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Agree	Disagree	
		Affiliative - associated, connected
		Ambitious - enterprising, striving, eager
		Status-conscious - attentive to position and wealth
		Humble - reserved, self-conscious, modest
		Accurate - correct, clear-cut, beyond doubt
		Defensive - protective, shielded, careful
		Joking - witty, wisecracking, jesting
		Defenseless - unguarded, unprotected, needing shelte
		Consoling - solace, to cheer up
		Hospitable - welcoming, warm, receptive
		Goal-oriented - seeking success and achievement
		Seeks Attention - wanting to be noticed
		Obedient - compliant, amenable, dutiful
		Responsible - accountable, trustworthy
		Wary - cautious, watchful, on guard
		Playful - implish, mischievous, frivolous
		Trusting - confident, committed
		Protective - defended, guarded, careful
		Loyal - steadfast, faithful, devoted
		Striving - contending, exerting effort
		Seeks Recognition - wanting to be praised
		Yielding - deferring, relenting, gives in
		Tidy - neat, orderly, clean
		Secretive - covert, underhanded, concealed
		Pleasure-seeking - seeking gratification or delight
		Insecure - inadequate, unsure, shaky
		Nurturing - nourishing, supporting, fostering
		Individualistic - one-of-a-kind, independent
		Accomplishing - successful, to bring to completion
		Socially Striving - seeking respectability