

The First Annual Symposium
on
Project Management

May 13 & 14, 1993

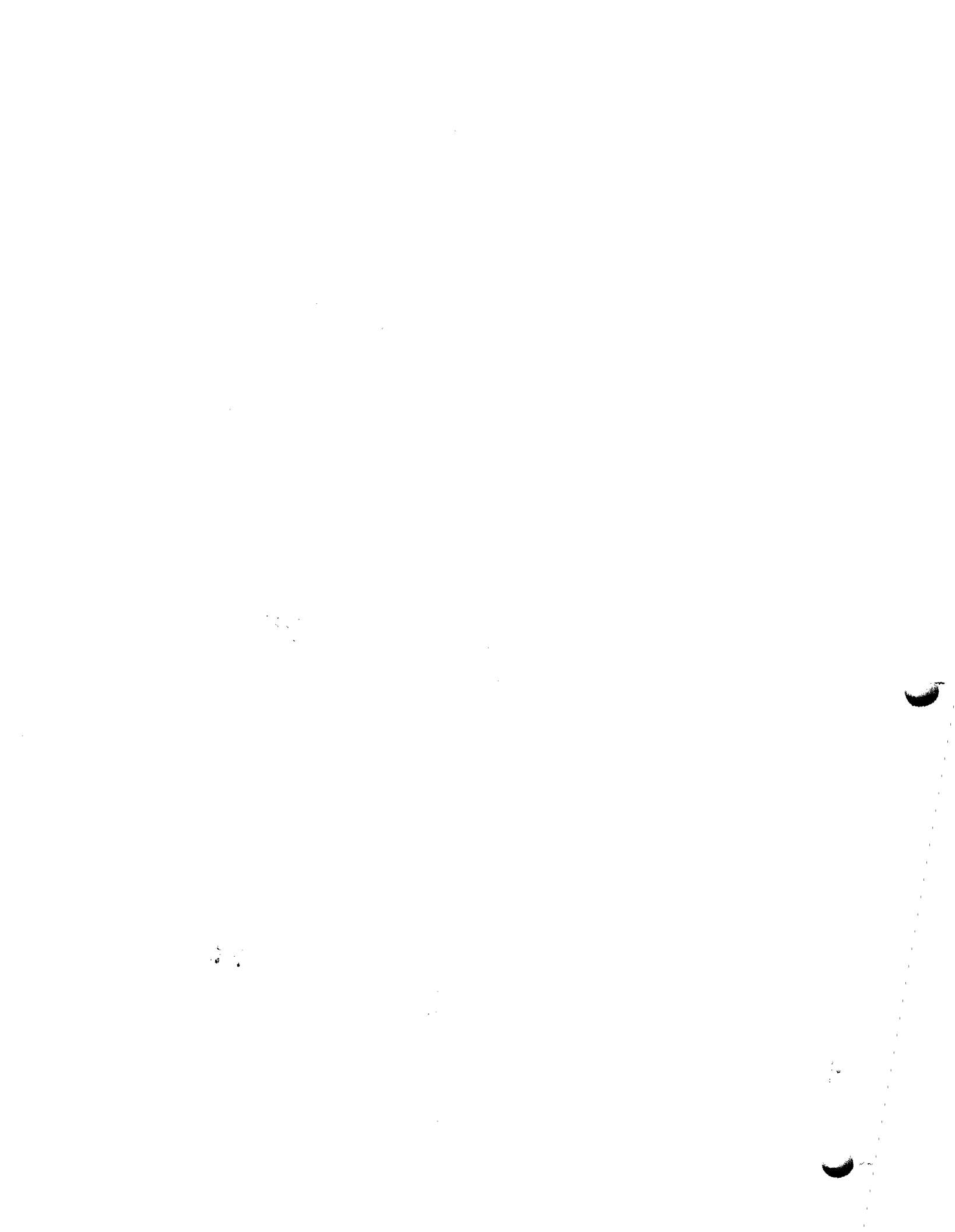
**TOTAL QUALITY
PROJECT MANAGEMENT**



sponsored by

The Association for Project Managers
in the Design Professions

Educational Program Provider
University of Wisconsin - Madison
The College of Engineering
Professional Development



MEMBERSHIP REQUIREMENTS/ RESPONSIBILITIES

ROUND TABLE DISCUSSION

PURPOSE:

The demands placed on project managers today are staggering. The Association for Project Managers is a source for answers to the questions we face everyday in professional practice. To be effective, the membership of the Association must develop a forum to focus on their concerns. This roundtable is a part of an ongoing dialogue which is the trademark of the Association.

The goals for the Roundtable are expressed as a series of questions.

GOALS FOR ROUND TABLE DISCUSSION:

- What information should the Association be offering?
- How can APM best meet the needs of project managers?
- What services and benefits should APM offer?
- Is the quarterly journal, "The Project Manager" adequate?
- What subjects should be covered in the Journal?
- Besides the AEC InfoNet, what relationships should APM establish with other organizations?
- How closely should APM become allied with the American Society of Quality Control (ASQC)?
- How should APM operations be funded?



GOALS AND EXPECTATIONS ROUND TABLE DISCUSSION

PURPOSE:

The Association for Project Managers was founded on the need for improvement in both quality and project management in the design and construction industries. In only one and one-half years, APM has grown to nearly 250 members and is now holding its first Symposium.

The future direction of the Association must be determined by the membership. The purpose of this round table is to begin the process of charting the future. While a firm foundation is now in place, members must help to develop the goals and expectations for APM.

GOALS FOR ROUND TABLE DISCUSSION:

- Help prepare a mission statement for APM
- Determine what legal status is best
- Outline the future direction and focus (should APM be primarily for designers or include contractors, owners, etc.?)
- What should the leadership do to attract members?
- How can financial stability best be achieved?
- What is the best role for the Board of Directors and other committees?
- How closely allied should APM be with other organizations such as the American Society of Quality Control (ASQC), Construction Specifications Institute (CSI), etc.?



FIRST ANNUAL SYMPOSIUM ON PROJECT MANAGEMENT

sponsored by :

The Association for Project Managers

PROGRAM NOTES

Educational Program

presented under the direction of

**Philip M. Bennett, Program Director
The Department of Engineering
Professional Development
College of Engineering
University of Wisconsin-Madison**

**Embassy Suites Chicago O'Hare Hotel
May 13-14, 1993**



FIRST ANNUAL SYMPOSIUM ON PROJECT MANAGEMENT
Embassy Suites Chicago O'Hare Hotel
May 13-14, 1993

PROGRAM NOTES
Table of Contents

Speaker Biographies

Thursday, May 13, 1993

- | | | |
|----------------|--|-------------------------|
| Tab One | Fulfilling the Demands Placed on Today's Project Manager | Ralph Stephenson |
| Tab Two | Focus on Total Quality Management --Adding Value to the Project | Fred C. Teltgen |

Friday, May 14, 1993

- | | | |
|------------------|--|---|
| Tab Three | Successful PM Applications to Budgeting and Financial Management Projects | Steve L. Winter |
| Tab Four | Managing the Project During the Planning and Programming Phases | Chris E. Liakakos
Joe DeVoss |
| Tab Five | Successful Application of Project Management: A Case Study of a \$650 Million Airport Facility (Chicago O'Hare) | H. Bruce Brummel |
| Tab Six | Successful Application of Project Management: Health Care Facilities | Larry M. Oppenheimer |



FIRST ANNUAL SYMPOSIUM ON PROJECT MANAGEMENT
Embassy Suites Chicago O'Hare Hotel
May 13-14, 1993

Tab One

**Fulfilling the Demands Placed on
Today's Project Manager**

Ralph Stephenson



01
02
03

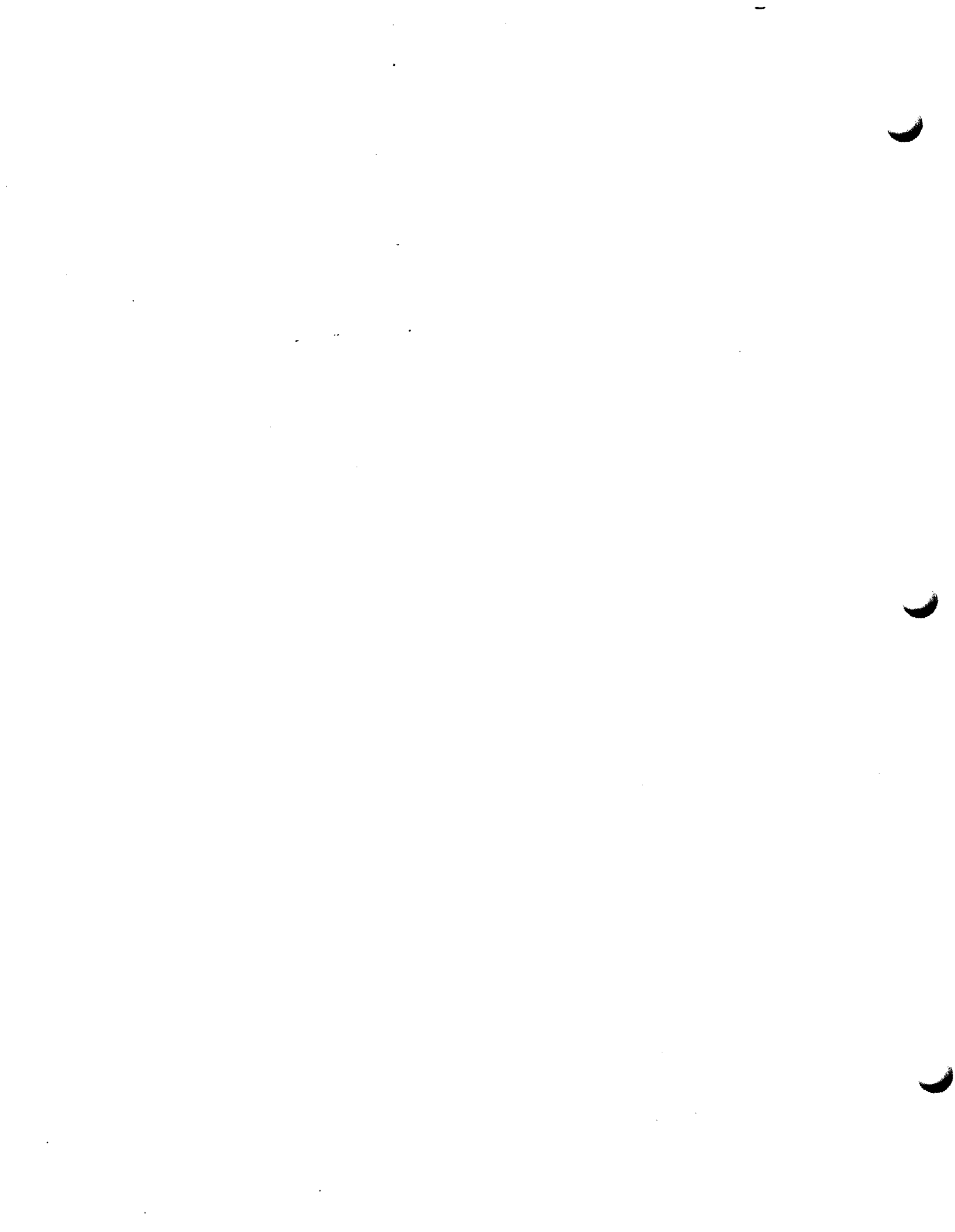


Ralph J. Stephenson, P. E., P. C.
Consulting Engineer
April 26, 1993

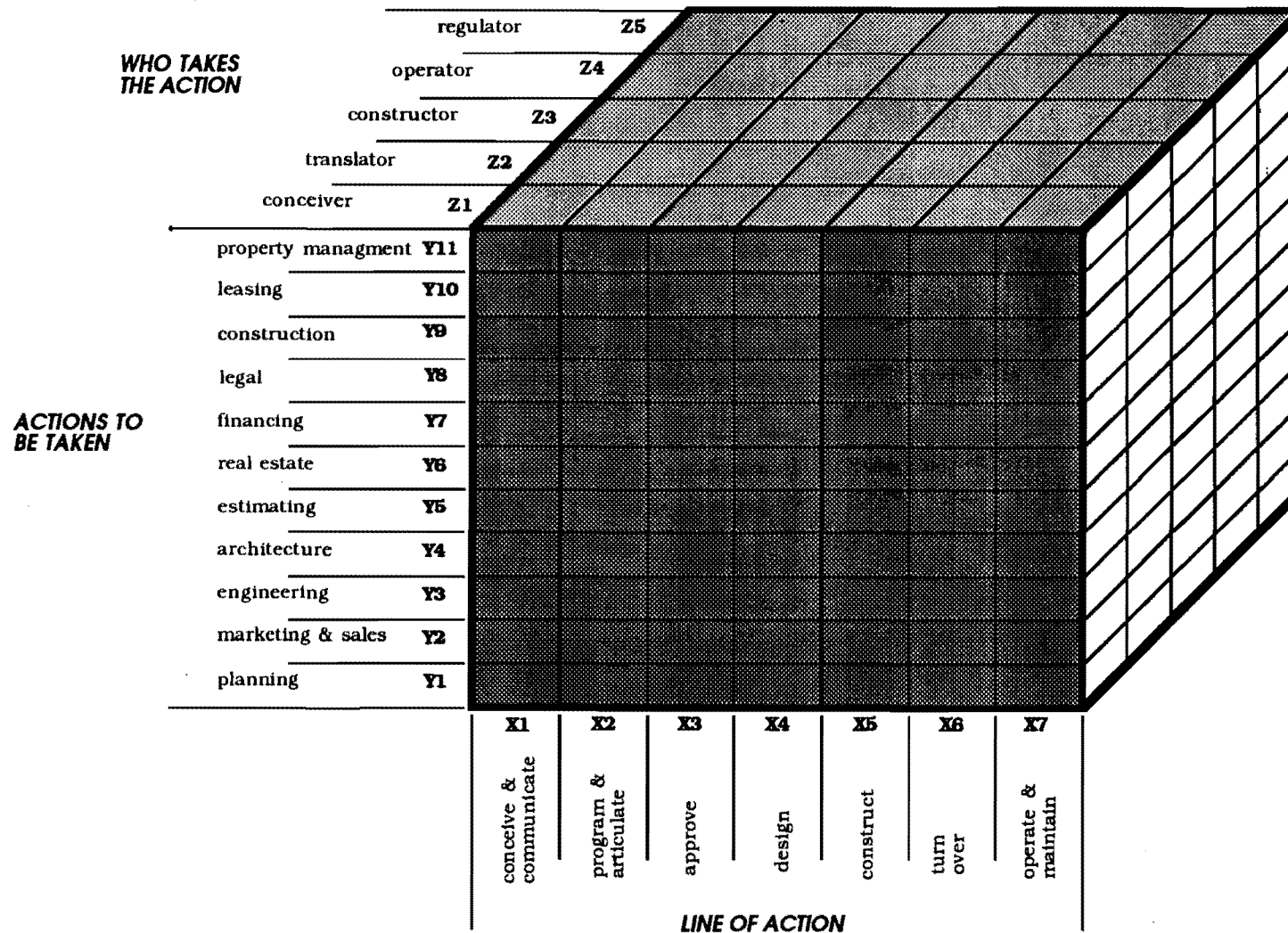
Association of Project Managers Symposium - Chicago, 1993

Index - *Fulfilling the Demands Placed on Today's Project Manager*

01	Macro matrix boundaries of design & construction
02 & 03	9 steps to effective proj mgmt
04	Questions to be asked about your project
05	Types of management in project oriented businesses
06	Functional and project management in evolution
07	Obligations heirarchy
08	Obligations & professional needs
09	Obligations & business needs
10	Ethics - questions to ask to guide ethical decision making
11	The need for profit
12	4 i's improvement cycle
13 & 14	Creativity & how it is used in project management
15	Paretos law
16	Project costs committed and spent
17	U of Q organization structure
18	Submittal turn around
19	Bulletin/change order record
20	Equipment activity tabulation
21	Professional service contract characteristics
22	Construction contract characteristics
23 & 24	Suggestions on selling design/build services
25 & 26	Claim prone job characteristics
27 to 30	Common causes of contested claims
31	Dispute resolution steps
32	agc partnering
33	cii partnering
34	Generic partnering
35 to 37	Sample partnering charter
38	Turnover cycle analysis
39	Money flow
40 to 42	Elements of importance to success in design & construction
43	Job planning - what is it?
44	Advantages of good planning
45 to 47	Act from a plan
48 & 49	Solution to exercise #1 - numbered nodes
50	Clarion base network model



MACRO MATRIX BOUNDARIES OF DESIGN & CONSTRUCTION



Ralph J. Stephenson PE PC
Consulting Engineer

323 Hiawatha Drive
Mt. Pleasant, Michigan 48858
ph 517 772 2537

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

QUESTIONS TO BE ASKED

- 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 will 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's 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)

TYPES OF MANAGEMENT IN PROJECT ORIENTED BUSINESSES

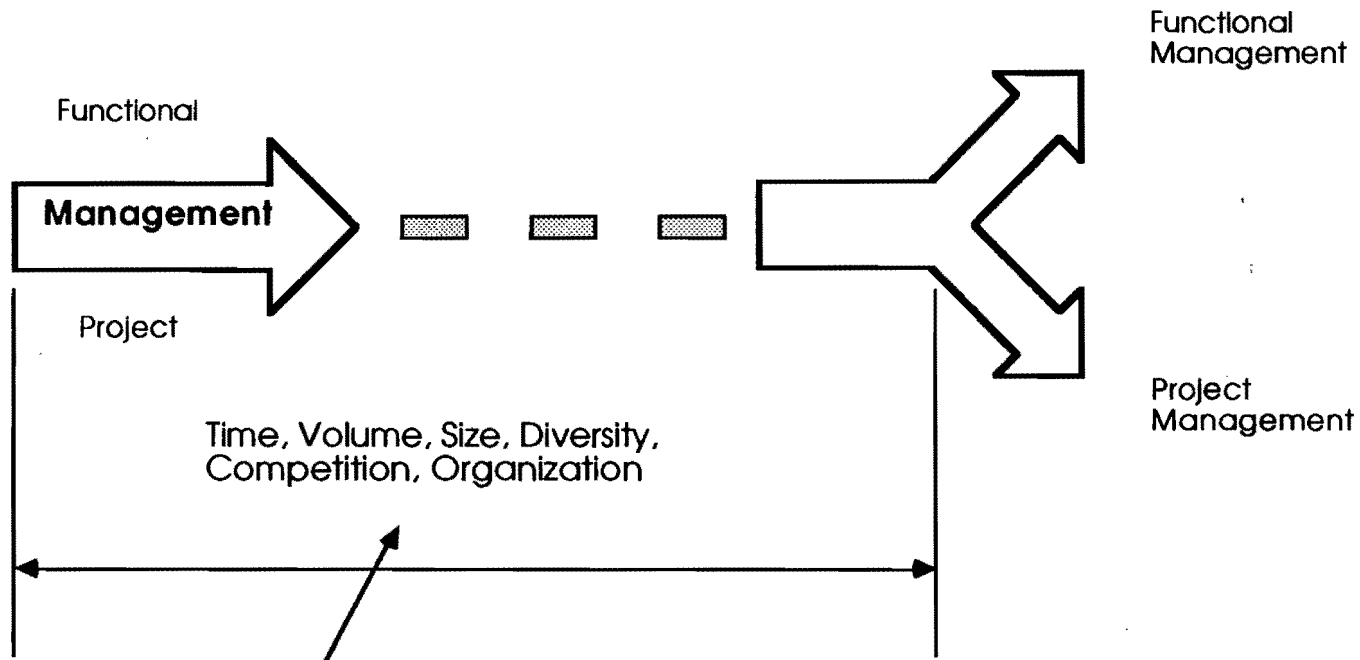
• FUNCTIONAL - as related to continuous management

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 discrete 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.



- These are some of the factors that initiate changes in the method by which a planning, design, construction organization is managed .

Relation between functional and project management in the evolving organization

Ralph J. Stephenson PE
 Consulting Engineer

OBLIGATIONS

Hierarchy of professional obligations as formulated by Dean Freund

- *Prime - Protection of public health,
welfare & safety*
- *Secondary - Your employer or client*
- *Tertiary - Your peers*

OBLIGATIONS & PROFESSIONAL NEEDS

- The design and construction professional is obliged, above all, to protect the health, welfare and safety of the public.
- The legal professional is obliged, above all, to protect the interest of his or her client. These interests are supposed to be defined by the body of law. Thus the body of law, not the legal professional, is depended upon to protect the health, welfare & safety of the public - relative to the law.

OBLIGATIONS & BUSINESS
NEEDS

- To profitably produce services & facilities.
- To provide solutions.
- To measure the quality of the process you provide.
- To help manage destructive conflict.
- To encourage early action on potentially damaging events.
- To reduce professional liability costs.

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

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

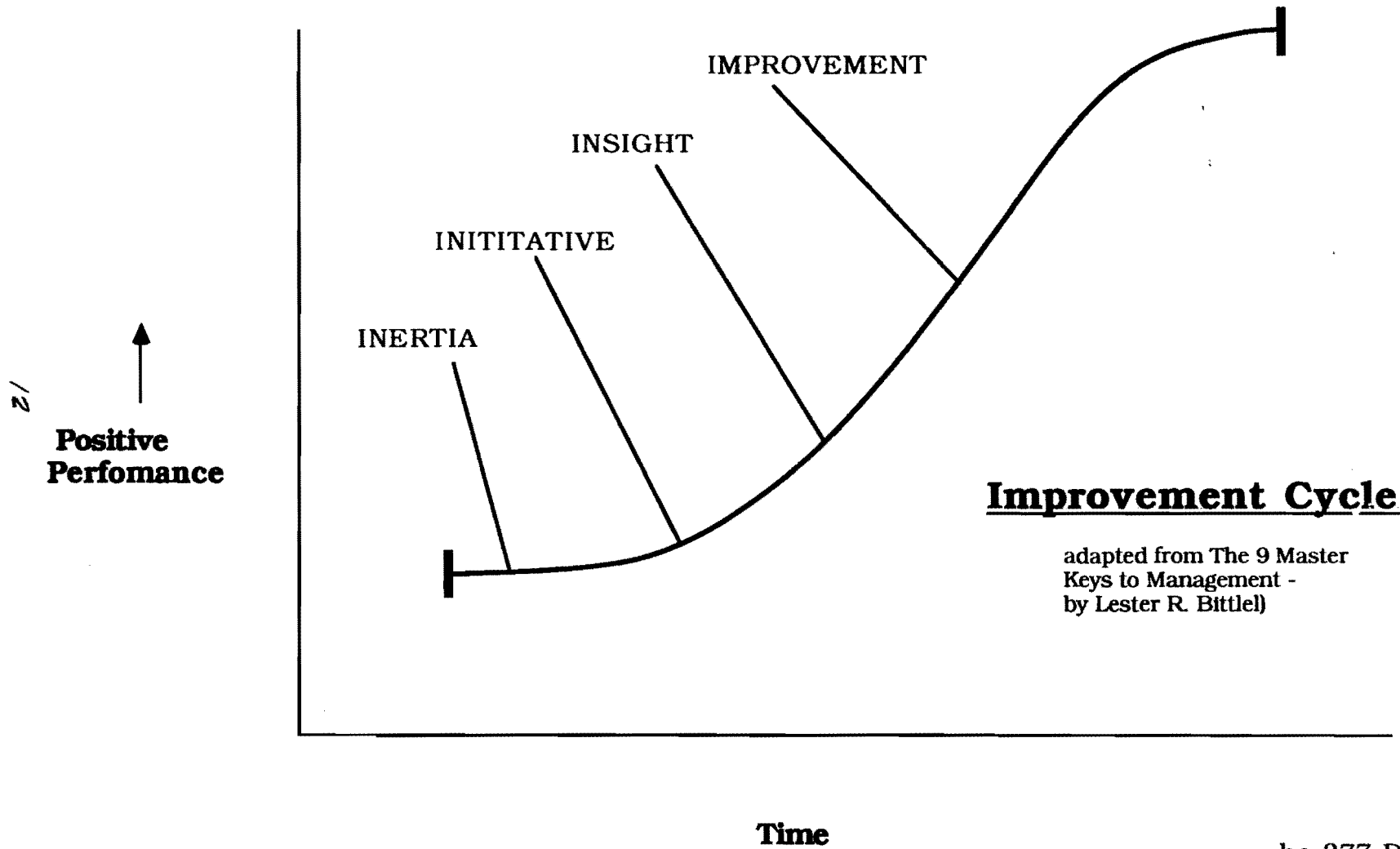
1. Competence
2. Service
3. Integrity
4. Cost
5. Delivery
6. Understanding

C. HOW DO WE ACHIEVE PROFIT - TRUE PROFIT ?

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

& profits will be automatic!

Ralph J. Stephenson PE
Consulting Engineer



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

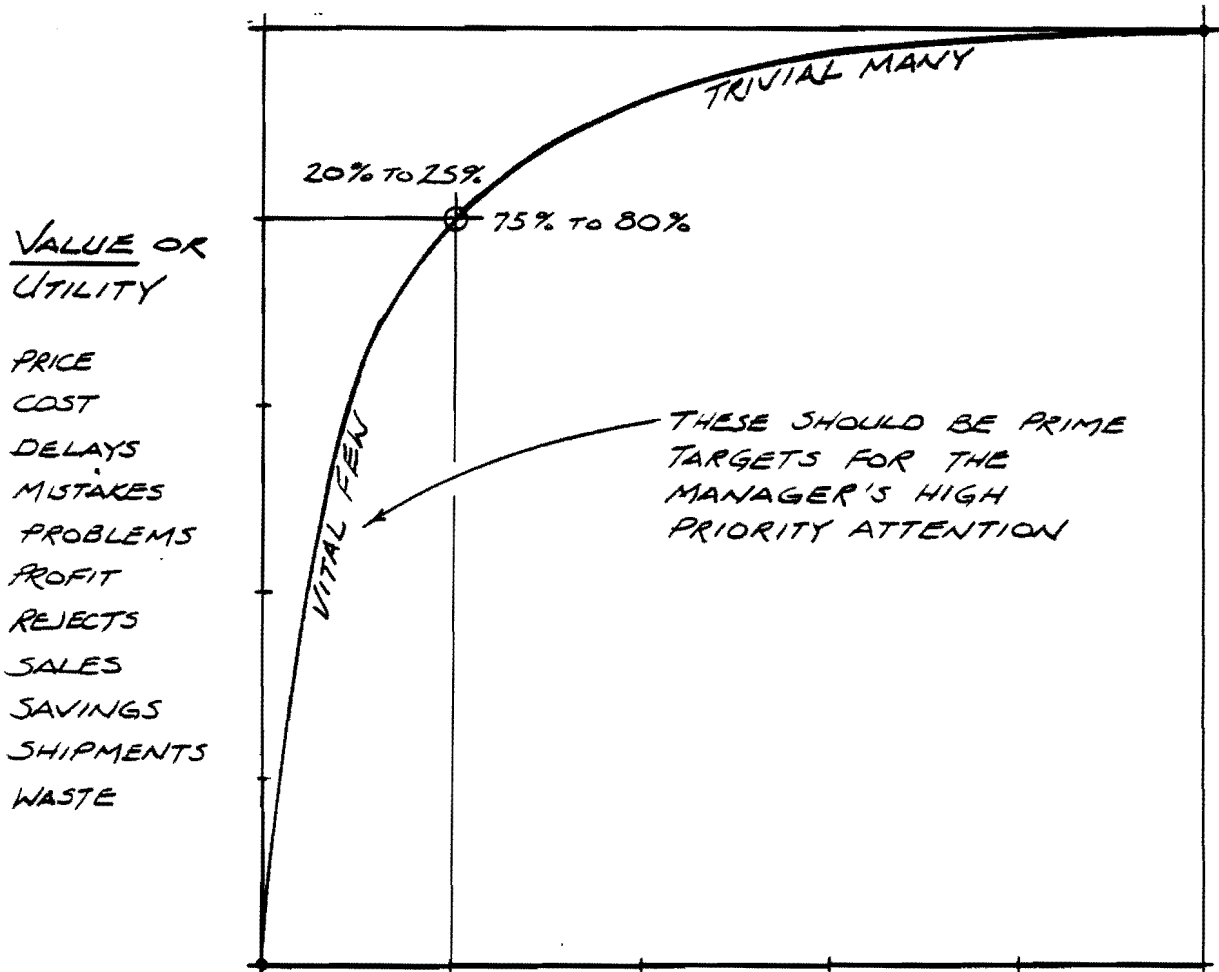
of doubtful merit is a brilliant thought in league with other ideas.

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!

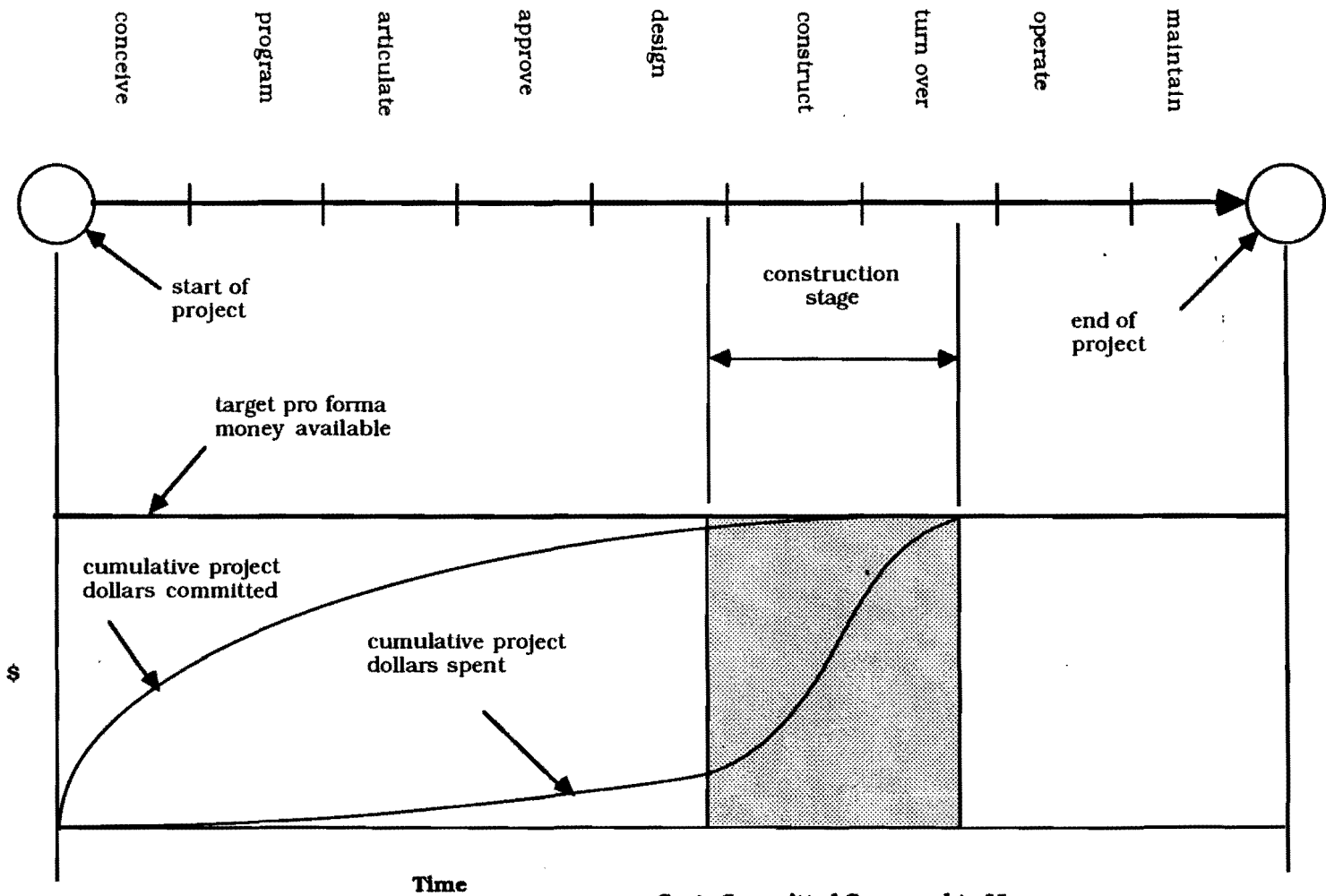
PARETOS LAW - IN AN OBJECT/VALUE SITUATION ONLY A FEW OF THE OBJECTS ACCOUNT FOR THE GREATEST PART OF THE VALUE.



OBJECTS OR RESOURCES

- | | |
|------------|-------------|
| ACTIVITIES | MATERIALS |
| CAUSES | METHODS |
| OCCURANCES | PRODUCTS |
| PROBLEMS | SALES CALLS |
| RESOURCES | SERVICES |
| PRODUCTS | STAFF |
| DECISIONS | |
| FACILITIES | |

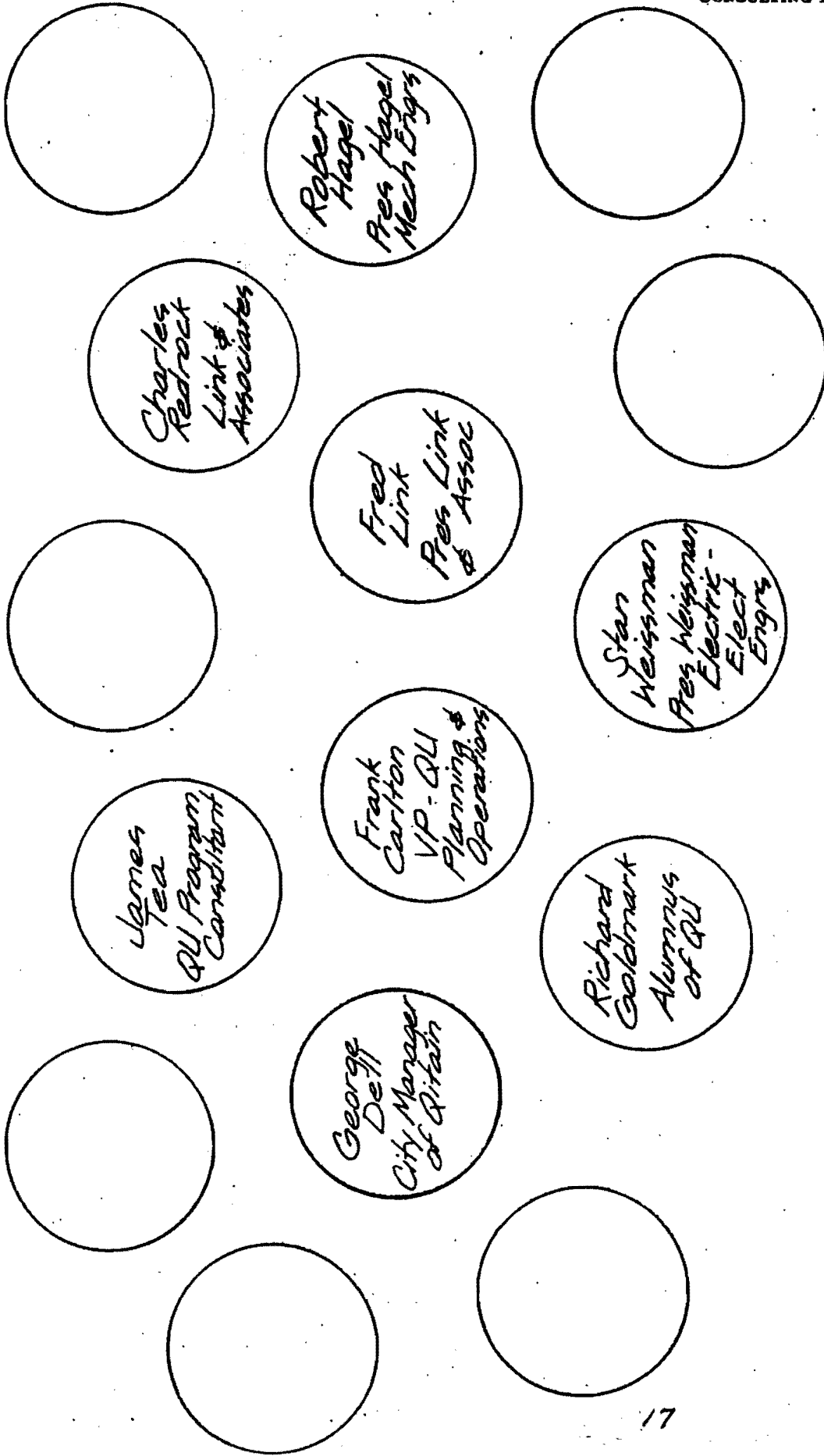
7/



Costs Committed Compared to Money Spent on Construction Projects

Ralph J. Stephenson PE
Consulting Engineer

ho 350 Jan 90



QITAIN UNIVERSITY - PROJECT
ORGANIZATION STRUCTURE

SUBMITTAL TURN AROUND TIMES

TIME REQUIRED IN WORKING DAYS

	ACTION	NORMAL	EXPEDITED	SUPER EXPEDITED
1	* PRIME CONTRACTOR LOG IN & CHECK	1+2 3	1+1 2	1/2 + 1 1 1/2
2	PRIME CONTRACTOR TRANSMIT TO A/E	3	1	1
3	A/E LOG IN & CHECK	1+15 16	1+10 11	1/2 + 5 5 1/2
4	A/E TRANSMIT TO PRIME CONTRACTOR	3	1	1
5	PRIME CONTRACTOR LOG IN & REVIEW	1+2 3	1+1 2	1/2 + 1/2 1
6	** PRIME CONTRACTOR TRANSMIT TO SUBCONTRACTOR	3	1	1
	TOTALS	31 WORKING DAYS	18 WORKING DAYS	11 WORKING DAYS

* TABULATION TAKEN FROM POINT IN TIME WHERE SUBMITTAL ARRIVES AT PRIME CONTRACTOR'S OFFICE.

** TABULATION ENDS WHEN APPROVED SUBMITTAL ARRIVES AT SUBCONTRACTOR'S OFFICE.

RALPH J. STEPHENSON, P. E.
CONSULTING ENGINEER

BULLETIN #	170 8/31/82	180 9/15/82	190 9/29/82	200 10/13/82	210 10/27/82	220 11/10/82	230 11/24/82	240 12/7/82	250 12/21/82	260 1/10/83	270 1/24/83
11											
10											
9											
8											
7											
6											
5											
4											
3											
2											
1											

VOIDED, 11/4/82. (216) NOT QUOTED

CHANGE ORDER #

Bulletin quoting period

Quote evaluation period



BULLETIN/CHANGE ORDER RECORD

①	②	③	④	⑤	⑥	⑦	⑧
LINE #	EQUIPMENT DESCRIPTION & WHO FURNISHES	PRESENT LOCATION OF EQUIP	FINAL LOCATION	ACTION TAKEN & BY WHOM	ACTION TAKEN & BY WHOM	OTHER EQUIP AFFECTED	REMARKS
1	2 existing compressed air tanks (Telco)	Existing paint shop	New building paint dept	Relocate Set Hook up	Falstaff Young & Falstaff Falstaff	New compressor must be ready to run	
2	3 existing paint spray booths (Telco)	NW corner existing building	New building paint dept	Move & Set Hook up	Young Telco	-	
3	2 new paint spray booths (Falstaff)	New	New building paint dept	Erect Hook up	Young Telco	-	
20	4	6 existing column mounted 4lb cranes (Telco)	Col's 6C 5D 7D 3F 4C 2F	Remove Move & Install	Telco Young	-	
5	2 new prefab shop offices 10'x15'x8' (Young)	New	1 in new bldg lab area 1 in existing bldg QA area	Erect Mech/Elect	Young Telco	In existing bldg after Telco clears space (watch!)	

Abbreviations

NW Northwest
QA Quality Assurance

EQUIPMENT ACTIVITY TABULATION

2. Professional Service Contract Characteristics

Ralph J. Stephenson PE
Consulting Engineer

A. Agreement premises

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

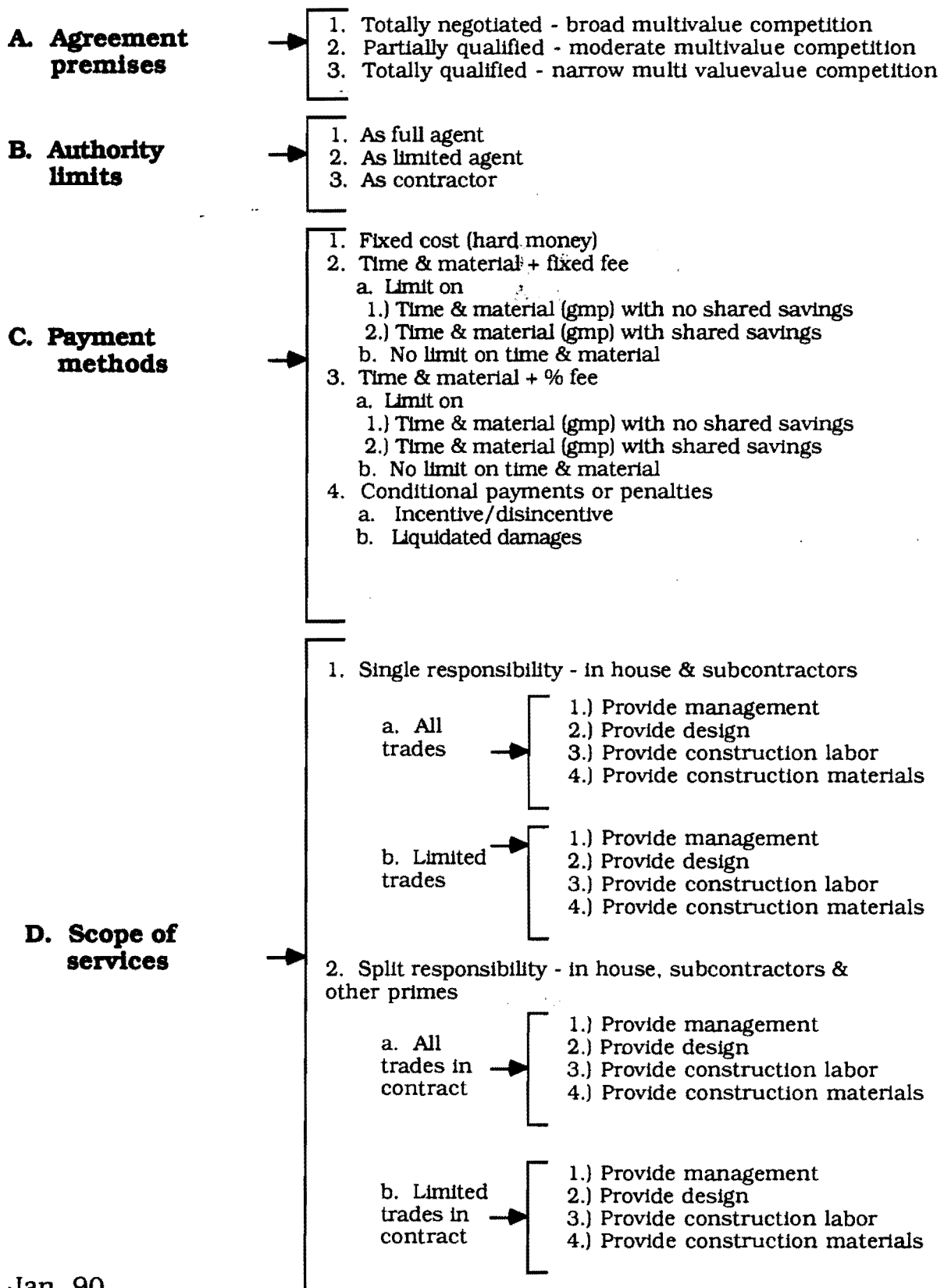
D. Scope of services

- 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

ho 362 Jan, 90

3. Construction Contract Characteristics

Ralph J. Stephenson PE
Consulting Engineer



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.

To Increase Customer Motivation:

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.

To Deal with Pricing Problems:

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

Ralph J. Stephenson PE PC
Consulting Engineer

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.

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.

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.

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.

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.

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.

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.

31

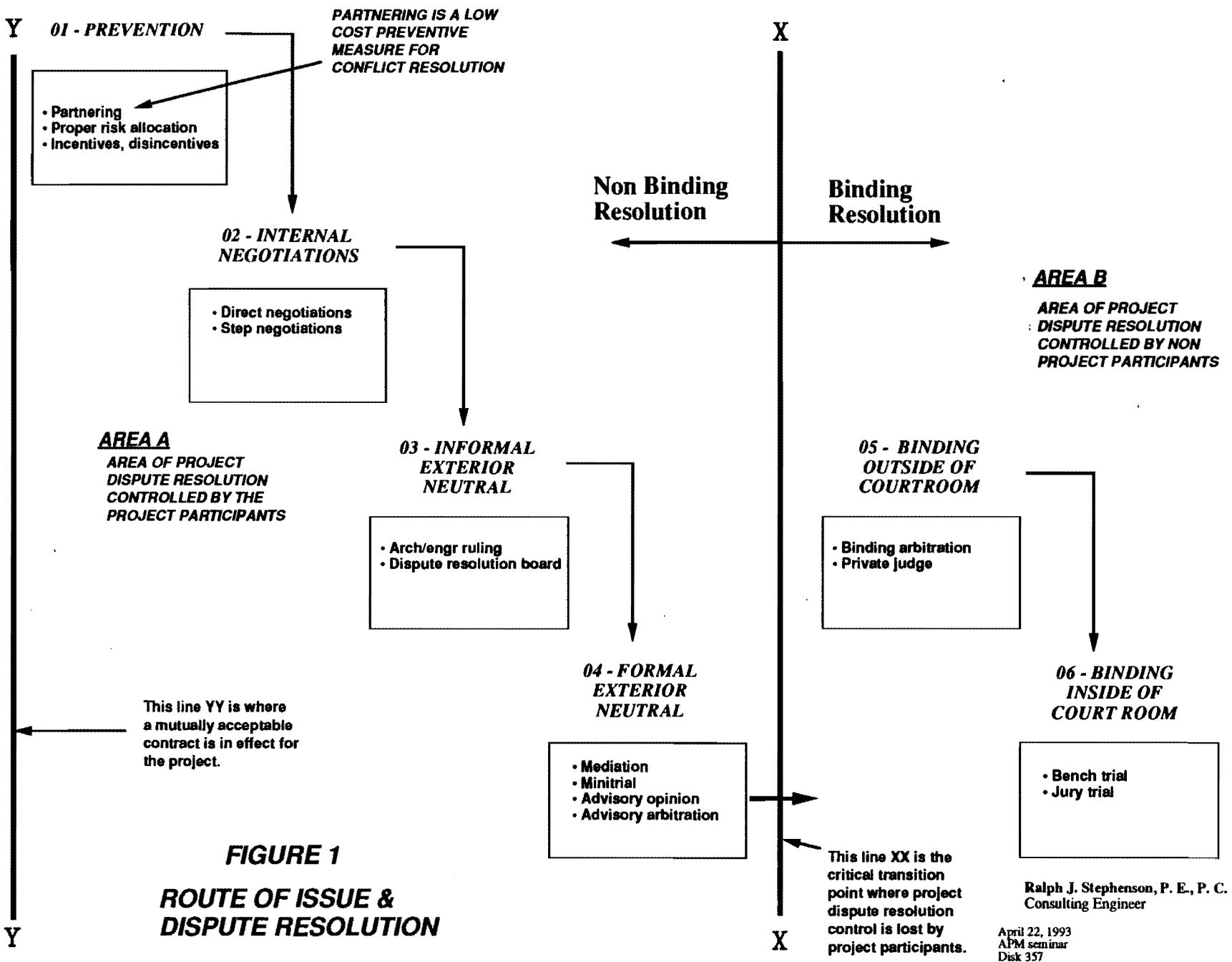


FIGURE 1
ROUTE OF ISSUE & DISPUTE RESOLUTION

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

April 22, 1993
APM seminar
Disk 357

PARTNERING - A. G. C.

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 - C. I. I.

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

**A method of conducting
business in the planning, design,
and construction profession
without unnecessary, excessive,
or disruptive external party
involvement.**

APM charter example

I. Charter for new Detroit, Michigan Post Office, Area P

A. Mission

This partnering team commits to deliver a quality project on time, within budget, safely, profitably for all, and of the intended quality, through mutual cooperation among the participants.

B. Objectives

1. Maintain a clean and well maintained work site
 - a) Experience no lost time from accidents.
 - b) Be a good neighbor.
 - c) Use good construction site housekeeping practices.
2. Effectively administer the project
 - a) Prepare & publish an acceptable payment procedure.
 - b) All parties submit complete, accurate & timely billings.
 - c) Prepare & publish an acceptable submittal processing procedure.
 - d) Treat each other fairly
3. Close out the project in a proper & timely fashion
 - a) Prepare & publish acceptable close out guidelines.
 - b) Establish clearly defined punch out procedures and standards early in the project.
4. Maintain effective lines of communication.
 - a) Recognize the need for quality information.
 - b) Minimize response times in all matters.
 - c) Maintain an appropriate level of documentation.
 - d) Be available.
5. Resolve problems effectively
 - a) Develop, approve, and implement a responsive conflict resolution system
 - b) Resolve disputes and conflicts at the originating level if at all possible.
 - c) Resolve disputes and conflicts as quickly as possible.
 - d) Eliminate the need for third party legal involvement
6. Limit cost growth
 - a) Maintain objective attitude toward constructability.
 - b) Develop cost effective measures to apply to all job related activities.
 - c) Recognize owner's needs in occupation and operation of project.
7. Maintain technical excellence in all program, design & construction work.
 - a) Owner abate promptly as required
 - b) Define and clearly communicate quality standards expected
 - c) Maintain constructability of the project.
 - d) Properly plan and schedule the work.
 - e) Do it right the first time.
8. Maintain good job morale & attitudes
 - a) Promote partnering attitudes at all levels of contract administration.
 - b) Have pride in your work.
 - c) Have fun.
9. Maintain partnering effectiveness
 - a) Prepare and publish a partnering effectiveness measurement system.
 - b) Meet on a scheduled, regular bases and formally evaluate the partnering effectiveness.
 - c) Take prompt steps to correct any deterioration of partnering effectiveness on the project.

II. Issue resolution

A. Policy

It is the objective of the Area P Post Office project team management to first and foremost avoid unnecessary disputes and conflict on the job. It is the intent to do this by achieving the objectives of the charter, particularly to resolve an issue promptly and at the level at which it originates. If this is not possible the issue will be referred promptly to the next highest level for resolution.

In all cases, individuals who are involved in a difference should be businesslike and not resort to personal attack. The principles outlined in the Partnering Charter mission and charter should be followed at all times in resolving differences.

Upon request, site meetings will be convened to discuss any unresolved issue and to attempt to reach resolution. Any issue presented should be clearly defined and alternative solutions suggested. The resolution process is to work through open communication and looking at the other side's point of view. In addition, issues are to be kept in the forefront to ensure resolution in a timely manner. A log of unresolved issues will be maintained from meeting to meeting.

if resolution cannot be reached at the job site, the principals of the involved firms or agencies should attempt to reach resolution through informal discussion before the formal process outlined in the contract documents is used.

In seeking resolution to an issue, involved parties will attempt to:

- Thoroughly understand the issues.
- Maintain empathy for the other point of view.
- Communicate thoughts openly and clearly.
- Clearly document the issue resolution.

B. Methodology

Goal - To encourage and provide a forum for resolution of issues at the lowest possible level, but to provide a mechanism to elevate the issue if needed.

If resolution is not achieved at the lowest level forum, the principals in the firms in conflict will attempt to reach resolution through informal discussion.

III. Partnering evaluation

Each objective in the Charter is to initially be given a par weight as indicated below. The par weight indicates how important the item is in relation to achieving the project mission. Weights are assigned from 1 to 5. A weight of 5 indicates that the objective is of critical importance in achieving the project mission. A weight of 1 indicates that the objective is of least importance when evaluated against the highest weighted objectives.

The weight of the objectives remains constant throughout the project. Therefore care must be taken in assigning them properly at the onset of the evaluation process.

The quality of the project performance in relation to the Partnering Charter objectives is to be measured once per month by representatives of all organizations participating in writing the Charter. Partnering performance quality ratings are to be from 1 to 5.

A quality rating of 1 indicates very poor performance and little adherence to the standards set out by

the objective. A quality rating of 5 indicates high and excellent adherence to standards set by the objectives.

The total evaluation of the objective is the constant weight multiplied by the quality for each objective for each evaluation. The total partnering performance is measured at each evaluation.

Total partnering performance = total of the (objective weights x the objective quality) for the period.

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:

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

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

$$t = \frac{x - i - d}{(n-1)}$$

Examples:

For x unknown

$$i = 160$$

$$d = 7 \text{ wd}$$

$$t = 4 \text{ wd}$$

$$n = 11 \text{ units}$$

For i unknown

$$x = 325$$

$$d = 10 \text{ wd}$$

$$t = 6 \text{ wd}$$

$$n = 21 \text{ floors}$$

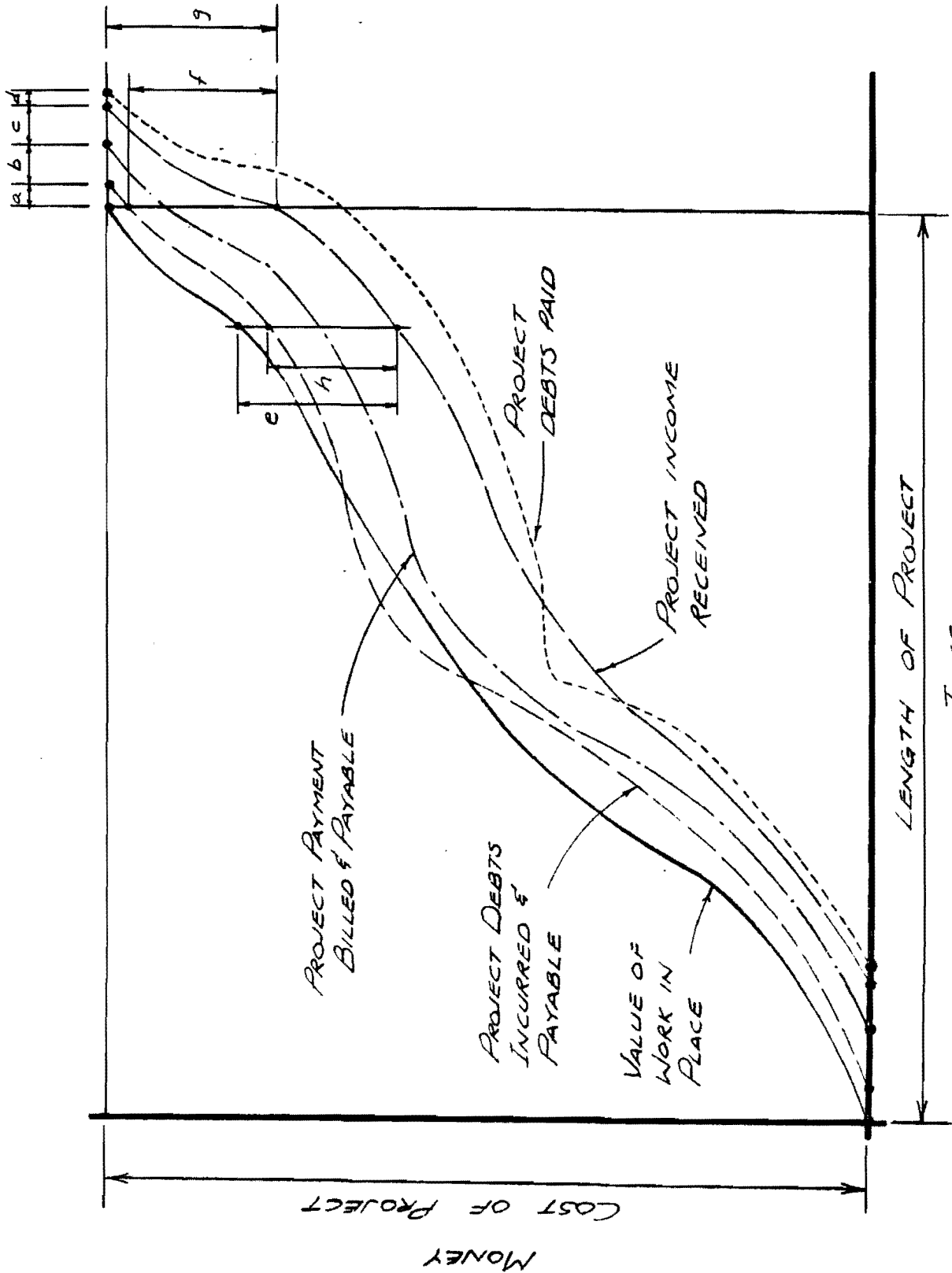
For t unknown

$$x = 352$$

$$i = 280$$

$$d = 9$$

$$n = 15 \text{ sectors}$$



PROJECT MONEY FLOW

37 Elements of Importance to success in design and construction - no 341

By Ralph J. Stephenson PE PC

• **Summary**

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 37 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

• **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.

Design and construction elements

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.

Design and construction elements

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.

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 !

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.

A. Five essential planning questions for the manager to ask and have answered.

1. What?
2. Where?
3. When?
4. How?
5. Who?

B. Essential planning actions for the manager to take

1. Set goals, objectives, and a project delivery system
2. Prepare, approve and translate an action plan
3. Organize, assemble resources and set project systems
4. Do the job

C. Set goals, objectives and a project delivery system

1. Definitions
 - a. Goals - targets, desires, wishes and aims expressed without quantification
 - b. Objectives - Expressed goals which have been quantified
2. Be specific when setting objectives - projects are objective oriented
3. Set objectives so that movement toward their achievement can be measured

D. Prepare, have approved and translate an action plan

1. May be mental, verbal, text written or graphic
2. May be strategic or tactical, summary or tactical
3. May be short, medium or long range (the manager must set the time scale)
 - a. The shorter the time interval covered by the plan, the greater is the chance the plan will succeed. However, the shorter the time interval covered, the greater is the probability that longer range

needs, which truly measure the manager's effectiveness, will remain unmet

b. The higher you are in the management structure, the larger and longer are the planning scales you must use (the higher you are the further you are expected to see)

4. A good manager plans the work and then works the plan

E. Organize, assemble the resources, set the project systems & do the job

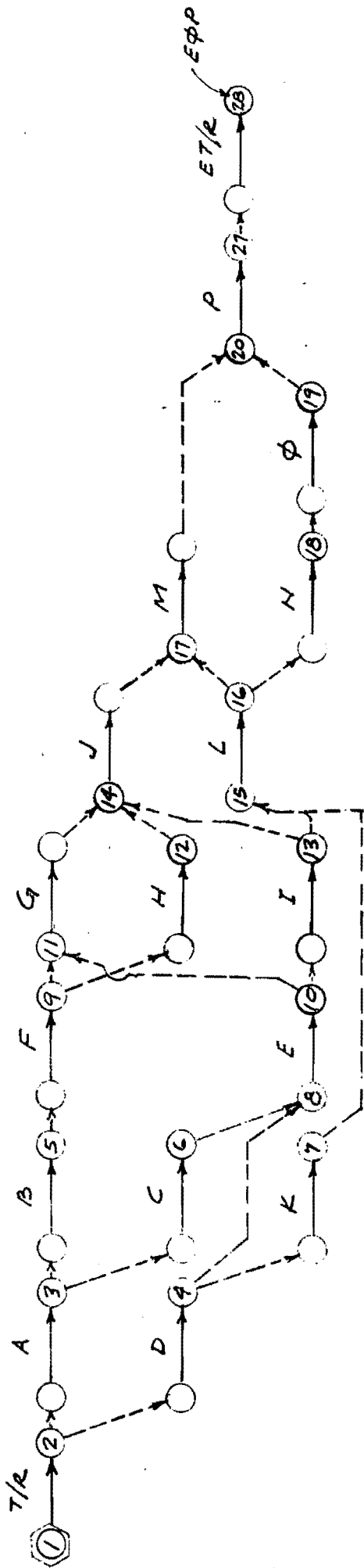
1. Build plans based on optimum integration of management viewpoints
2. Define relationships through functional diagraming of interconnections
 - a. Formal
 - b. Informal
 - c. Reporting
 - d. Staff
 - e. Temporary
3. Make clear cut assignments
 - a. The manager should not assume a person will automatically know his full pattern of responsibilities.
 - b. Don't leave definition of authority and responsibility to chance. Be specific.
4. Build a feedback system
 - a. Organizational grapevines are often used for informal feedback
 - b. Formal feedback systems should be built by specific assignment (must have a standard of project performance defined before a formal feedback system can be put in place)
5. Keep organization goal and objective oriented
 - a. Keep organization lean - avoid unnecessary staffing
 - b. Provide delegation and training opportunities
 - c. Tend to build around objectives and needs rather than people (there are major exceptions to this - distinguish these early)
 - d. Provide for proper grading of decision to action time spans

F. Common planning failures

1. Not touching all organizational and management bases - use the

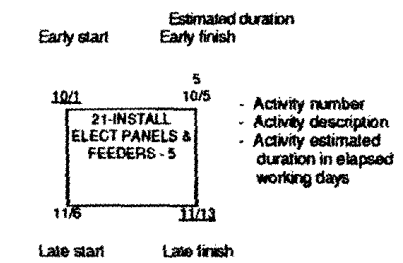
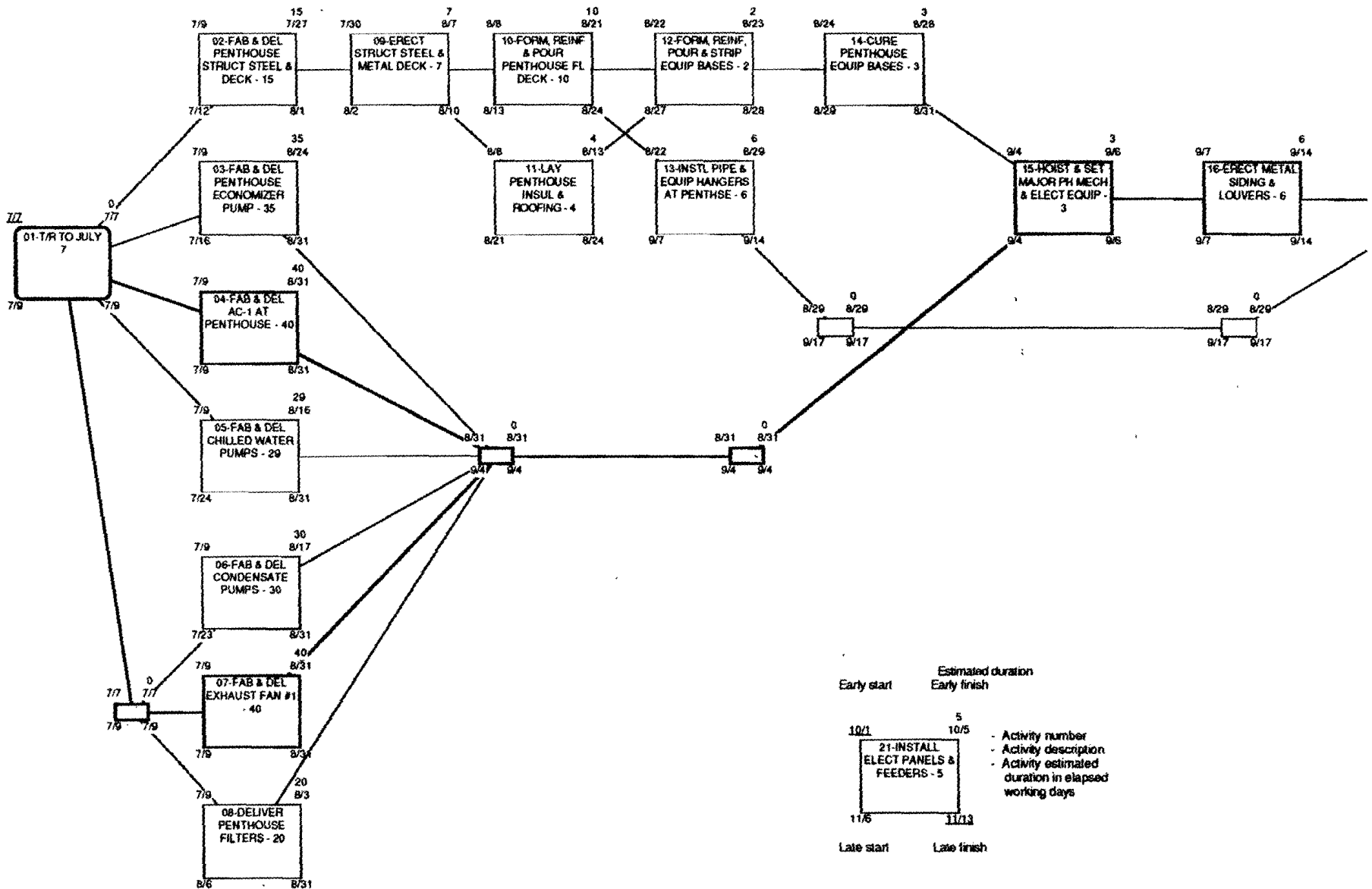
Ralph J. Stephenson PE PC
Consulting Engineer

- what, where, when, how and who system
2. Committing to too many objectives at one time
 3. Underestimating the value and need for good forward planning
 4. Failing to challenge plans and actions at the right time
 5. Not providing proper escape hatches, mouseholes and safeguards
 6. Failure to encourage timely, knowledgeable staff participation
 7. Failure to obtain higher level approvals of goals and objectives
 8. Inadequate monitoring and control of costs, progress, documentation and resource allocation
 9. Poor assignment of duties, authority, responsibilities and actions;
and
 10. Failure to understand that planning is a major responsibility of the manager



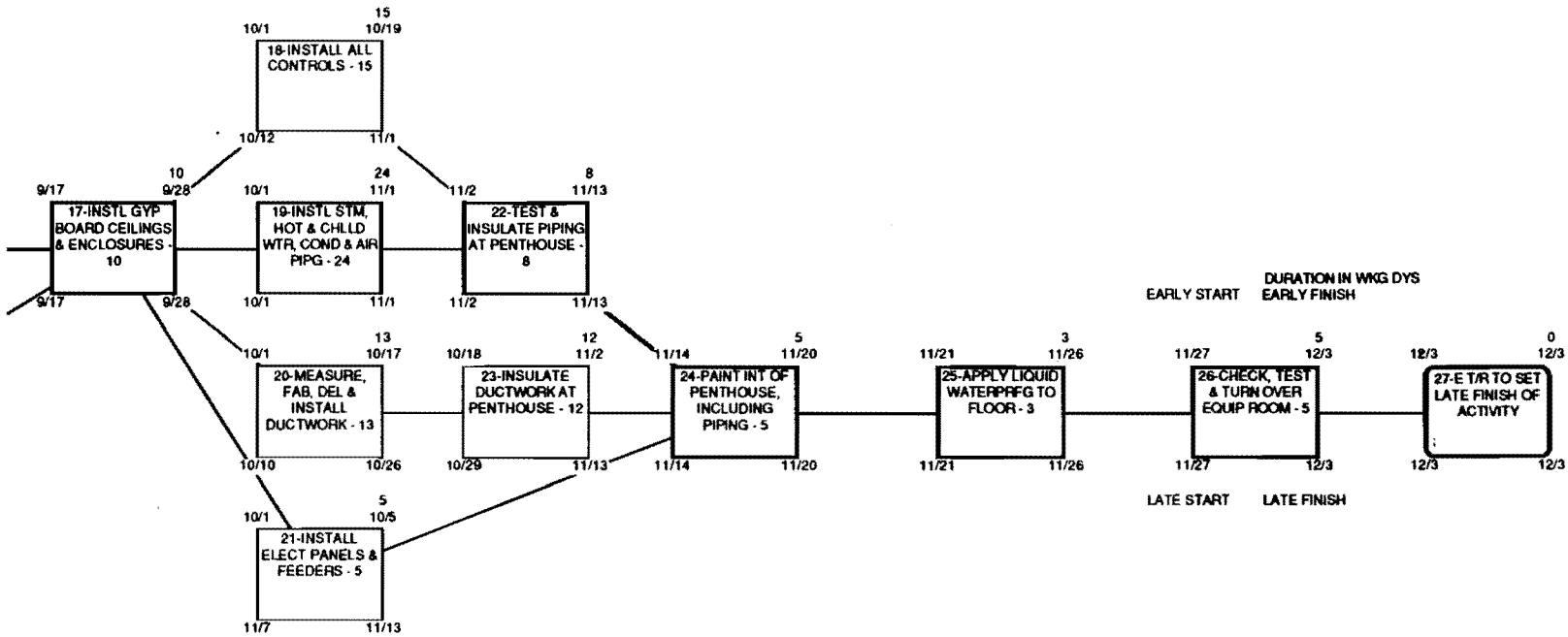
Reserved Node Nos.
21 24
22 25
23 26

SOLUTION TO EXERCISE # 1
ARROW DIAGRAM



ACTIVITY DATA KEY

47



55

Base Plan of Action

**NETWORK MODEL FOR
CLARION OFFICE BUILDING
PENTHOUSE MECHANICAL
EQUIPMENT ROOM #1**

Issue #1 - July 7
330 clarion base plan
disk 162

Reserved Activity Numbers

- 041 046
- 042 047
- 043 048
- 044 049
- 045 050

Luther Mechanical Contractors
Washington D.C.

sheet
ph-1