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Mission of the MDOT Project Planning and Scheduling Seminar

The most important result of this workshop and seminar being successfully completed is for those attending to have gained a hands-on understanding of planning and scheduling systems in common current use.

Additionally, those attending should have improved their ability to plan and schedule design and construction work on which they and their firms might be involved for MDOT.

date printed: 6/5/96

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GROUND RULES

1. Open your mind to new ideas & to new applications of old ideas.

2. Listen well & ask helpful questions.

3. Be selective in which techniques you use.

4. Learn more about the subjects of interest to you.

5. Relax and enjoy the company of your professional friends.

ho 368 Jan, 96

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THINKING PATTERNS

Why plan?.................to evaluate

Why translate?.........to communicate

Why control?...........to achieve

Why correct?...........to maintain

Why learn?..............to improve

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APPROACH PATTERNS

1. Improve capabilities
2. Gain control
3. Expand your conceptual grasp
4. Be creative
5. Experiment - in the low leverage areas
6. Continue to learn
7. Solve problems
8. Define goals & turn them into objectives
9. Teach others to achieve what is important

ho 271 Jan 96

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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!

ho 282 January, 96

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CONSTRUCTION CONTROL DOCUMENTS

• PROGRAM - A narrative statement of the project requirements, characteristics, and allowable costs.

• 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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TRADITIONAL PROJECT DELIVERY SYSTEM CHARACTERISTICS

1. Checks and balances normally built in from start

2. Construction decisions usually based on capital costs

3. Participant selection often made by cost competitive bidding

4. Job control is highly centralized in most stages

5. Project usually being built for owner/users

6. Contract documents completed before bidding

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

8. Bonding is often required

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

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

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

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NON TRADITIONAL PROJECT DELIVERY SYSTEM CHARACTERISTICS

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

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

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

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

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

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

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

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

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

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

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PARTICIPANTS IN DESIGNING & BUILDING ENVIRONMENTS

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

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

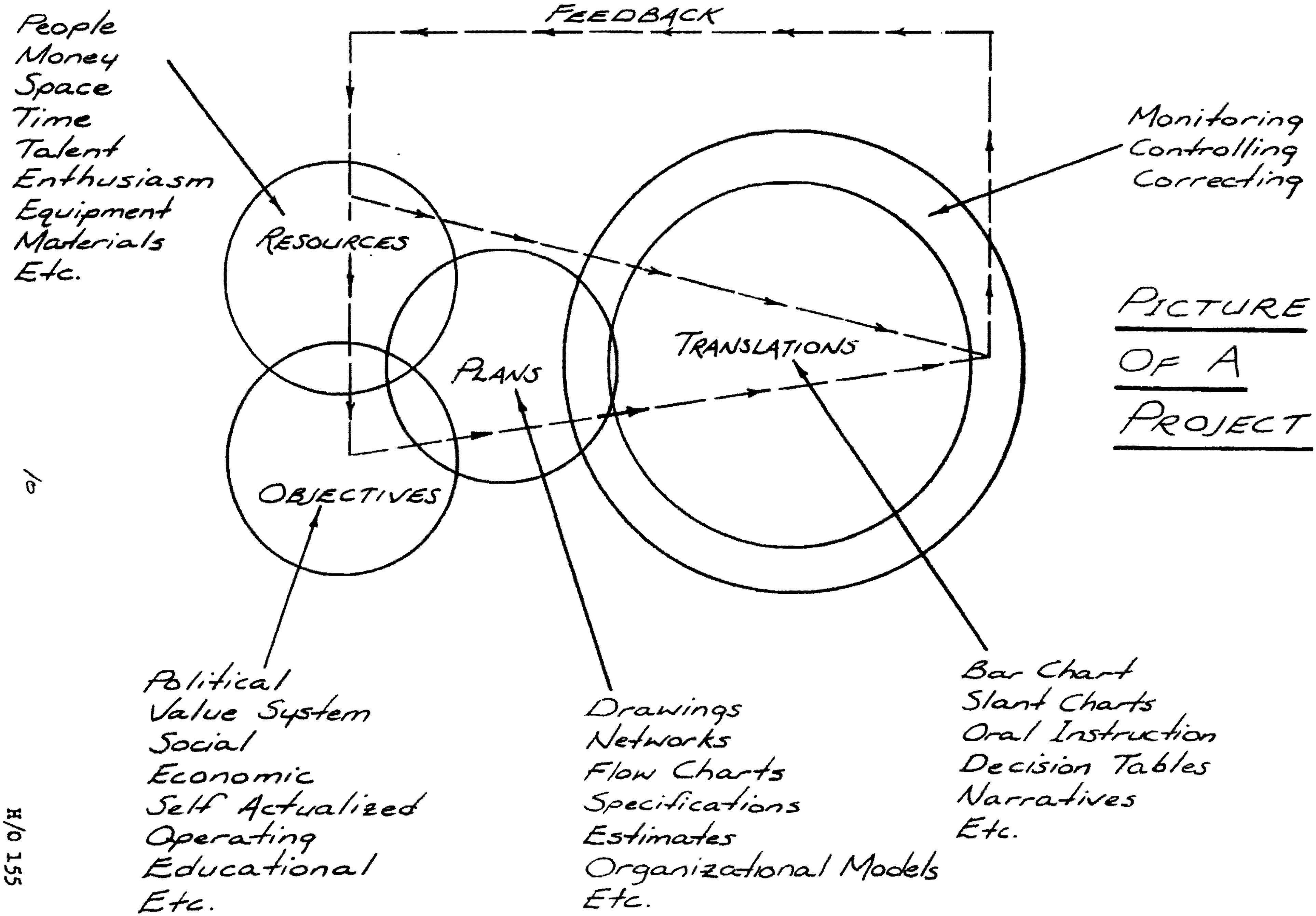
Translators - Those who translate the environmental program into construction language. Traditionally we think of the architect/engineer as the translator. However careful consideration of this matter shows there are many others who translate the conceiver's fundamental ideas into understandable, workable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

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

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

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

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



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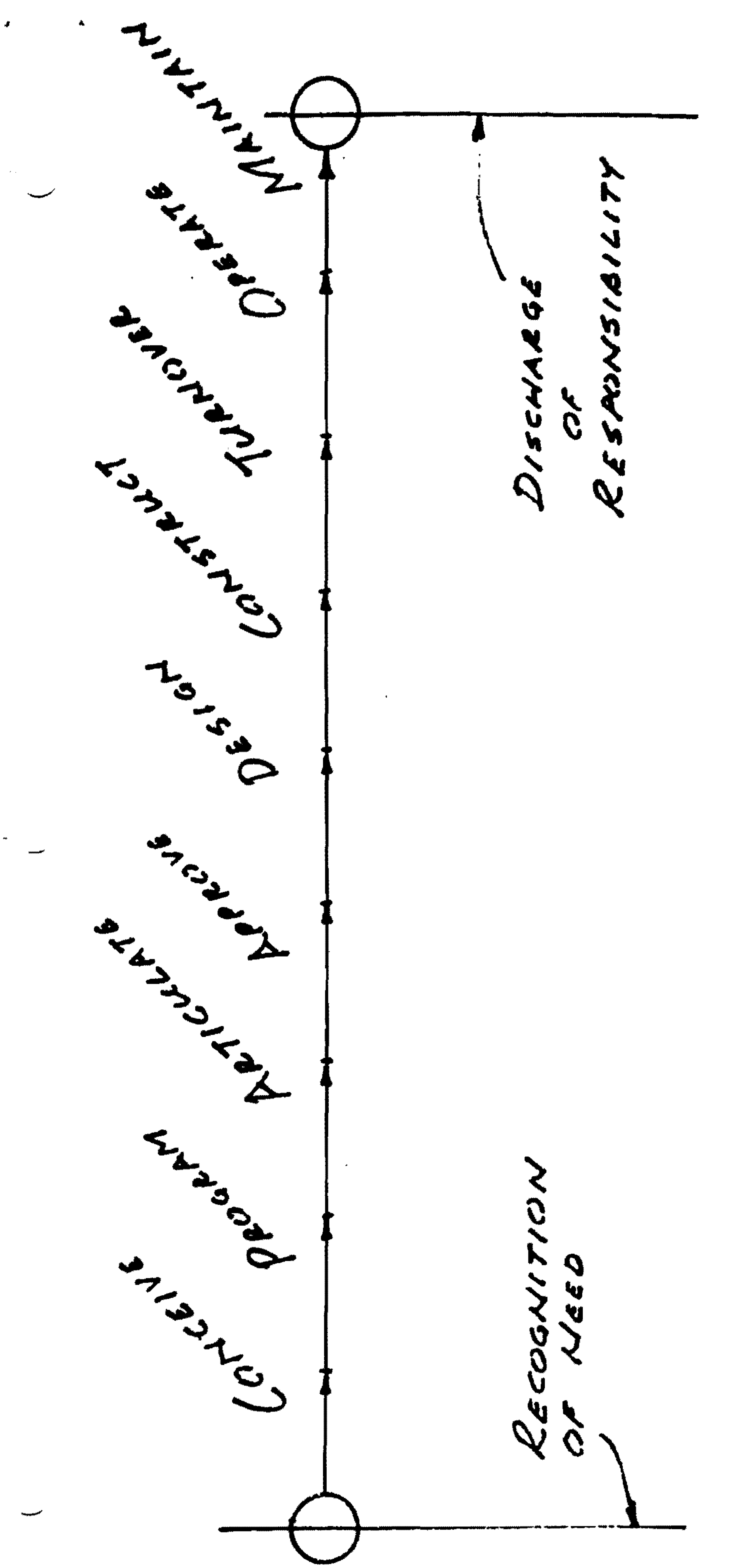
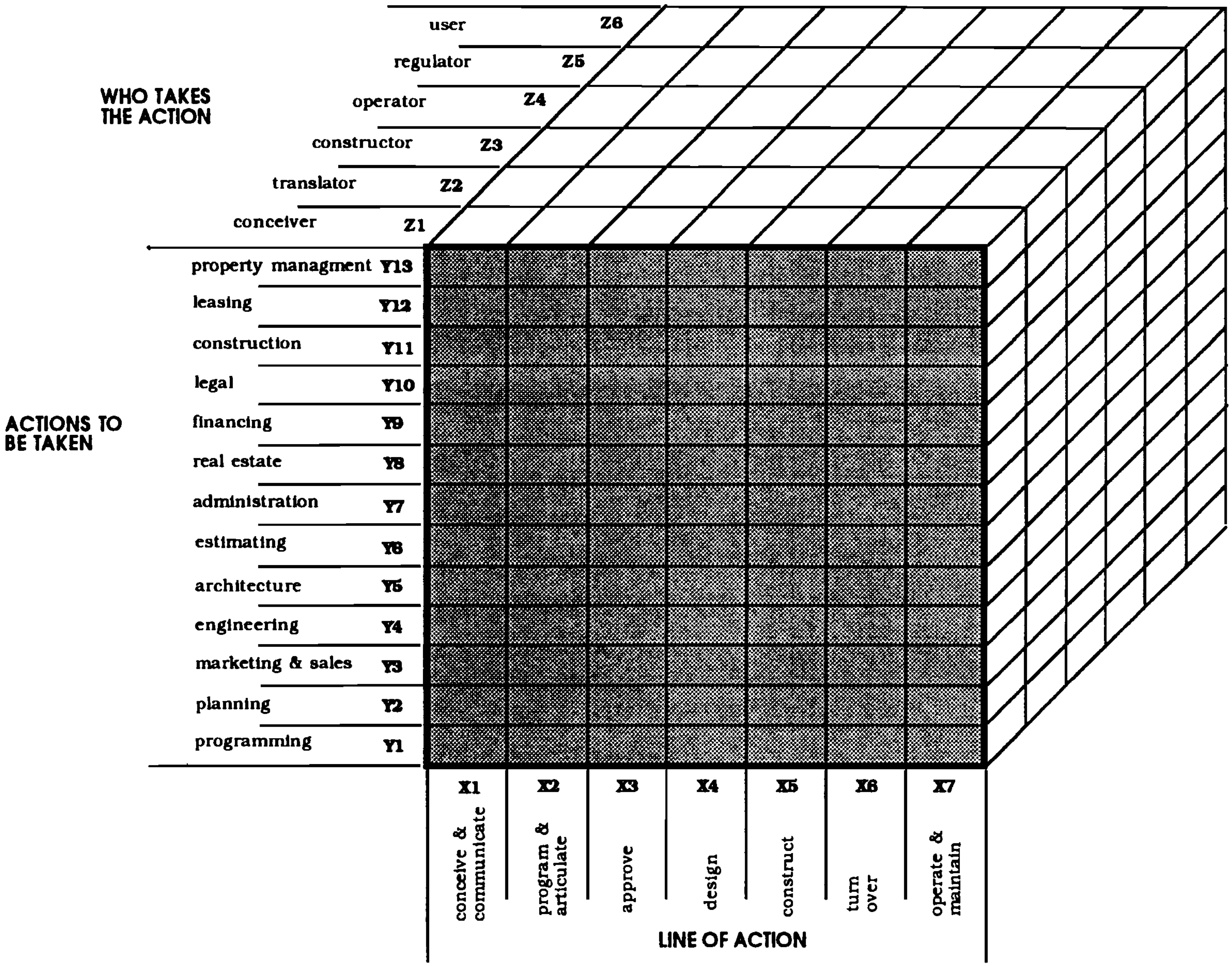
Line of Action



MACRO MATRIX BOUNDARIES OF DESIGN AND CONSTRUCTION



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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.

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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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.

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Total mentions of problem types from a list of 2,855 problems others cause us and problems we cause others, gathered from 23 partnering charter meetings. Problem types are listed by frequency of appearance

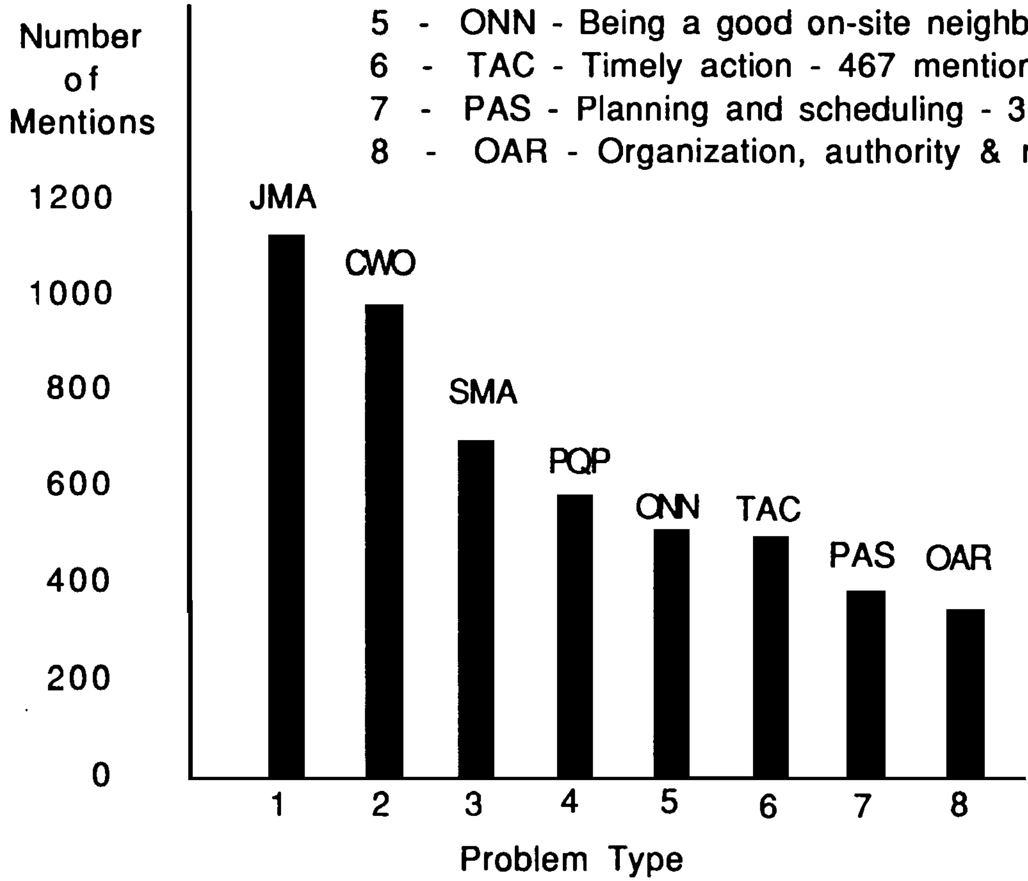
01. 1146 - Job management.
02. 0984 - Communicating with others.
03. 0684 - Staff morale and attitudes.
04. 0593 - Personnel quality and problems.
05. 0475 - Being a good on-site neighbor.
06. 0467 -Timely action.
07. 0396 - Planning and scheduling.
08. 0371 - Organization, authority, and responsibility.
09. 0288 - Work site conditions.
10. 0268 - Revision processing.
11. 0267 - Construction document quality.
12. 0233 - Program conditions.
13. 0205 - Submittal processing.
14. 0166 - Issue, conflict, and problem resolution.
15. 0166 - User group interaction.
16. 0145 - Equipment and material problems.
17. 0141 - Documents and documentation.
18. 0133 - Decision making.
19. 0125 - Procurement of materials and equipment.
20. 0116 - Project cost structure.
21. 0112 - Closing out the project.
22. 0097 - Contract interpretation.
23. 0097 - Quality management.
24. 0095 - Payment processing.
25. 0092 - Paper and administrative work.
26. 0090 - Approval processes.
27. 0088 - Being a good off-site neighbor.
28. 0073 - Time growth.
29. 0070 - Policies and procedures.
30. 0069 - Inspecting and testing.
31. 0069 - Staffing and manpower.
32. 0064 - Cost growth.
33. 0058 - Substitutions and alternates.
34. 0052 - Maintaining regular project evaluations.
35. 0052 - Safety.
36. 0049 - Regulatory agency matters.
37. 0022 - Constructibility.
38. 0022 - Training.
39. 0022 - Value engineering.
40. 0014 - Labor conditions.
41. 0014 - Legal matters.
42. 0011 - Backcharges.
43. 0011 - Financial problems.
44. 0010 - Weather conditions.
45. 0005 - Warranty conditions

From "Project Partnering for the Design and Construction Industry" by Ralph J. Stephenson, P.E.

- The eight most frequently mentioned design &construction problems. From a total of 2,855 responses to the question "what job difficulties are caused by us and by others?"

Problem Type

1 - JMA - Job management - 1146 mentions
2 - CWO - Communicating with others - 984 mentions
3 - SMA - Staff morale & attitudes - 684 mentions
4 - PQP - Personnel quality & problems - 593 mentions
5 - ONN - Being a good on-site neighbor - 475 mentions
6 - TAC - Timely action - 467 mentions
7 - PAS - Planning and scheduling - 396 mentions
8 - OAR - Organization, authority & responsibility - 371 mentions



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ho 468

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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!

ho 284 Jan, 96

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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 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 right the first time.

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 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 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.

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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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NETWORK PLANNING MINITEXT

Symbols

1. Arrow or task ⟶

   A single definable action (or a single grouping of a number of definable actions) requiring resources.

2. Circle or node ○

   The starting or ending point of a task .... a momentary point in time.

3. Dotted or dummy arrow ---->

   A symbol representing the existence of a relationship between tasks. Dummies have no resources allocated.

   Note: 95% of time a dummy goes from end of one task to start of another.

KEEP SYMBOLS SIMPLE !

Rules of Job Planning

1. All tasks preceding any single task must be complete before that single task can start.

2. The logic plan represented by a series of single tasks, nodes and dummies must be explicit.

Steps in Network Planning

1. Define scope of work.
2. Draw logic plan.
3. Approve logic plan.
4. Assign durations.
5. Compute ES, LF and TF
6. Analyze and recompute, if necessary. (May make additional resource allocation)
7. Issue.

Rules for Numbering Nodes

1. It is recommended the numbering sequence move down and to the right.

2. Normally, twenty numbers per hundred should be reserved for future use, and noted on diagram.

3. A node, having two or more arrows entering, or two or more arrows leaving, is numbered.

4. A node, having a single arrow entering, and a single arrow leaving, does not have to be numbered unless required by rule 5.

5. No more than one node in a sequence should be without a number.

Note: Node numbers are used to identify tasks. The final measure of whether node numbers are assigned correctly is whether any task in the network can be identified uniquely (the only one in the network) by its pair of node numbers.

_i_ is the initial node number designation.

_j_ is the end node number designation.

NETWORK PLANNING MINITEXT

Symbols

1. a. Task - for arrow diagramming 

   b. Task - for precedence diagramming 

   Definition - A single definable action (or a single grouping of a number of definable actions) requiring resources.

2. a. Circle or node - for arrow diagramming 

   b. No comparable symbol for precedence diagramming

   Definition - The starting or ending point of a task .... a momentary point in time.

3. a. Dotted or dummy arrow - for arrow diagramming 

   b. Solid relation arrow - for precedence diagramming 

   Definition - A symbol representing the existence of a relationship between tasks. Dummies and relational arrows have no resources allocated to them.

KEEP SYMBOLS SIMPLE!

Rules of Job Planning

1. All tasks precededing any single task must be complete before that single task can start.
2. The logic plan represented by a series of tasks, nodes, and dummies or relational arrows must be explicit.

Steps in Network Planning

1. Thoroughly define the scope of work - use random laundry list technique.
2. Draw the logic plan.
3. Approve the logic plan.
4. Assign durations to each task..
5. Compute the early start (ES), early finish (EF), late start (LS) and late finish (LF) for each task.
6. Analyze the network for its validity and revise as required.
7. Issue the network model and the appropriate translations.

Rules for numbering nodes (for arrow diagramming) and tasks (for precedence diagramming)

The i node is the initial node, and the j node is the end node of a task in arrow diagramming. In precedence diagramming the task has only a single identification number.

1. The numbering sequence should move down and to the right.
2. Normally, 20 numbers per 100 per sheet should be reserved for future use.
3. In arrow diagramming a node having two or more arrows entering or leaving is numbered.
4. In arrow diagramming a node having a single arrow entering or leaving does not have to be numbered unless the immediately preceding node has not been numbered.
5. In precedence diagramming all activities are numbered.

ho 261 Nov, 93

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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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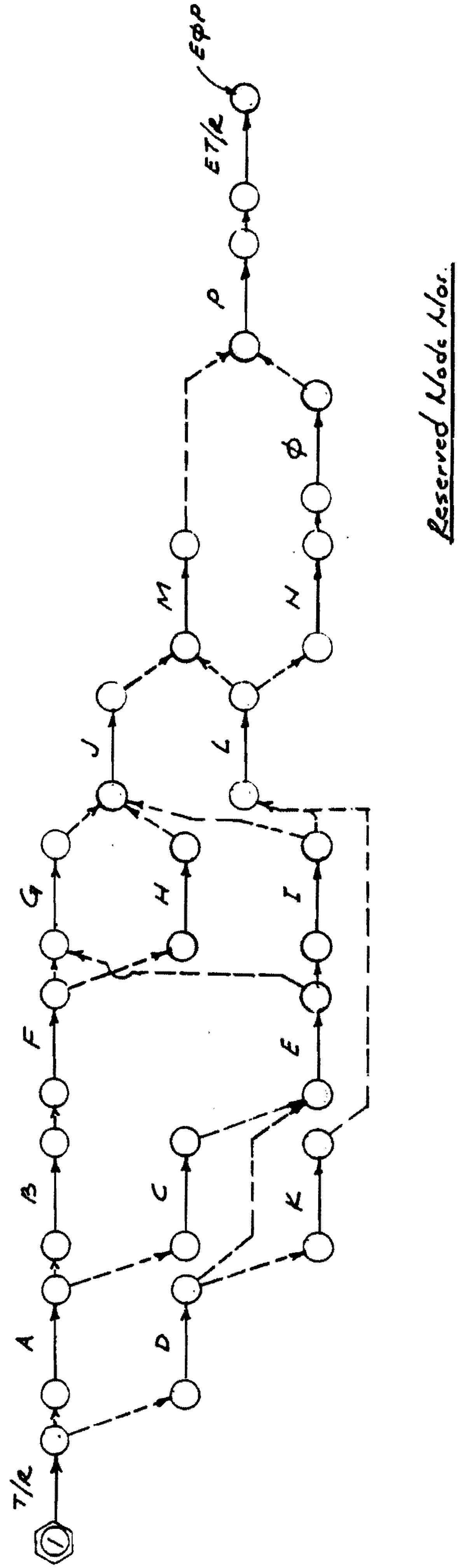
SOLUTION TO EXERCISE #1
ARROW DIAGRAM



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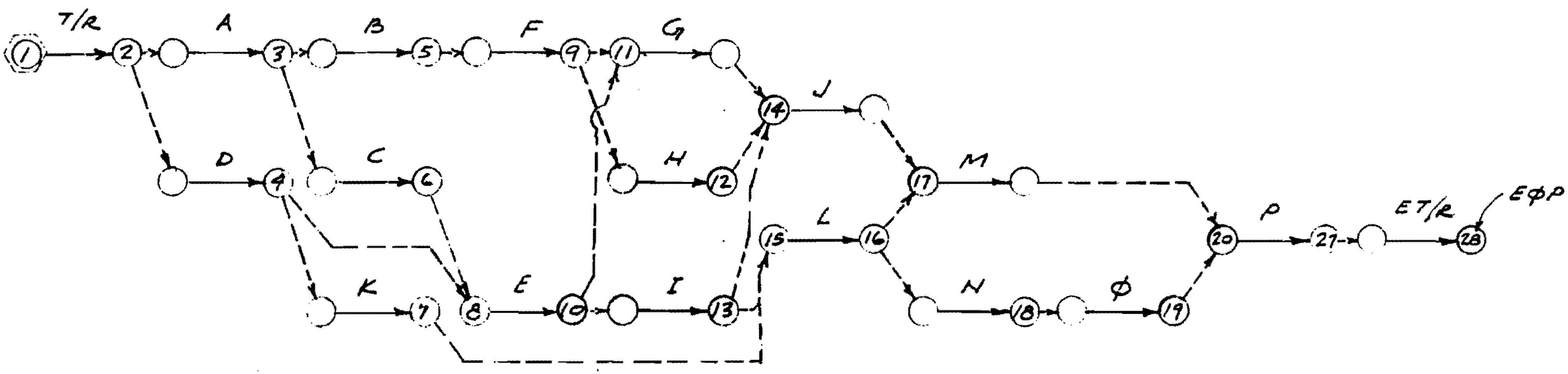

Reserved Node Nos.

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SOLUTION TO EXERCISE #1
ARROW DIAGRAM

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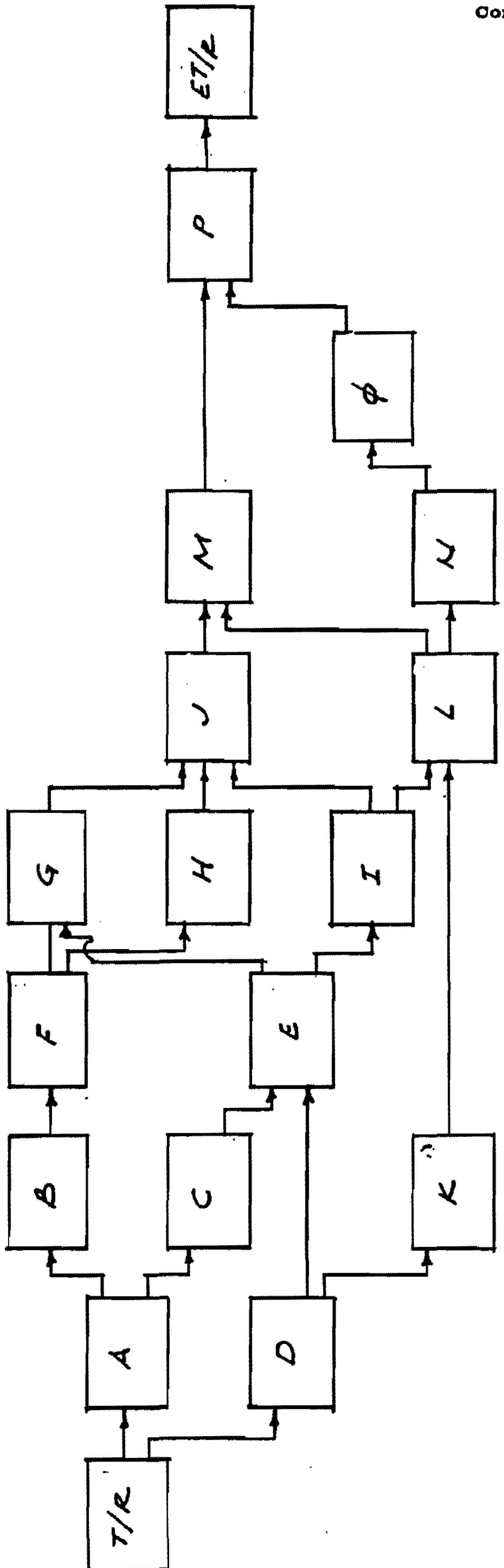

SOLUTION TO EXERCISE #1
PRECEDENCE DIAGRAM

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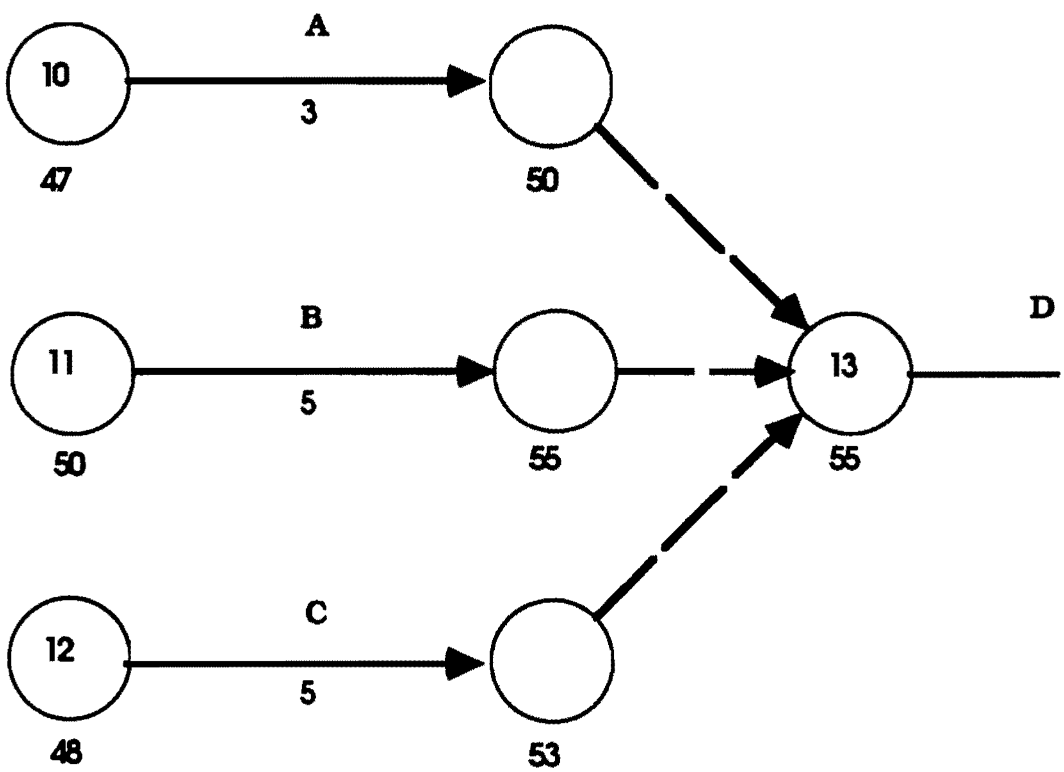
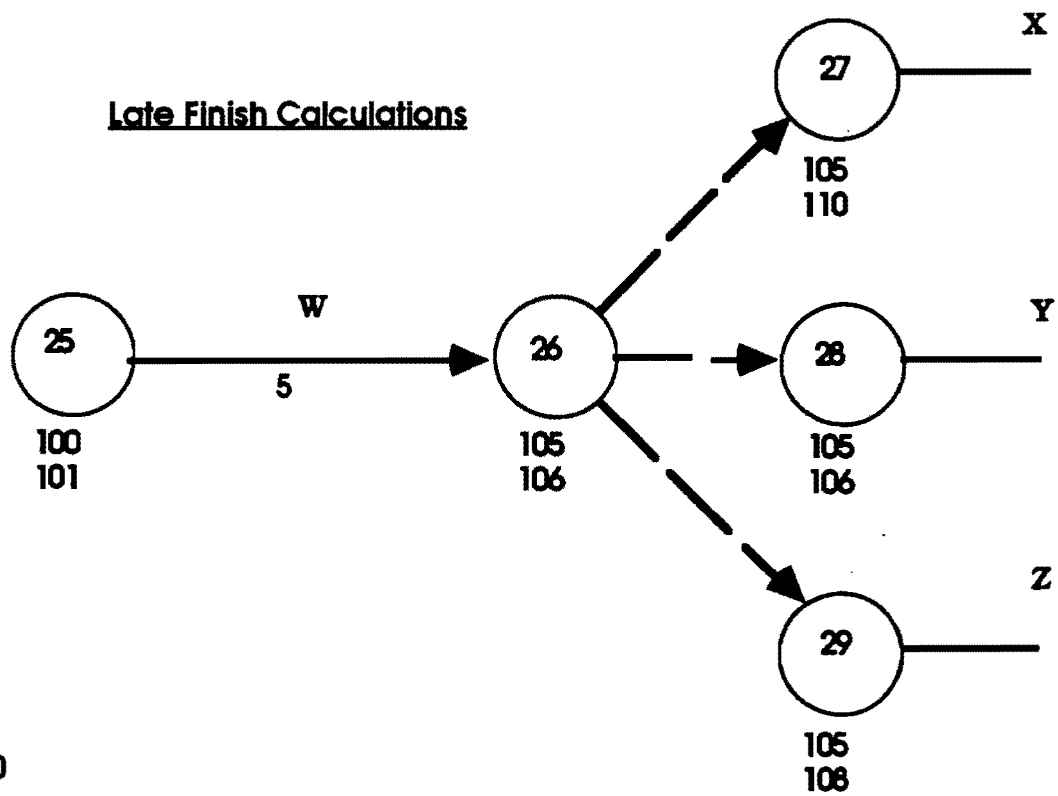
<u>Early Start Calculations</u>



<u>Late Finish Calculations</u>



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Mt. Pleasant, Michigan 48858, ph 517 772 2537

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CPM EXERCISE #2

Z, T, & L are the first tasks and can be concurrent.
X must be complete before N can start.
Q follows H.
C must follow L and precede W.
S follows B & W and precedes D & V.
N must be complete before M can begin.
K & D must be complete before R & X can start.
A must follow Z.
G precedes Q and follows V.
H cannot begin until F & R are complete.
D must be complete before F can start.
U follows B and precedes K.
W cannot start until T is complete.
M is the last task & follows Q.
B cannot begin until A & T are complete.

Z2	C6	M4
T4	W1	R5
L1	S3	U2
X3	B1	A2
N4	D2	F3
Q2	V3	G4
H3	K1	

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EXERCISE #3

1. Project begins with a time restraint (T/R) followed directly by task A.

2. Task A restrains tasks B and G.

3. Task H follows task G.

4. Task M follows task G and restrains task N.

5. Task C is restrained by B and restrains D, E and I.

6. Task I is restrained by H and restrains J, K and O.

7. Task O is restrained by N and restrains P and Q.

8. Tasks D and E restrain F.

9. Task L cannot start until J and K are complete.

10. Tasks P and Q must be complete before R can start.

11. Tasks F, L and R are not related to each other but can be completed simultaneously.

12. When tasks F, L and R are complete the project is complete.

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EXERCISE #4

- Project starts with T/R task A
- Tasks B, C, D follow task A directly and can be concurrent
- Task E is restrained by task C and restrains tasks G, H and J
- Task F follows task C and precedes task J
- Tasks G and H are restrained by task D
- Task K is restrained by tasks G, H and J and must be done before tasks N and M can begin
- Task L is restrained by task K and must be complete before task P can start
- Task P is restrained by tasks M and N and restrains task Q from beginning
- Task R cannot begin until task Q is complete and R is the last task in the network
- Task B restrains tasks G, H and J

CPM
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H/O 89

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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)

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NETWORK PLANNING ABBREVIATIONS

A	Area
ABV	Above
AC	Air condition
ACCESS	Accessories
ACOUST	Acoustic
ACT	Activate
AD	Approve, deliver
AFD	Approve, fabricate, deliver
AL	All
ALT	Alteration
ALUM	Aluminum
AP	Approve
ASMBLY	Assembly
ASP	Asphalt
/	And
⁄	At
BAL	Balance
BALC	Balcony
BD	Board
BKFL	Backfill
BKFLG	Backfilling
BLDG	Building
BLKG	Blocking
BLT	Bolt
BM	Beam
BRG	Bearing
BRK	Brick
BSE	Base
BSMT	Basement
CASD	Check and approve shop drawings
C/B	Columns and beams
CER	Ceramic
CL	Column line
CLG	Ceiling
CLKG	Calking
CNTL	Control
CO	Cutoff
COATG	Coating
COL	Column
COMP	Complete
CONC	Concrete
CONCT	Connect
COND	Conduit
CONN	Connection
CONST	Construct
CONT	Continue
COOLG	Cooling
CONVTR	Convector
CP	Cap
CP	Complete
CT	Ceramic tile
CVR	Cover
D	Dummy
D	Duration
DAFD	Detail, approve, fabricate, deliver
DEMOL	Demolish
DIFF	Diffuser
DK	Deck
DPPRF	Damp proof
DR	Door
DRINKG	Drinking
DRN	Drain
DUCTWK	Ductwork
DWG	Drawing
E	East
EF	Early finish
EFRP	Excavate, form, reinforce, pour
EIB	Excavate, install, backfill
ELEC	Electric
ELEV	Elevator
ENERG	Energize
EQUIP	Equipment
ERCT	Erect
ES	Early start
E T/R	End time restraint
EXC	Excavation
EXP	Exposed
EXT	Exterior
EXTG	Existing

F	For
FAB	Fabricate
FD	Fabricate, deliver
FDN	Foundation
FFG	Fill, fine grade
FINL	Final
FL	Floor
FLL	Fill
FLSHG	Flashing
FM	Form
FMG	Forming
FN	Finish
FOG	Floor on grade
FP	Fire protection
FRM	Frame
FRP	Form, reinforce, pour
FRPS	Form, reinforce, pour, strip
FTG	Footing
FX	Fixture
GLAZG	Glazing
GRD	Grade
GRDR	Girder
GRDG	Grading
GRLL	Grill
GRATG	Grating
GUT	Gutter
HD	Head
HDWE	Hardware
HM	Hollow metal
HTR	Heater
HU	Hookup
I	Iron
I/C	In ceiling
IFW	In floor work
INCLDG	Including
INSTL	Install
INSTLG	Installing
INSUL	Insulation or Insulate
INT	Interior
ITMS	Items
JC	Janitor closet
LAYG	Laying
LF	Late finish
LN	Line
LS	Late start
LT	Light
LTH	Lath
LVL	Level
MACH	Machinery
MECH	Mechanical
MEMBRN	Membrane
MEZZ	Mezzanine
MH	Manhole
MLLWK	Millwork
MISC	Miscellaneous
MK	Make
MSNRY	Masonry
MTL	Metal
MTR	Motor
N	North
NLR	Nailer
NT	Not
OFD	Order, fabricate, deliver
OH	Overhead
OPNG	Opening
PARTN	Partition
PC	Precast
PERIM	Perimeter
PH	Penthouse
PHS	Phase
PILG	Piling
PIPG	Piping
PKG	Parking
PL	Plate
PLCP	Pile cap
PLG	Plug
PLSTC	Plastic
PLSTR	Plaster
PLTFM	Platform
PLUMBG	Plumbing
PNL	Panel
PNT	Paint
PNTG	Painting

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POURG	Pouring
PRES	Pressure
PRM	Primary
PROT	Protection
PRS	Piers
PVG	Paving
RAD	Radiant
RAILG	Railing
RD	Road
REINF	Reinforcing
REL	Relocate
REQD	Required
RESIL	Resilient
RESTL	Reinforcing steel
REMV	Remove
RFG	Roofing
RISR	Riser
RM	Room
RR	Railroad
RSC	Rolling steel curtain
RUBB	Rubber
RUFF	Rough
S	South
SBSTNTLY	Substantially
SDWK	Sidewalk
SETTG	Setting
SEWR	Sewer
SHT	Sheet
SIDG	Siding
SLB	Slab
SOG	Slab on grade
SPDRL	Spandrel
SPRNKLR	Sprinkler
SS	Structural steel
SS	Substation
ST	Start
ST	Street
STD	Stud
STL	Steel
STM	Steam
STR	Stair
STRP	Strip
STRUCT	Structural
SUPT	Support
SURF	Surface
SUSP	Suspension
SWTCHGR	Switchgear
SYS	System

TEMP	Temporary
TFT	Total float time
TK	Tank
TO/R	Toilet room
TPG	Topping
T/R	Time restraint
TR	Trim
TRANSFRMR	Transformer
TRD	Tread
TST	Test
TWR	Tower
UG	Underground
ULG	Unloading
UTIL	Utility
US	Underside
U T/R	Updating time restraint
VB	Vapor barrier
VENTILTR	Ventilator
VEST	Vestibule
W	West
WASHG	Washing
WK	Work
WLKWY	Walkway
WLL	Wall
WNDW	Window
WP	Waterproofing
WTR	Water
W T/R	Weather time restraint

Factors in evaluating network models - ho 260

Factors are to be rated from 1 to 10 with 1 meaning the network fails to satisfy even mininum requirements of the factor. 10 means the factor is satisfied fully and expertly.

__1. Quality of goal & objective definition
Do the goals & objectives meet the needs of the project & of the project organization?

__2. Completeness of laundry list
Does the laundry list contain all reasonable activities to be accomplished for successful completion of the project?

__3. Accuracy of logic relationships
Are the interrelationships between activities shown correctly? Are concurrent and sequential tasks properly diagrammed?

__4. Completeness of activity description
Is the exact definition of each activity apparent from reading the description?

__5. Reasonablness of duration assignment
Do the durations shown represent times to do the activity that are reasonable, and achieve the objectives of the project?

__6. Correctness of calculations
Are the ES/EF's & LS/LF's properly computed?

__7. Quality of network appearance
How well was the diagram presented? Could you understand what the job was all about from reading the network without explanation?

__8. Presence of abbreviations,task #'s,issue #'s,sheet #'s,codes & dates
Is there enough supplementary information on the logic plan so you can read it without having someone explain it to you?

__9. Overall appearance of network
Does the overall plan appearance reflect quality & competence of execution? Does it give you confidence that the person who prepared it knew what they were doing?

_____ Total
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_____ Average (total divided by 9)

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FIRST LEVEL NETWORK - Summary Management Diagram

A diagram prepared very early in the project life. The summary network provides an overall look at the entire program, grouping major operations and containing tasks with durations from 10 to 50 working days. This network should normally contain 25 to 70 tasks exclusive of dummies.

SECOND LEVEL NETWORK - Working Diagram

A diagram prepared when most data about major tasks is available and the actual project work is about to begin or is underway. The working network should be sufficiently detailed so as to define key points or milestones at closely spaced intervals. It should contain tasks with durations of one to 10 working days. The second level network is the one most commonly used during project implementation.

THIRD LEVEL NETWORK - Key Operation Sub Diagram

A diagram prepared for the detailed planning of smaller operations within the second level network. Task durations usually range from one to five working days. Most often these networks are prepared by or for sub-contractors, vendors, suppliers, manufacturers and conform to established early start/late finish limits determined from the second level network.

Laundry list for pile test

Pueblo Plant
Nebraska Public Power Distribution District
Oaski, Nebraska
Introduction

You are a facilities engineer for the Nebraska Public Power Distribution District. Your boss has assigned you to be project manager for construction of a new Pueblo Plant in Osaki, Nebraska. He has asked you to plan and execute the installation of test piles to help decide the final design characteristics of the power plant foundation.

You have completed selection of the type of test pile to be used and must now write the test specification, select the number of piles and their location, and lay out the piles in the field. There is a possiblility of saving & using the test pile cluster for the total building foundation group. Therefore you plan to retain a test contractor that could also be awarded the full piling installation contract

Plan the entire test pile installation process.

Laundry list - at random unnumbered

Select test pile locations
Record test load results
Load piling
Order testing equipment
Decide whether test piles remain as permanent piles
Select number of test piles
Deliver test pile materials
Retain test pile contractor
Prepare test procedures
Approve test pile results
Remove test loads
Approve test procedures
Order test pile materials
Lay out test piles in field
Deliver testing equipment
Drive & fill test piles

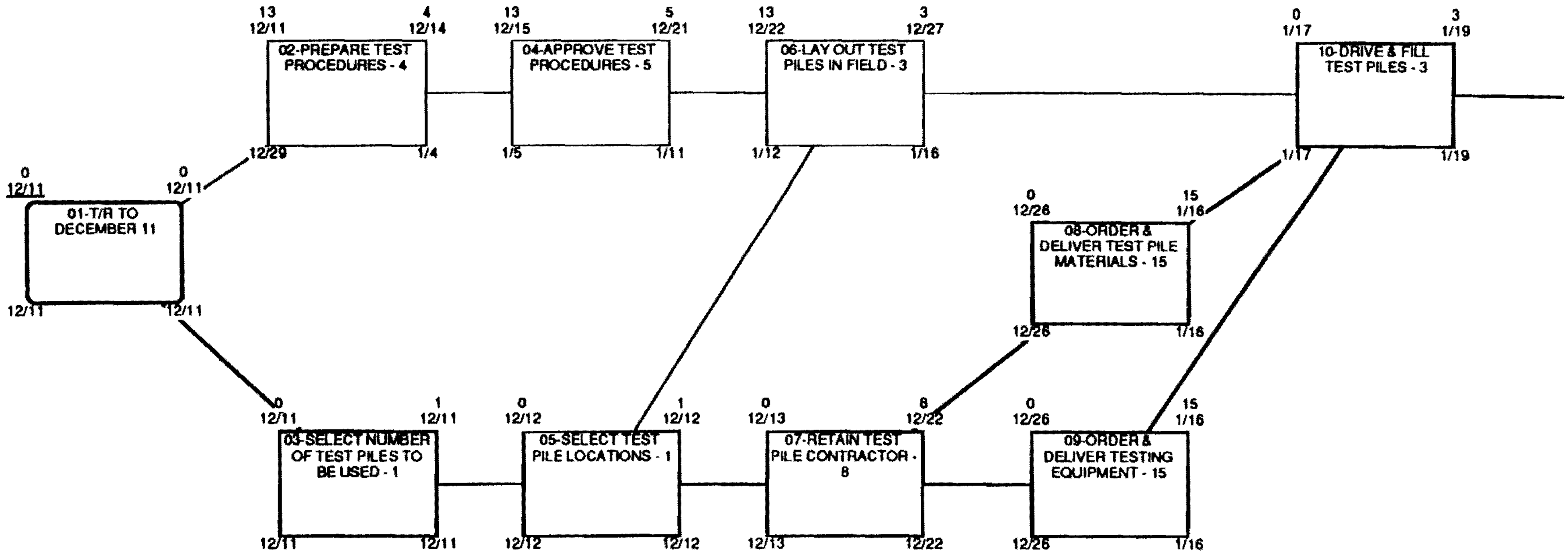
Laundry list - at random numbered in rough action sequence

002 - Select test pile locations
010 - Record test load results
008 - Load piling
005 - Order testing equipment
011 - Decide whether test piles remain as permanent piles
001 - Select number of test piles
006 - Deliver test pile materials
004 - Retain test pile contractor
001 - Prepare test procedures
011 - Approve test pile results
009 - Remove test loads
003 - Approve test procedures
005 - Order test pile materials
004 - Lay out test piles in field
006 - Deliver testing equipment
007 - Drive & fill test piles

Laundry list - numbered & ordered

001 - Prepare test procedures
001 - Select number of test piles
002 - Select test pile locations
003 - Approve test procedures
004 - Lay out test piles in field
004 - Retain test pile contractor
005 - Order test pile materials
005 - Order testing equipment
006 - Deliver test pile materials
006 - Deliver testing equipment
007 - Drive & fill test piles
008 - Load piling
009 - Remove test loads
010 - Record test load results
011 - Approve test pile results
011 - Decide whether test piles remain as permanent piles

HO 317 Nov 93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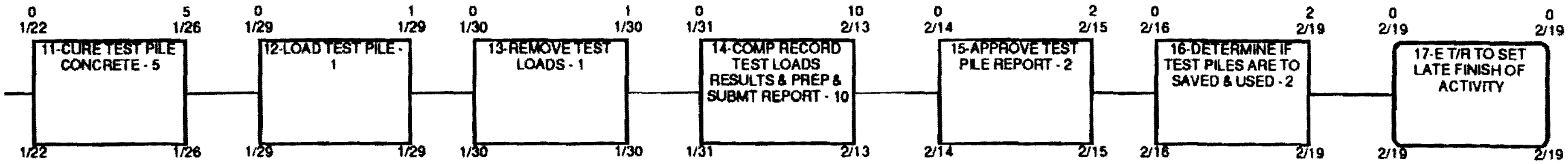
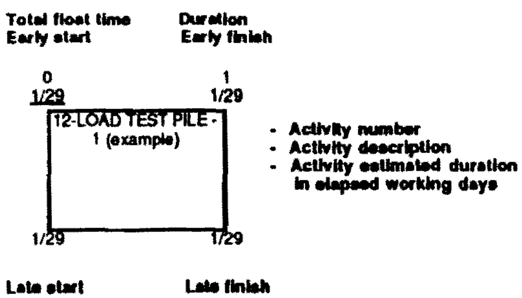
02-PREPARE TEST PROCEDURES - 4
13 12/11 4 12/14
12/29 1/4
04-APPROVE TEST PROCEDURES - 5
13 12/15 5 12/21
1/5 1/11
06-LAY OUT TEST PILES IN FIELD - 3
13 12/22 3 12/27
1/12 1/16
10-DRIVE & FILL TEST PILES - 3
0 1/17 3 1/19
1/17 1/19
08-ORDER & DELIVER TEST PILE MATERIALS - 15
0 12/26 15 1/16
12/26 1/16
03-SELECT NUMBER OF TEST PILES TO BE USED - 1
0 12/11 1 12/11
12/11 12/11
05-SELECT TEST PILE LOCATIONS - 1
0 12/12 1 12/12
12/12 12/12
07-RETAIN TEST PILE CONTRACTOR - 8
0 12/13 8 12/22
12/13 12/22
09-ORDER & DELIVER TESTING EQUIPMENT - 15
0 12/26 15 1/16
12/26 1/16





ACTIVITY DATA KEY

Issue #1 - January 6, 1996
354 tst pl ntwk 318 - disk 203
ho 354 - Jan, 96

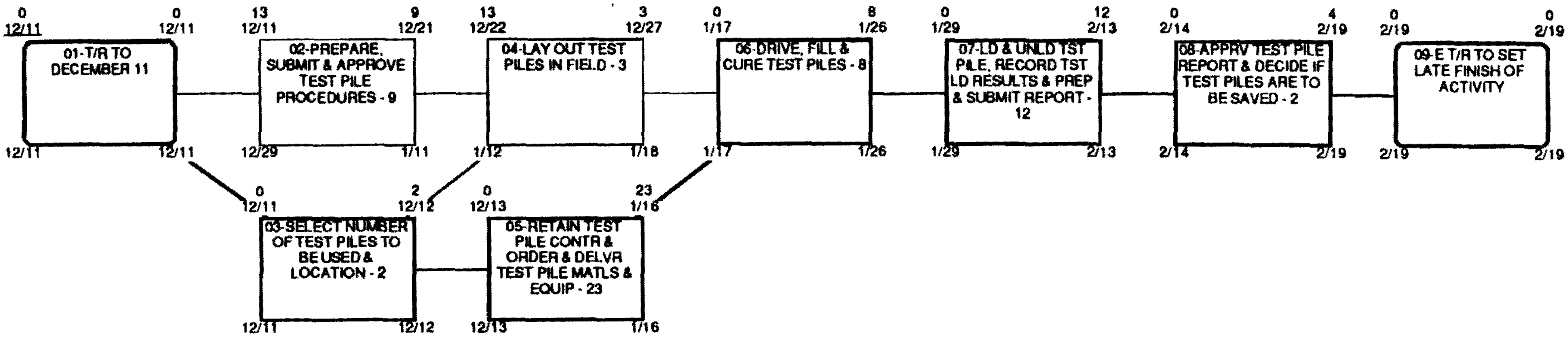
Reserved activity numbers

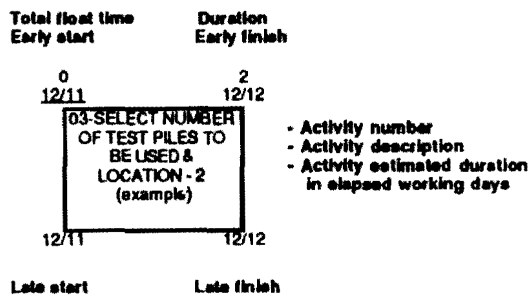
41	46
42	47
43	48
44	49
45	50

NETWORK MODEL FOR TEST PILE INSTALLATION - NEBRASKA PUBLIC POWER DISTRIBUTION DISTRICT PUEBLO PLANT - OSAKI, NEBRASKA

Ralph J. Stephenson PE
Consulting Engineer
323 Hiawatha Drive
Mt. Pleasant, Michigan 48858
ph 518 772 2537

SHEET #1





ACTIVITY KEY

SUMMARY NETWORK MODEL FOR TEST PILE INSTALLATION - NEBRASKA PUBLIC POWER DISTRIBUTION DISTRICT PUEBLO PLANT - OSAKI, NEBRASKA

Issue #1 - January 6, 1996
353 tst pl ntwk - disk 203
ho 353 - Jan 96

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Reserved activity numbers

41	46
42	47
43	48
44	49
45	50

SHEET SM-1

Ralph J. Stephenson PE PC
Consulting Engineer

The Domino Move Case Study

An exercise in planning successive moves

You are the project manager on a domino move realignment of space in a new 2nd floor addition to the Lucky, Florida social security office. The addition has been closed in and base building work is complete ready for tenant fit up.

The moves needed to complete tenant fit up involve shifting from 1st floor occupancy to a combined 1st and 2nd floor use. Each move from one space to another is estimated to require 2 working days.

Remodeling will require the following times:

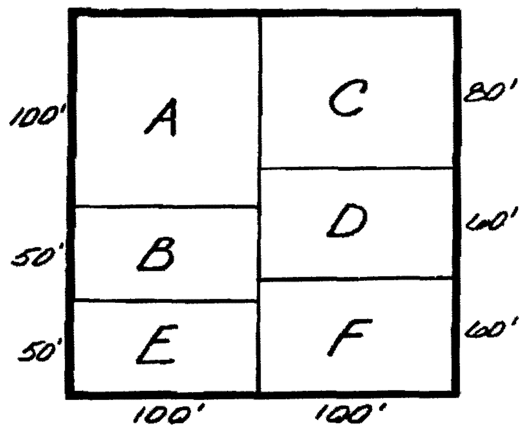
• Remodeling existing A & B to new C	30 working days
• Remodeling existing C to new D	15 working days
• Remodeling existing E to new west F	20 working days
• Remodeling existing D to new north F	10 working days

Note: The F space is to be remodeled in two phases while being occupied by staff.

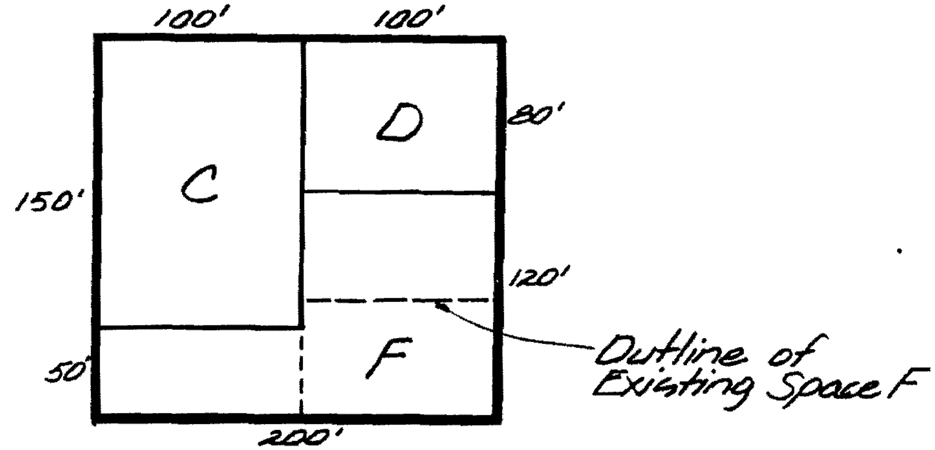
To do

1. Prepare a network logic model for the move and remodeling sequence.
2. Quantify and calculate the logic model.
3. Analyze the move sequence and identify when you want to move E and remodel F.

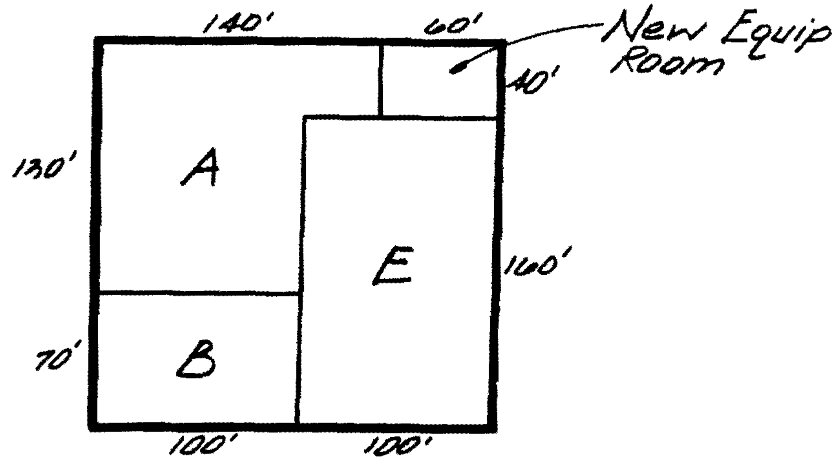
RALPH J. STEPHENSON, P.E., P.C.
CONSULTING ENGINEER



EXISTING 1ST FL



NEW 1ST FL

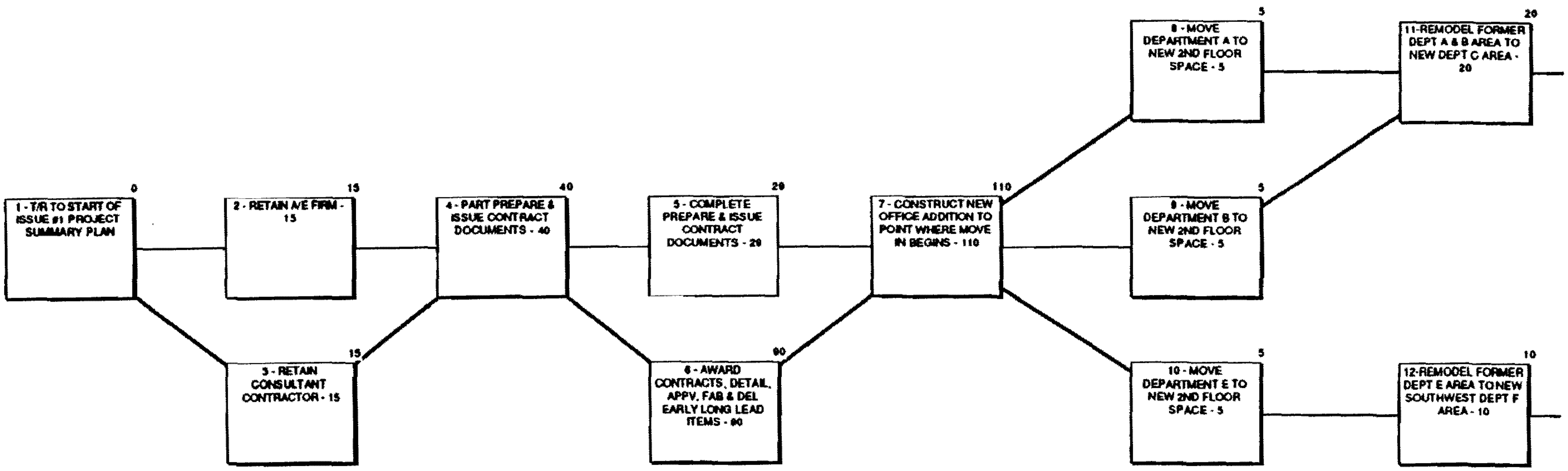


NEW 2ND FL

NORTH

SCALE: 1" = 100'

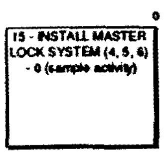
SUMMARY MOVE PLAN



Reserved activity numbers

041	046
042	047
043	048
044	049
045	050

Duration



- Activity number
- Activity description
- Resource codes
- Estimated duration in elapsed working days

Activity Key

Issue #1 - January 10
247 bengst smry plan - disk

SUMMARY NETWORK MODEL - BENGST CORPORATION EXPANSION PLAN TARRY, MONTANA

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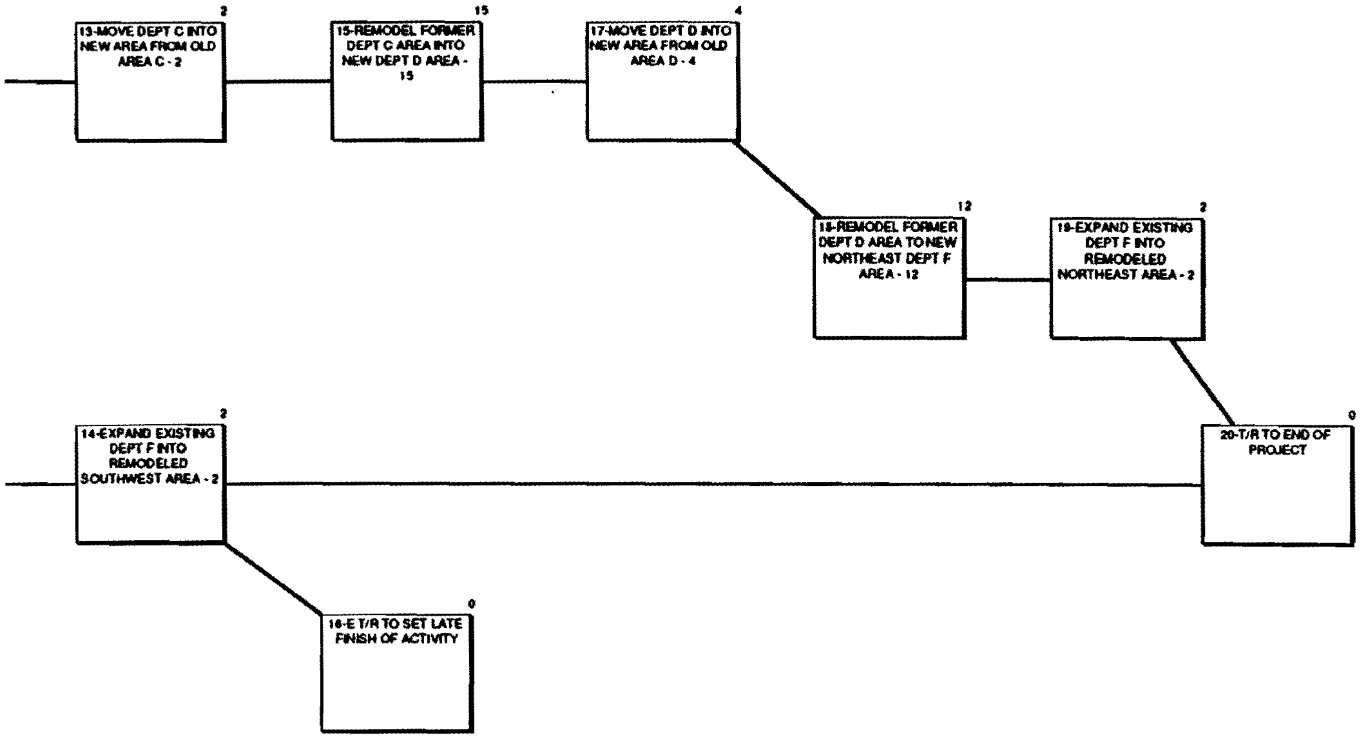
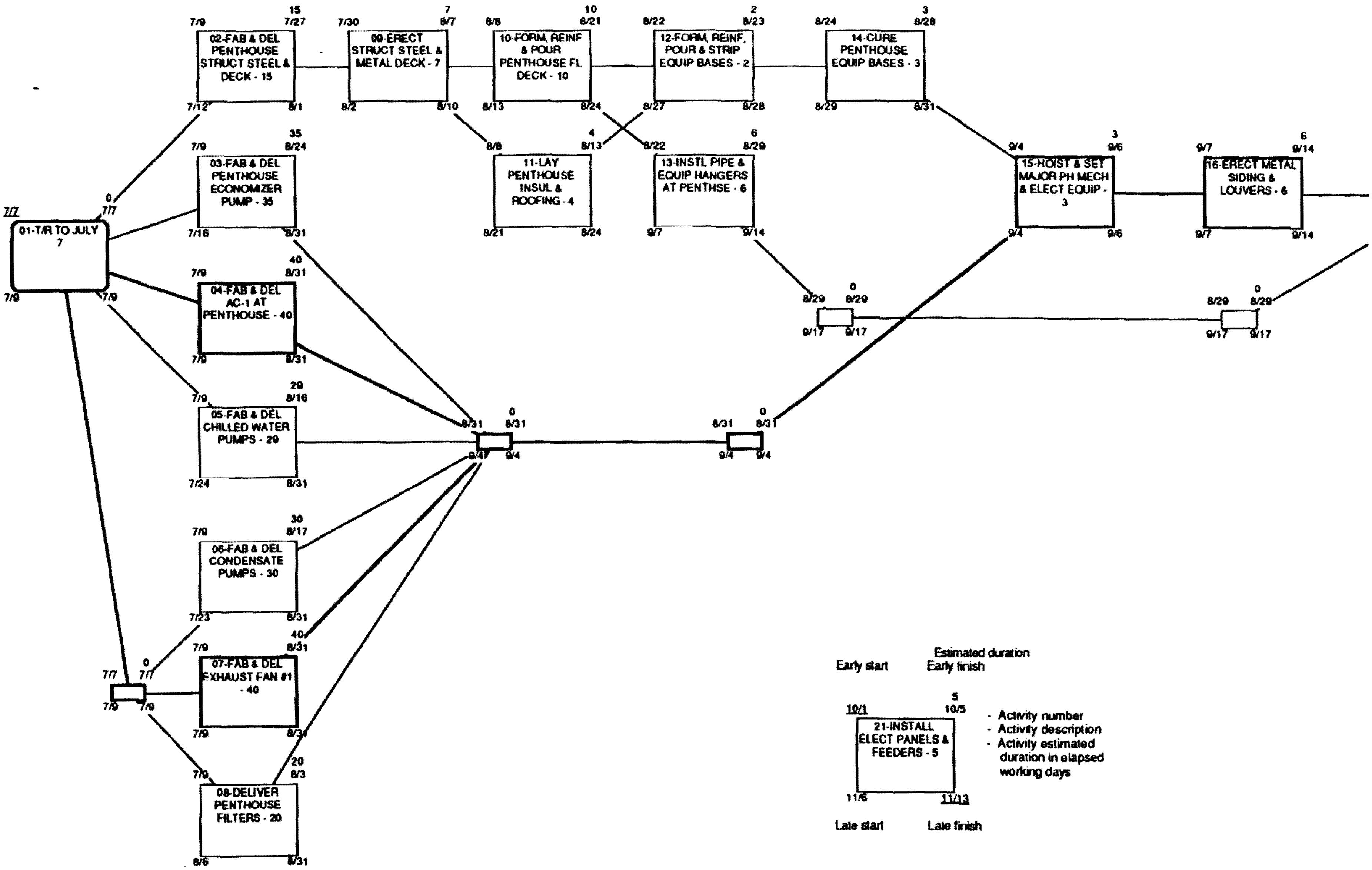
SHEET #SM1


2
13-MOVE DEPT C INTO NEW AREA FROM OLD AREA C - 2
15
15-REMODEL FORMER DEPT C AREA INTO NEW DEPT D AREA - 15
4
17-MOVE DEPT D INTO NEW AREA FROM OLD AREA D - 4
12
18-REMODEL FORMER DEPT D AREA TO NEW NORTHEAST DEPT F AREA - 12
2
19-EXPAND EXISTING DEPT F INTO REMODELED NORTHEAST AREA - 2
2
14-EXPAND EXISTING DEPT F INTO REMODELED SOUTHWEST AREA - 2
0
20-T/R TO END OF PROJECT
0
16-E T/R TO SET LATE FINISH OF ACTIVITY

50



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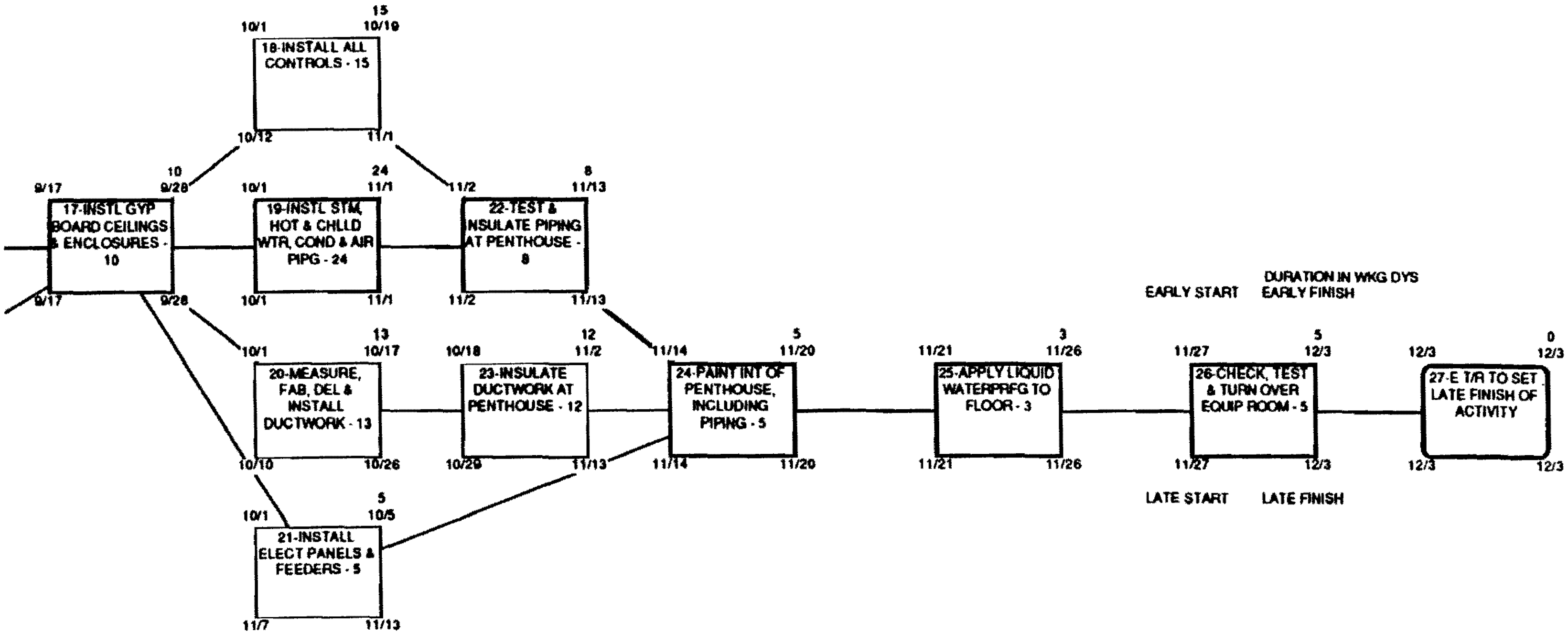


Base Plan of Action

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

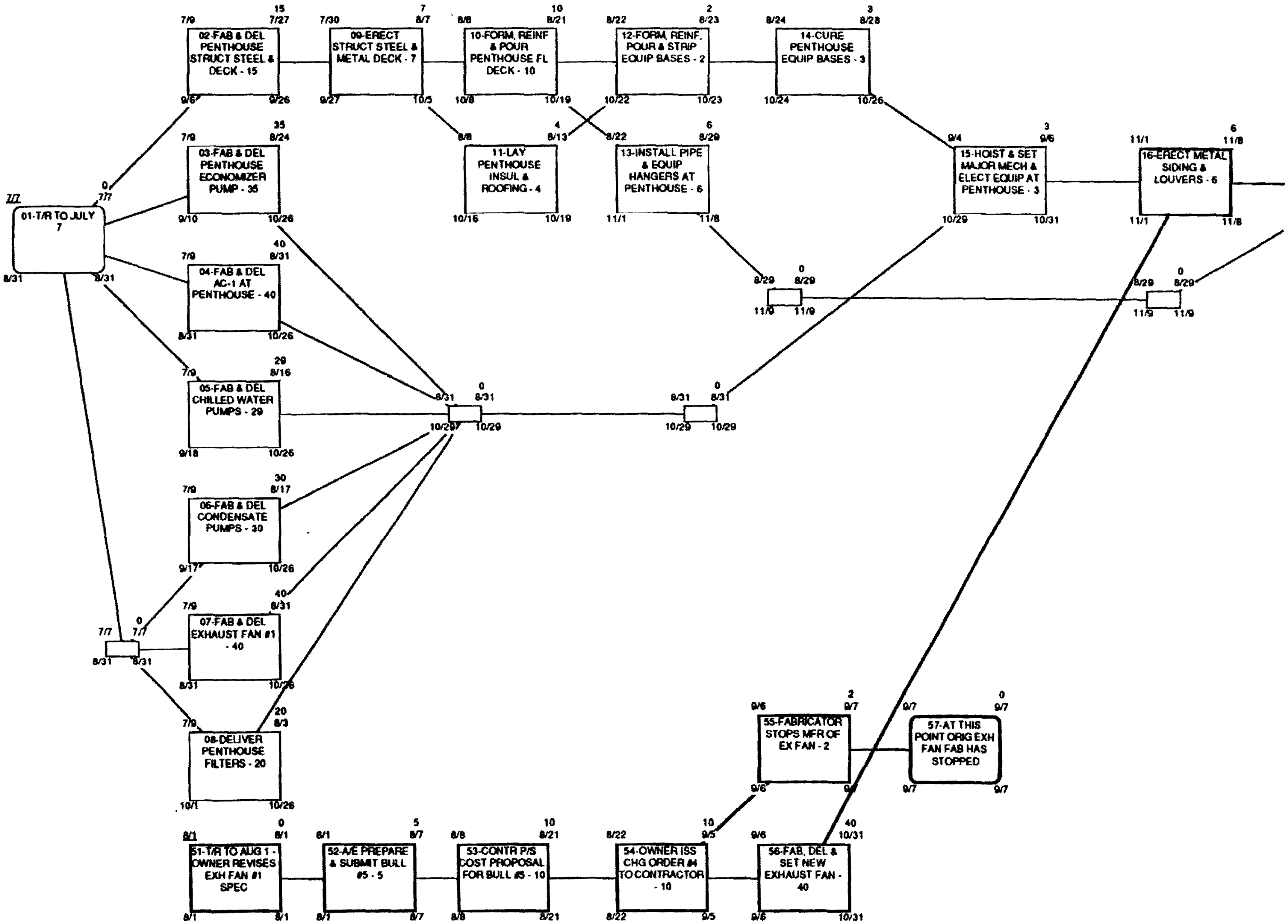
Issue #1 - July 7
330 clarion base plan
disk 162

Reserved Activity Numbers

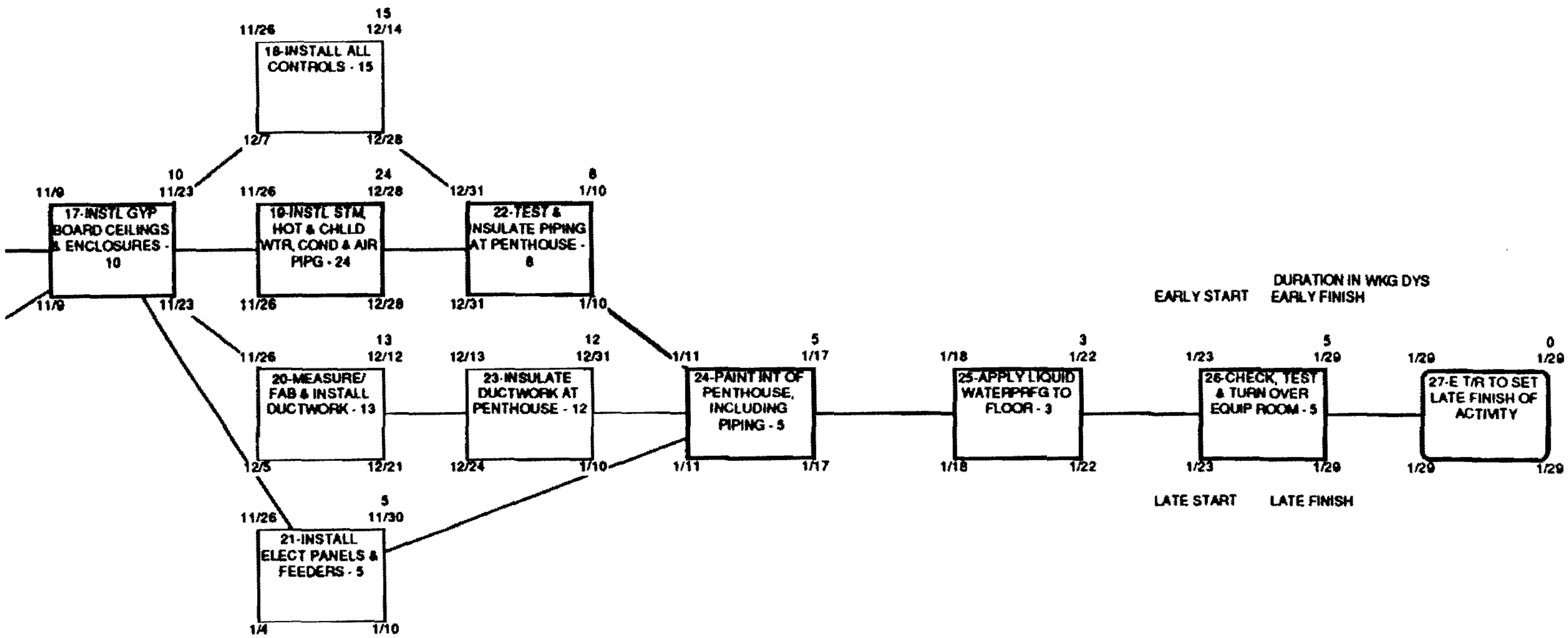
041	046
042	047
043	048
044	049
045	050

Luther Mechanical Contractors
Washington D.C.

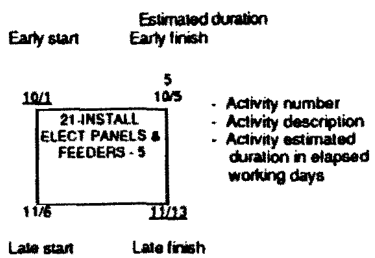
sheet ph-1


01-T/R TO JULY 7
02-FAB & DEL PENTHOUSE STRUCT STEEL & DECK - 15
03-FAB & DEL PENTHOUSE ECONOMIZER PUMP - 35
04-FAB & DEL AC-1 AT PENTHOUSE - 40
05-FAB & DEL CHILLED WATER PUMPS - 29
06-FAB & DEL CONDENSATE PUMPS - 30
07-FAB & DEL EXHAUST FAN #1 - 40
08-DELIVER PENTHOUSE FILTERS - 20
09-ERECT STRUCT STEEL & METAL DECK - 7
10-FORM, REINF & POUR PENTHOUSE FL DECK - 10
11-LAY PENTHOUSE INSUL & ROOFING - 4
12-FORM, REINF, POUR & STRIP EQUIP BASES - 2
13-INSTALL PIPE & EQUIP HANGERS AT PENTHOUSE - 6
14-CURE PENTHOUSE EQUIP BASES - 3
15-HOIST & SET MAJOR MECH & ELECT EQUIP AT PENTHOUSE - 3
16-ERECT METAL SIDING & LOUVERS - 6
51-T/R TO AUG 1 - OWNER REVISES EXH FAN #1 SPEC
52-A/E PREPARE & SUBMIT BULL #5 - 5
53-CONTR P/S COST PROPOSAL FOR BULL #5 - 10
54-OWNER ISS CHG ORDER #4 TO CONTRACTOR - 10
55-FABRICATOR STOPS MFR OF EX FAN - 2
56-FAB, DEL & SET NEW EXHAUST FAN - 40
57-AT THIS POINT ORIG EXH FAN FAB HAS STOPPED

53



Change order impact on base plan of action



ACTIVITY DATA KEY

Issue #1 - July 9
Issue #2 - August 1
333 clarion chg order
disk 162

Reserved Activity Numbers

041	046
042	047
043	048
044	049
045	050

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

Luther Mechanical Contractors
Washington, D.C.

sheet ph-1

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

Chicago Area Weather

Source: Jack Kolstadt

Week		Working Day	Total Working Days Worked	Loss in Working Days
Dec.	1	234	3½	1½
	2	239	3½	1½
	3	244	4	1
	4	249	3	2
Jan.	1	256	2-1/5	2-4/5
	2	261	2-1/5	2-4/5
	3	266	3½	1½
	4	271	3	2
Feb.	1	277	3	2
	2	282	3	2
	3	287	4	1
	4	292	3½	1½
Mar.	1	297	4½	½
	2	302	4½	½
	3	307	4	1
	4	312	3½	1½
Apr.	1	320	3½	1½
	2	325	4½	½
	3	330	4	1
	4	335		0

Ralph J. Stephenson PE PC
Consulting Engineer

TRANSLATE

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

SCHEDULE

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

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

The case of the resource sensitive school project

A project management case study in the allocation of resources

You and your partner own a small flat work firm, Regal Construction, Inc. located in northern Missouri. You are Alan Dobson, president ,and your partner is Fred Mikello, vice president. Both of you came from a large general contractor, the Rasmussen Company, where you were a senior project manager, and Fred was a senior field superintendent. The general superintendent for Rasmussen was George Bushnell, a good friend to both of you.

You each left Rasmussen about eight months ago to start Regal, and have done reasonably well constructing a small volume of sidewalks, drives and masonry work along with some earthwork and carpentry. You've been able to purchase a front loader and are now actively involved in finding ways to keep your equipment and tradesmen, mostly laborers and cement finishers, busy.

This morning George Bushnell called and said Rasmussen had just been awarded the general contract on a large educational park. The first of the projects is three moderate size masonry wall bearing buildings. They must start in the field immediately, but George says he cannot man the job for another 2 weeks. He asked if Regal could start within two days on layout, clearing the site and constructing the concrete and masonry foundations for the first three buildings, A, B & C. Footprint sizes of the buildings are for A - 150' x 200', B - 200' x 250' and C - 200' x 200'.

You reply that you could move on site immediately. George says to give him a rough budget estimate along with a plan of work, a schedule and an idea of how Regal would man the job all by tomorrow noon. If the cost and the schedule are in the ball park you have a job.

The business and management objectives you are thinking about as you consider how to plan the job include:

1. Maintain the plan of work finally agreed on. Plan the work and then work the plan!

2. Maintain crew integrity. Don't split a composite work crew.

3. Don't interrupt an activity once it has started.

4. Keep the total time of the job to no more than four and a half weeks.

5. Balance tradesmen use on the job, particularly laborers, to maintain as constant level as possible.

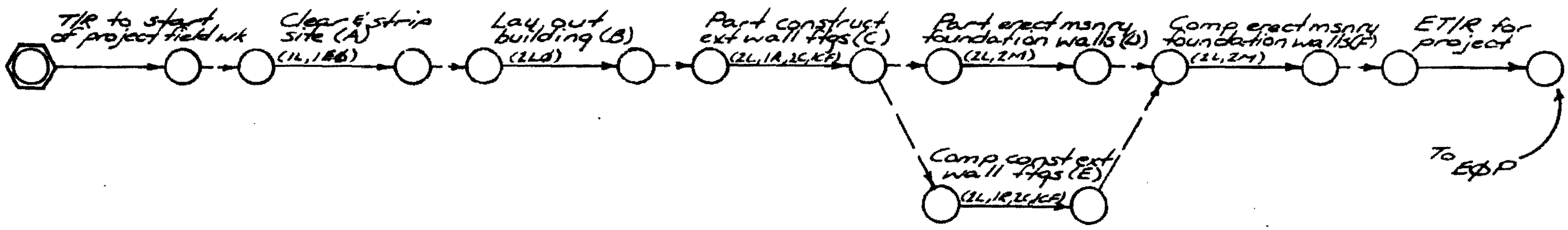
6. Use equipment you own. Don't rent anything you don't absolutely have to.

7. Minimize the risk of lost profit potential.

8. Do a first rate job for school and for Rasmussen.

You have just put down the phone. How do you proceed from here?

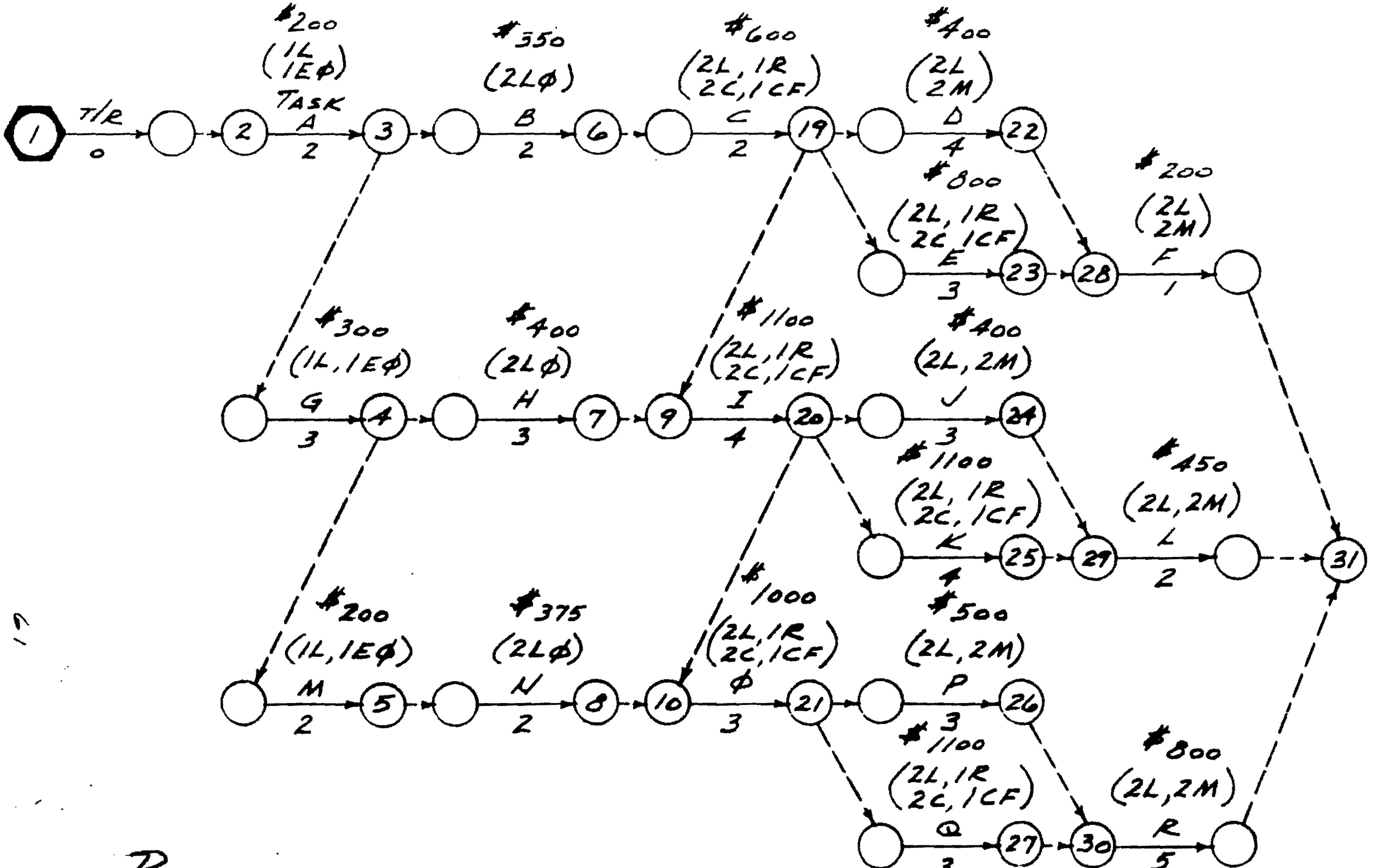
RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER



RESOURCE CODE

L Labors
EØ Equipment operators
LØ Layout engineers
R Reinforcing stl workers
C Carpenters
CF Cement finishers
M Masons

RESOURCE ALLOCATION



RESOURCE

ALLOCATION

RALPH J. STEPHENSON, P.E.

MAY 29, 1968

RESERVED NODE NOS.

11	15
12	16
13	17
14	18

SHT 1

SHT 2

WD → / TASK ↓	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	MP	#
1L 1EØ *A																													
2LØ B																													
2L.1R 2C.1CF C																													
2L,2M D																													
2L.1R 2C.1CF E																													
2L,2M F																													
1L 1EØ *G																													
2LØ *H																													
2L.1R 2C.1CF *I																													
2L,2M J																													
2L.1R 2C.1CF K																													
2L,2M L																													
1L,1EØ M																													
2LØ N																													
2L.1R 2C.1CF *Ø																													
2L,2M *P																													
2L,1R 2C,1CF *Q																													
3L 2M *R																													
																												0	0

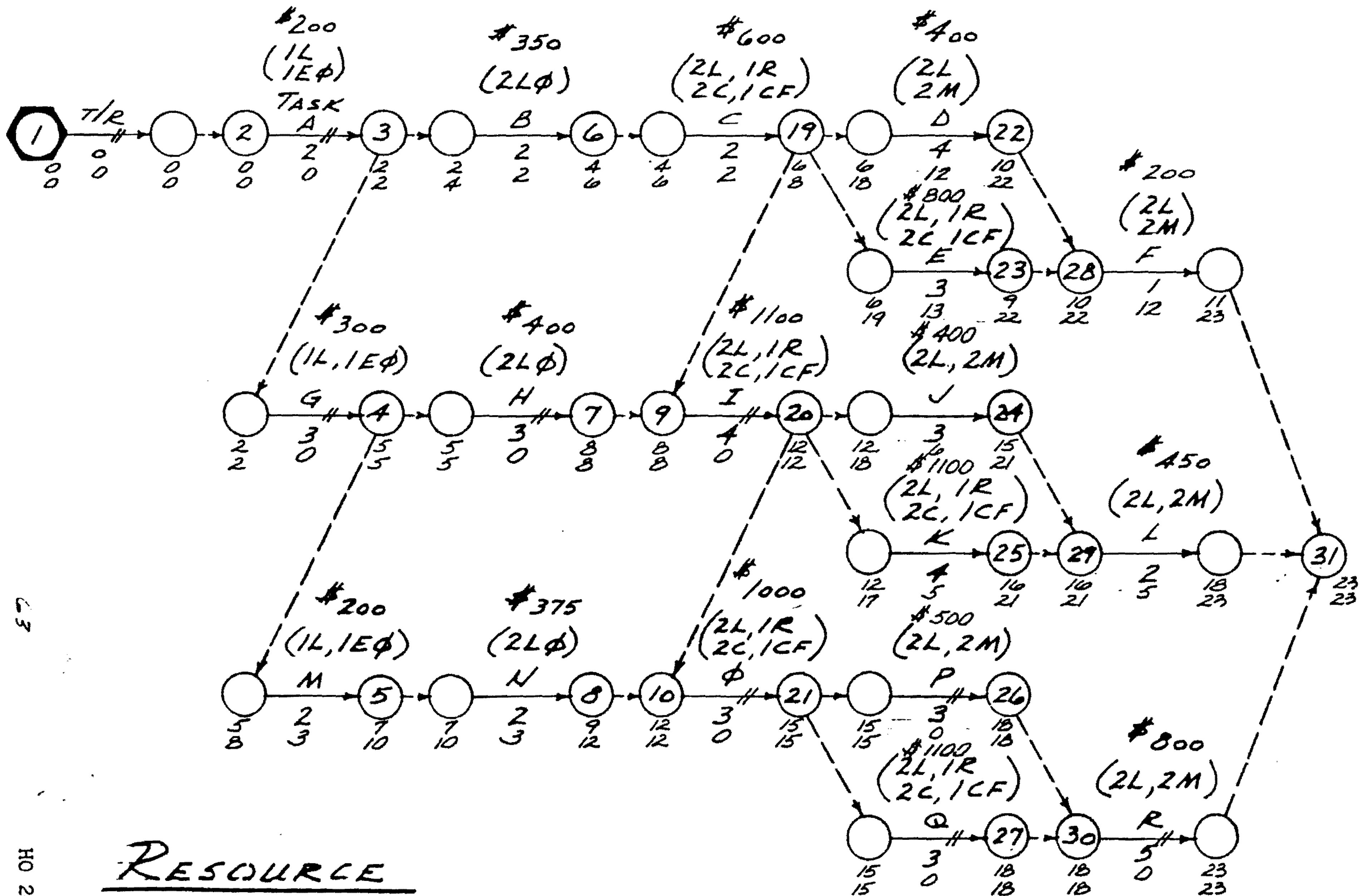
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26		
L																													
EØ																													
LØ																													
R																													
C																													
CF																													
M																													
TOTAL																													

RESOURCE ALLOCATION

MAY 29, 1968

RALPH J. STEPHENSON, P.E.

HO 26



RESOURCE

ALLOCATION

RALPH J. STEPHENSON, P.E.

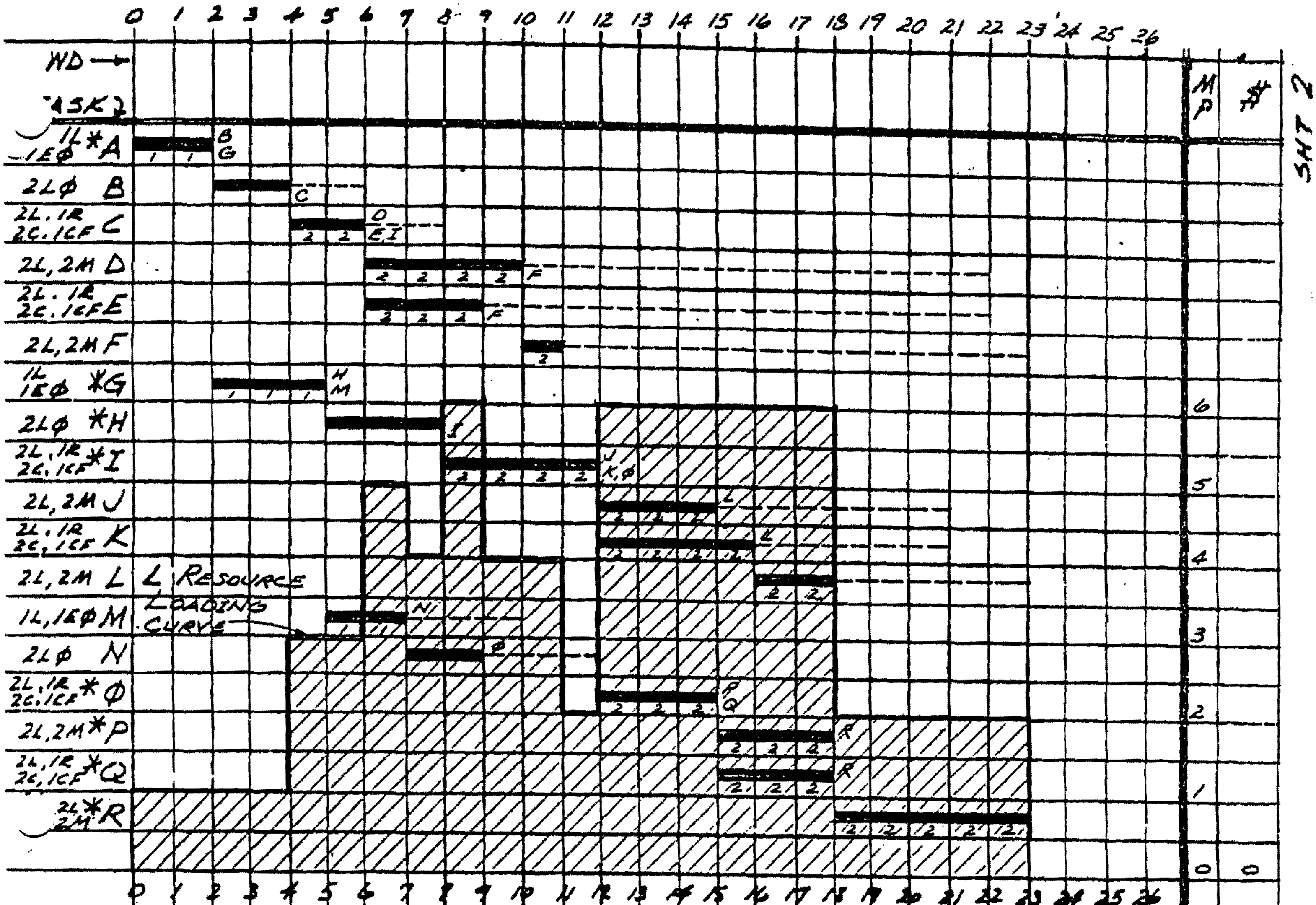
MAY 29, 1968

RESERVED NODE NOS.

11	15
12	16
13	17
14	18

HO 244

ES/EF SCHEDULE



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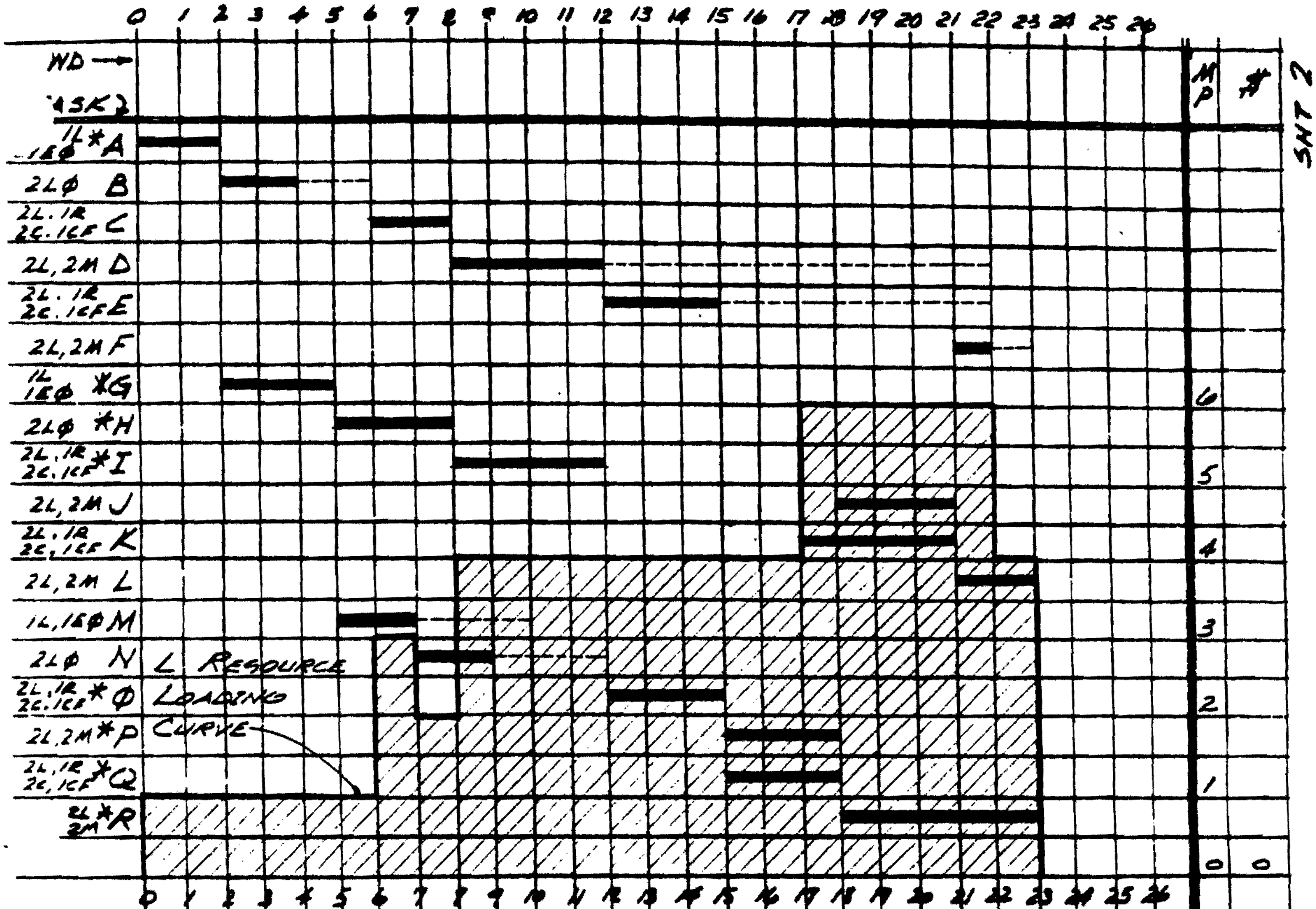
L	1	1	1	1	3	3	5	4	6	4	4	2	6	6	6	6	6	6	2	2	2	2	2					81
EΦ	1	1	1	1	1	1	1																					7
LΦ			2	2		2	2	4	2																			14
R					1	1	1	1	2	1	1	1	2	2	2	2	1	1										19
C					2	2	2	2	4	2	2	2	4	4	4	4	2	2										38
CF					1	1	1	1	2	1	1	1	2	2	2	2	1	1										19
M							2	2	2	2	2		2	2	2	2	4	4	2	2	2	2	2					36
TOTAL	2	2	4	4	8	10	14	14	18	10	10	6	16	16	16	16	14	14	4	4	4	4	4					214

RESOURCE ALLOCATION #1

HO 245

LEVELED SCHEDULE



	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	MP	#
CP ONLY*	1	1	1	1	1				2	2	2	2	2	2	2	4	4	4	2	2	2	2	2						41
FLOAT ONLY	0	0	0	0	0	1	3	2	2	2	2	2	2	2	2	0	0	2	4	4	4	4	2						40
TOTAL	1	1	1	1	1	1	3	2	4	4	4	4	4	4	4	4	4	6	6	6	6	6	4						81
EØ																													
LØ																													
R																													
C																													
CF																													
M																													
TOTAL																													

RESOURCE ALLOCATION #2

HO 246

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

Use of float time in project planning

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

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

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

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

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

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

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

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

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

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

* * *

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

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

PROFIT POTENTIAL LEVELS

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

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

A brief discussion of each is given below.

Level A Profit Potential

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

Level B Profit Potential

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

Level C Profit Potential

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

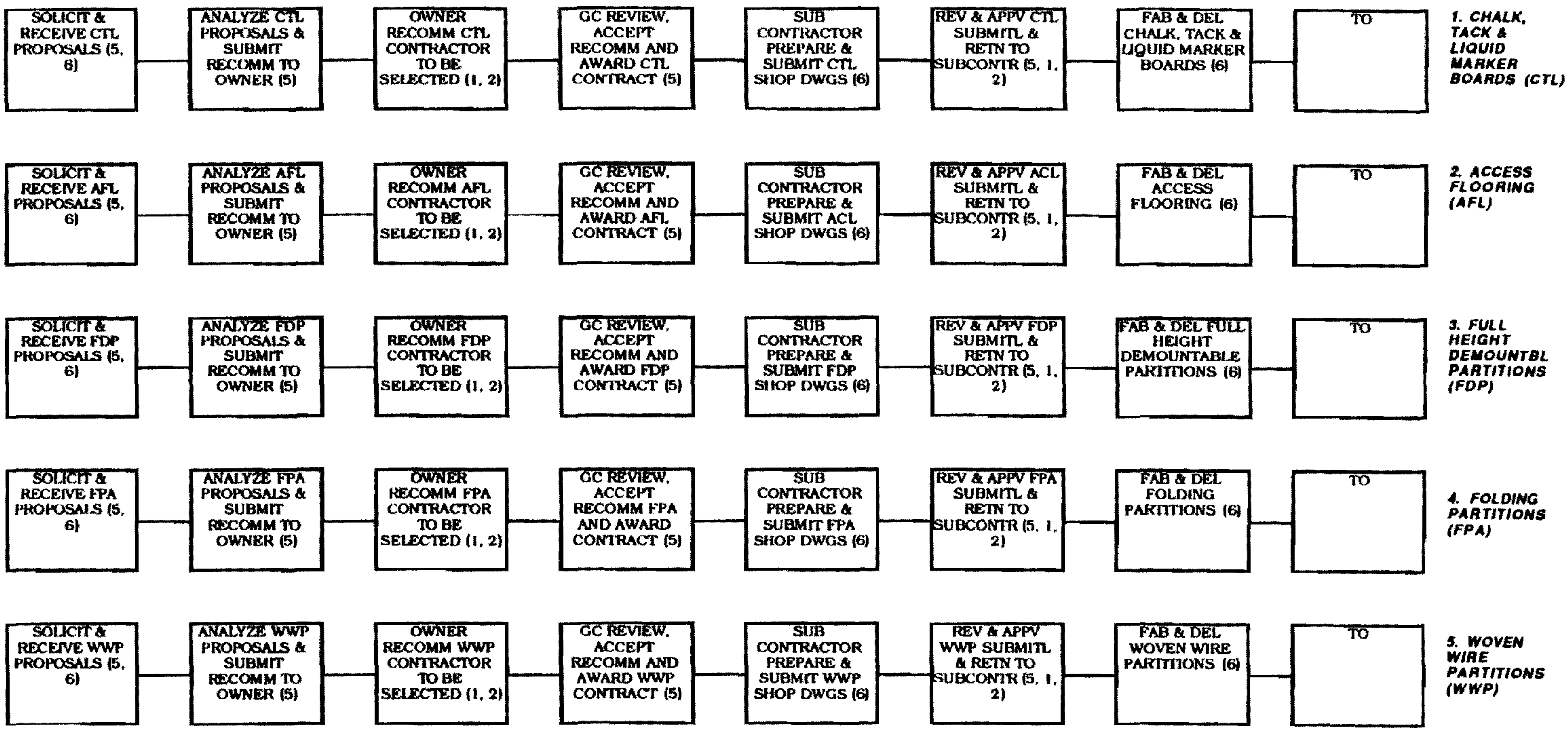
In a nutshall, level A profit potential deals with identifying all the elements involved. Level B profit potential is concerned with arranging these elements in a logical and effective action plan. The C level profit potential is engaged when the project is managed well by proper scheduling within allowable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

Project ____________________ Date __________ RALPH J. STEPHENSON

Sht __________ CONSULTING ENGINEER

ITEM PROCESSING SCHEDULE

Item	Date shop dwgs to be submitted			Date of shop dwg approval			Date fabrication complete	Date item on job site
	Subm 1	Subm 2	Subm 3	Subm 1	Subm 2	Subm 3		



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

Ralph J. Stephenson PE PC
Consulting Engineer
323 Hiawatha Drive
Mt. Pleasant, Michigan 48588
ph 517 772 2537

DIVISION 10

ITEMS INCLUDED

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

Issue #1 - November 15
i1div10sht1procumt
ho 300 - Dec 90

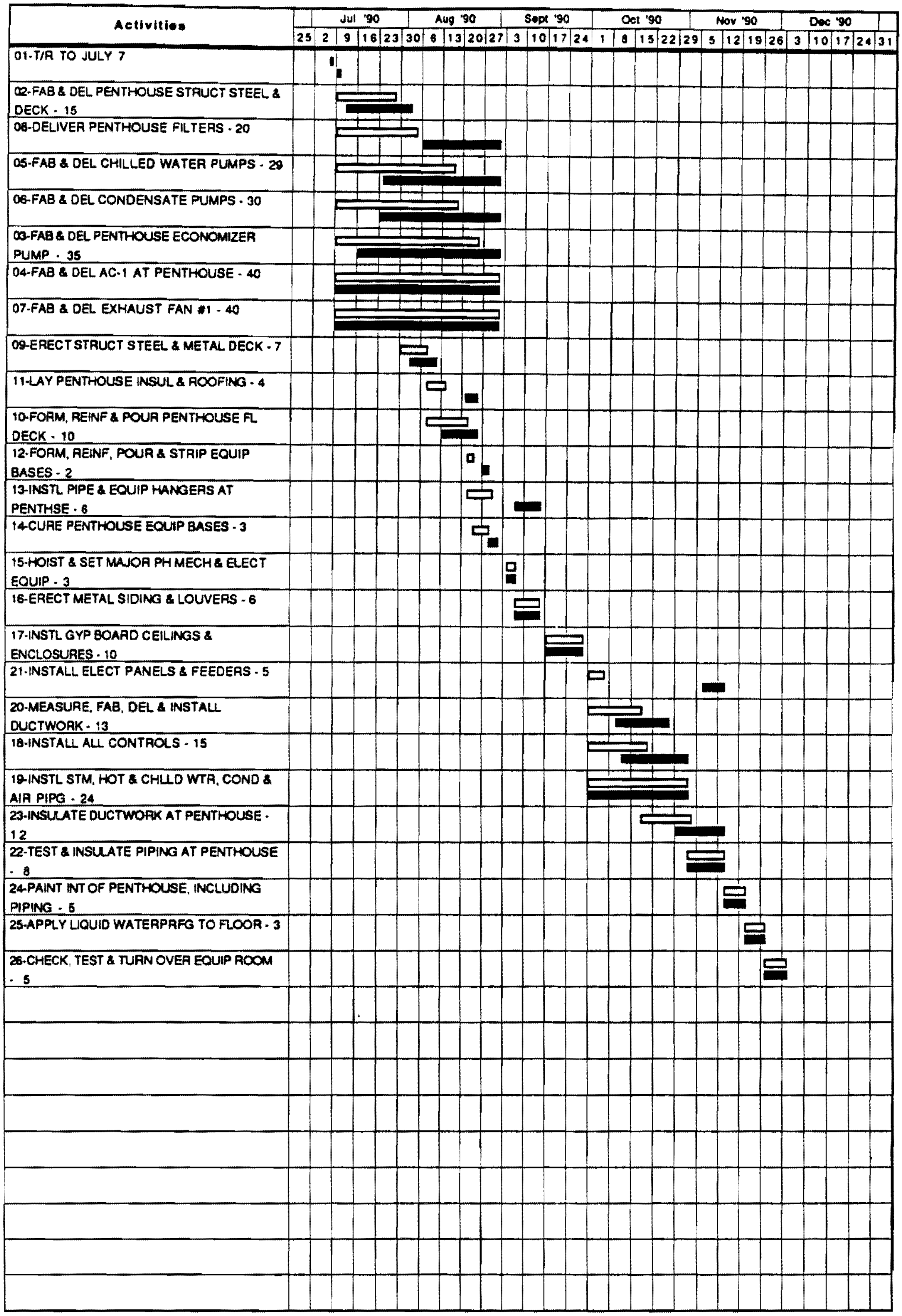
SHEET
P10-01

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

Listed in early start early finish order

Clarion Office Building
Equipment Room

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



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

Page 1 of 1
Saturday, January 6, 96

PAVILLION PROJECT DRAWING ISSUE

LISTED BY DATE OF ISSUE - DATE PRINTED: [illegible] 1983

RALPH J. STEPHENSON PE PC

ITEM	ISS DWG	AW CT	SUB SHD	REV APP
PILING	11/22/83			
ANCHOR BOLTS	11/22/83			
PILE CAP RESTL	11/22/83			
ER SPACE FRAME	11/22/83	11/22/83	12/07/83	12/14/83
STEEL JOISTS	12/06/83	12/08/83	12/20/83	12/27/83
STRUCT STEEL	12/06/83	12/08/83	12/20/83	12/27/83
ROOF/FL MTL DK	12/06/83	12/08/83	12/22/83	01/09/84
EXT WALL PANELS	12/06/83	12/08/83	01/09/84	01/16/84
RF TOP MECH EQP	12/06/83	12/08/83	12/22/83	01/09/84
SPRINKLER MATLS	12/06/83	12/08/83	12/30/83	01/23/84
FLAG POLE	12/06/83	12/08/83	12/30/83	01/16/84
EXT WALL FRAMG	12/06/83	12/08/83	01/09/84	01/16/84
TRANSFORMERS	12/06/83	12/08/83	12/30/83	01/09/84
ETB FAB STR STL	12/15/83	12/22/83	01/09/84	01/16/84
MISC IRON	12/30/83	01/09/84	01/30/84	02/06/84
HM FRAMES	12/30/83	01/09/84	01/23/84	01/30/84
LIGHT FIXTURES	12/30/83	01/09/84	01/23/84	01/30/84
ER FABRIC ROOF	12/30/83	01/09/84	01/30/84	02/13/84
HARDWARE	12/30/83	01/09/84	01/23/84	01/30/84
ETB FABRIC ROOF	12/30/83	01/09/84	01/30/84	02/13/84
HM DOORS	12/30/83	01/09/84	01/23/84	01/30/84
SECURITY GATES	01/16/84	01/23/84	02/13/84	02/27/84
LOUVERS	01/16/84	01/23/84	02/13/84	02/27/84

HO 238

SUBMITTAL TURN AROUND TIMES

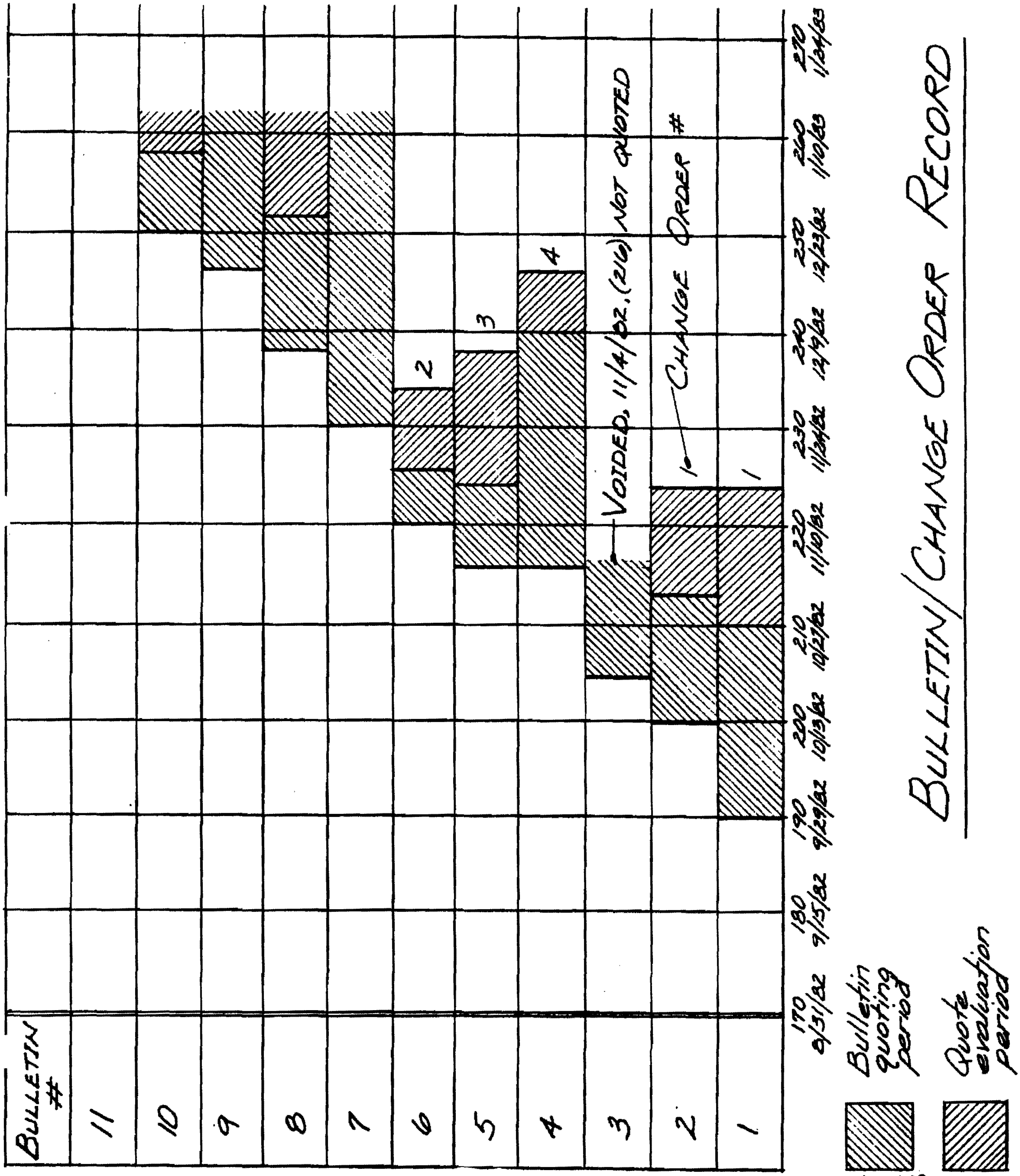
TIME REQUIRED IN WORKING DAYS

	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 WKG DAYS	18 WKG DAYS	11 WKG 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



ho 198

① LINE #	② EQUIPMENT DESCRIPTION & WHO FURNISHES	③ PRESENT LOCATION OF EQUIP	④ FINAL LOCATION	⑤ ACTION TO BE TAKEN & BY WHOM	⑥	⑦ OTHER EQUIP AFFECTED	⑧ REMARKS
1	2 existing compressed air tanks (Telco)	Existing paint shop	New building paint dept	Relocate Set Hook up	Falstaff Young & Falstaff Falstaff	New compressors 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	—	
4	6 existing column mounted jib cranes (Telco)	Cols 6C 5D 7D 3F 4C 2F	New bldg Cols 10A 11A 10B 11B 10C 11C	Remove Move & Instl	Telco Young	—	
5	2 new prefab shop offices 10'x15'x8' (Young)	New	1 in new bldg lab area 1 in exist'g bldg QA area	Erect Mech/Elect	Young Telco	In exist'g bldg after Telco clears space (watch!)	

Abbreviations

NW Northwest
QA Quality Assurance

EQUIPMENT ACTIVITY TABULATION

RALPH J. STEPHENSON, P.E., P.C.
CONSULTING ENGINEER

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 wd

t = 4 wd

n = 11 units

For i unknown

x = 325

d = 10 wd

t = 6 wd

n = 21 floors

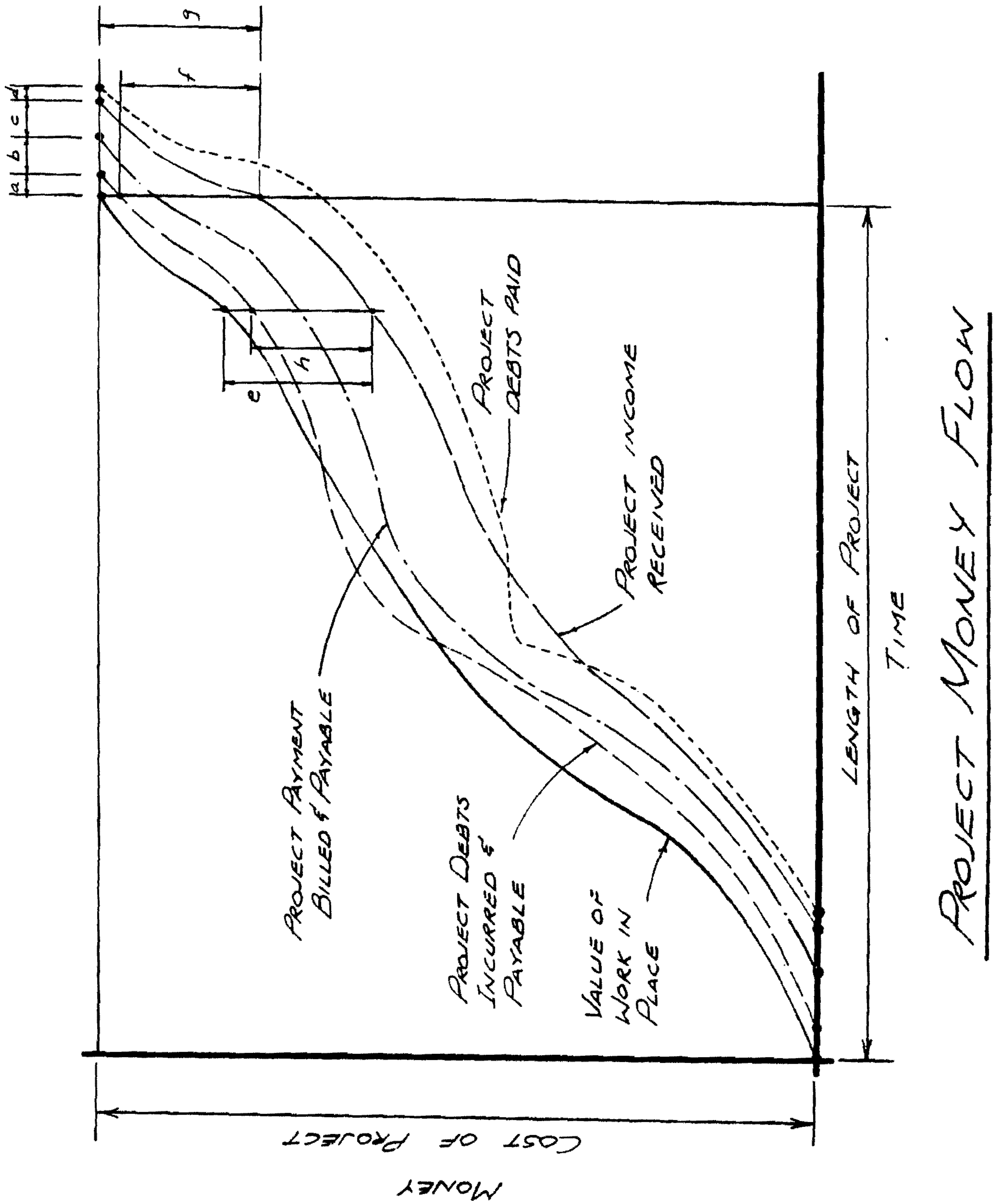
For t unknown

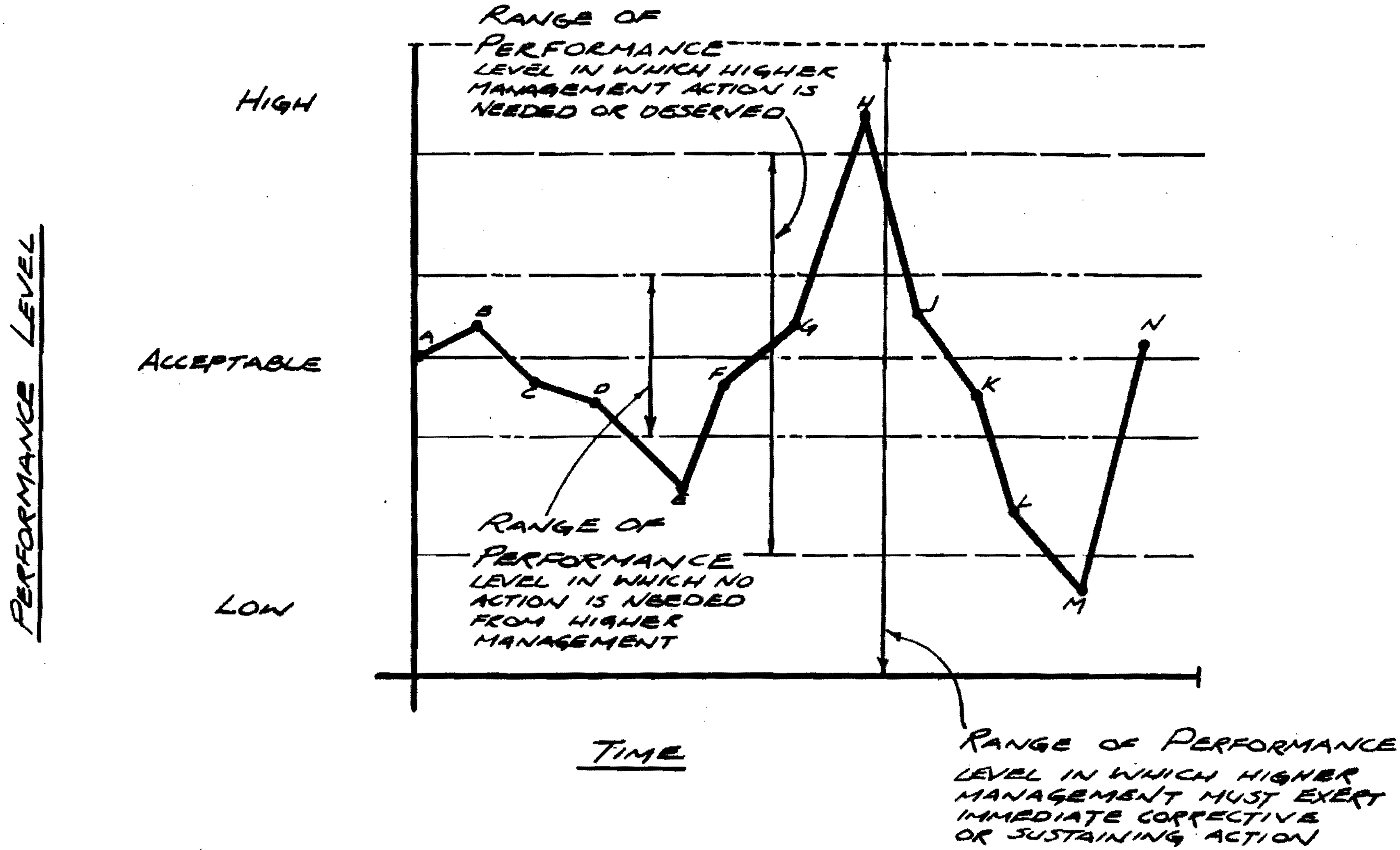
x = 352

i = 280

d = 9

n = 15 sectors


PROJECT MONEY FLOW
a
b
c
d
e
f
g
h
PROJECT DEBTS PAID
PROJECT INCOME RECEIVED
PROJECT PAYMENT BILLED & PAYABLE
PROJECT DEBTS INCURRED & PAYABLE
VALUE OF WORK IN PLACE
LENGTH OF PROJECT
TIME
COST OF PROJECT
MONEY



MANAGEMENT BY EXCEPTION (MX) AND PERFORMANCE LEVEL ACTIONS

Ralph J. Stephenson PE PC
Consulting Engineer

IDENTIFY VITAL TARGETS

Which inputs and outputs most affect the results, the conditions and the performance the manager wishes to achieve? In considering these questions the following should be kept in mind.

A. Rarely is more than one problem out of four worth other than a manager's fleeting glance.

B. The good manager must quickly identify where his efforts are going to do the most good.

C. The effective manager must understand Pareto's law - the principle of the vital few and the trivial many.

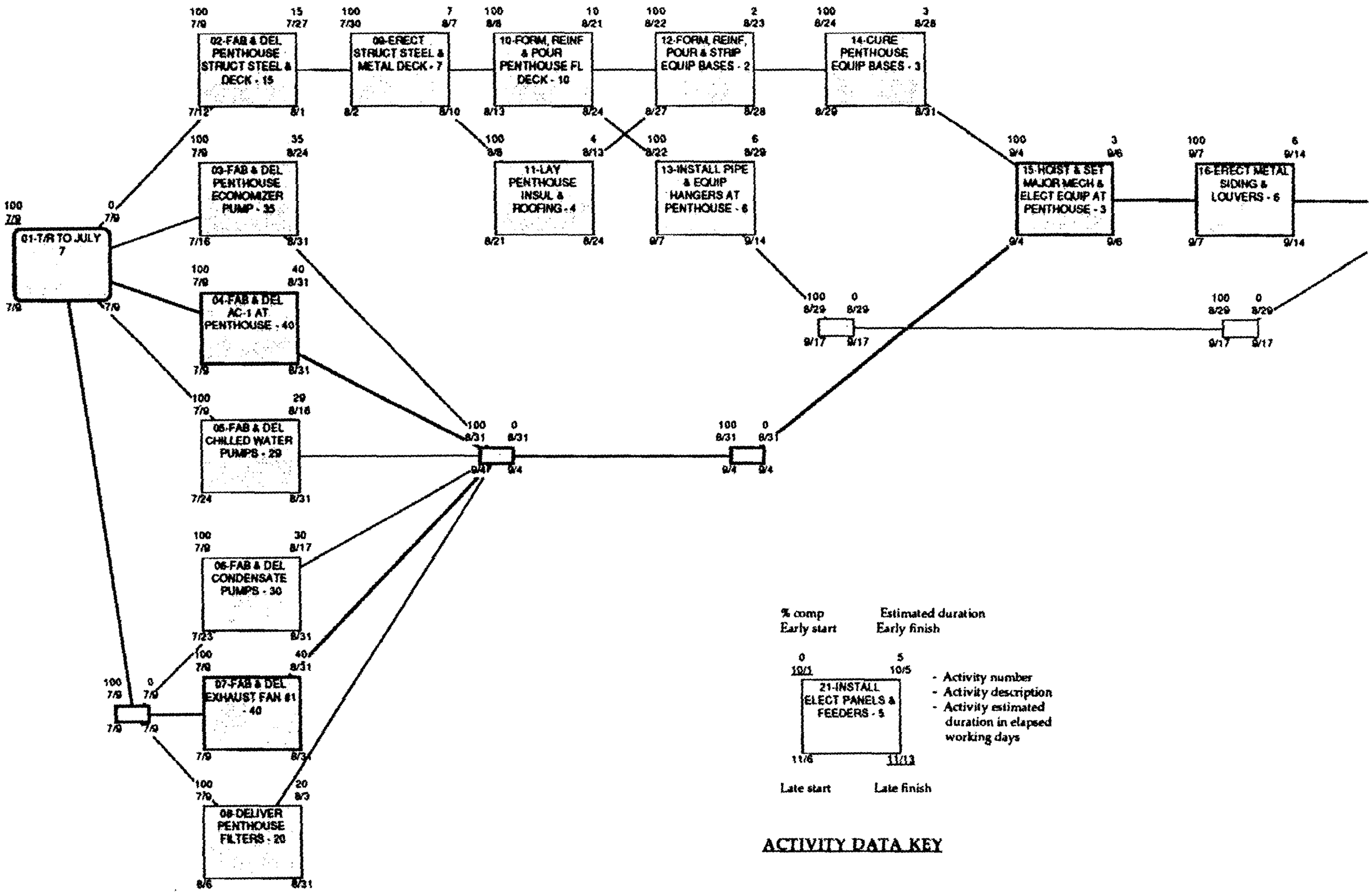
D. In general, fewer than one third of the people a manager supervises require more than two thirds of his time.

E. Managerial missteps resulting from not understanding the vital target concept include:
1. Following prejudices
2. Sticking with pat systems
3. Doing what is easiest
4. Playing hunches

F. How to pick the vital few
1. Prepare and use to do lists
2. Set priorities
3. Use a rating system
4. Identify the critical tasks in a plan of action

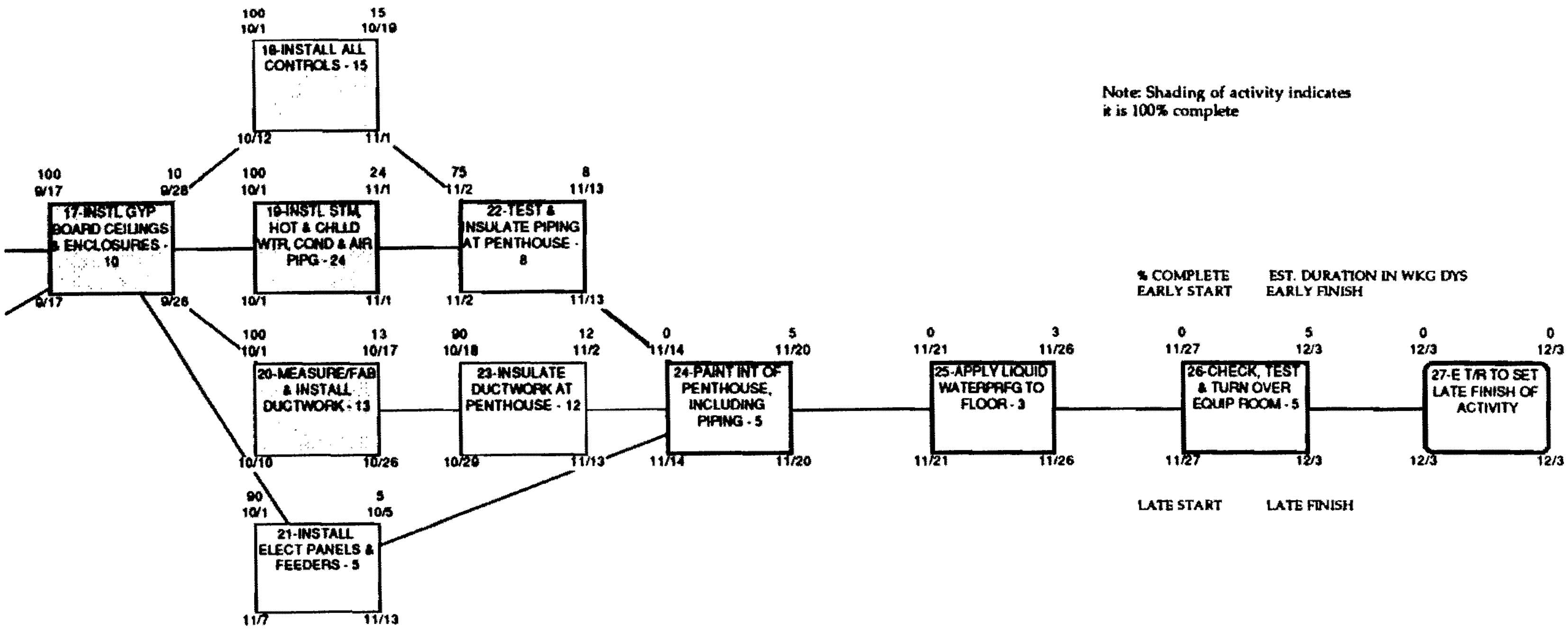
G. Moving from a situational view (macro) to the vital few (micro)

H. What to do with the trivial many
1. Delegate
2. Defer (How long?)



ACTIVITY DATA KEY

Note: Shading of activity indicates it is 100% complete



Project Status as of November 5

Issue #1 - July 7
Issue #1 - monitor 11/5
332 11/5 mtr phi i1shtph1
disk 162

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

Luther Mechanical Contractors
Washington, D.C.

Reserved Activity Numbers

041	046
042	047
043	048
044	049
045	050

ho 332 - December, 1993

sheet ph-1

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

CONTROL SYSTEM TECHNIQUES

Color Coding

Color coding is used to qualitatively evaluate project status. The status indicator colors described below are drawn on the solid task arrows, with the end of the color line shown at the approximate percentage of the task complete. The color line end is dated with the current calendar date.

Green

Task on time - currently not past early finish (EF) date.

Orange

Task on time - currently past early finish (EF) date.

Blue

Task behind - currently not past late finish (LF) date.

Yellow

Task behind - currently past late finish (LF) date.

Note that the evaluation is made on the basis of the current date. Changes in color are significant, indicating a deteriorating or improving sequence of work depending upon the progression. Color coding is primarily used to locate undesirable trends in work progress and to show job history.

Description of Various Listings

The computer output is issued in five (5) major listings - by ascending order of node numbers (node sequence), by ascending order of early start dates (ES sequence), by ascending order of late start dates (LS sequence), by ascending order of late finish dates (LF sequence), and by ascending order of available float time (TF sequence).

Node Sequence

The node sequence is arranged in ascending order, first by i node number, then by j node number, where i node numbers are the same. This is the master list from which all revisions are made. It is also the listing used when referring from the arrow diagram into the computer printout for information.

CONTROL SYSTEM TECHNIQUES
(Page 2)

Node Sequence (continued)

All dummy arrows are shown in this listing since subsequent changes to the network (updating) must be shown on the node sequence list to revise the computer input.

Early Start (ES) Sequence

The early start sequence lists all tasks in ascending order of their earliest possible starting dates. The ES listing is used most often by field management as a check list.

Late Start (LS) Sequence

The LS sequence lists tasks in ascending order of their latest allowable starting dates. This is a monitoring document and is used by first drawing a line under the current date in the LS column, and next evaluating tasks that have not started and are above that line. These tasks will be those that have not met their latest allowable starting dates.

As a suggestion, all tasks that are in-work can be indicated as such by circling their late start date. When tasks are complete, a check mark can be placed in front of their late start dates or the task can be crossed off. Thus, a quick inspection will show which tasks above the current date have not yet started or been completed.

Late Finish (LF) Sequence

The LF sequence lists all tasks in ascending order of their latest allowable finish dates. This list is used the same as the late start list but by applying the procedure to the late finish column.

Total Float (TF) Sequence

The TF list shows all tasks arranged in ascending order of the amount of float time available to the task. Those tasks indicated by a CP in the total float column are critical.

This list gives a good picture of (1) the relative criticalness of all tasks, and (2) what tasks become critical as a project begins to lag behind late finish dates. For instance, if a project has lost five (5) working days and it is still essential to maintain current anticipated end dates, then all tasks yet to be done and having float time to and including five, are now critical.

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CONSULTING ENGINEER

COLOR CODING

	1	2	3	4	5	6
IS TASK CURRENTLY PAST EF DATE?	N	N	Y	Y	Y	
IS TASK CURRENTLY PAST LF DATE?	N	N	N	N	Y	
WILL TASK MAKE LF DATE?	Y	N	Y	N	—	
COLOR CODE GREEN	X					
COLOR CODE ORANGE			X			
COLOR CODE BLUE		X		X		
COLOR CODE YELLOW					X	

Color coding is used to qualitatively evaluate project status. The status indicator colors described below are drawn on the solid task arrows, with the end of the color line shown at the approximate percentage of the task complete. The color line end is dated with the current calendar date.

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Task on time - currently past early finish (EF) date.

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Yellow

Task behind - currently past late finish (LF) date.

Note that the evaluation is made on the basis of the current date. Changes in color are significant, indicating a deteriorating or improving sequence of work depending upon the progression. Color coding is primarily used to locate undesirable trends in work progress and to show job history.

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CONSULTING ENGINEER

Monitoring #1

Project Status as of morning of Sept. 24 (working day 188)

Task	Color Code	Status	Was completed evening of	Will be completed
101 - 107		Comp.	Sept. 15	----
102 - 108		Comp.	Sept. 23	----
103 - 109		Comp.	Sept. 15	----
104 - 110		Comp.	Sept. 13	----
105 - 111		90% comp.	----	in 6 working days
106 - 112		Comp.	Sept. 22	----
107 - 114		Comp.	Sept. 22	----
108 - 115		50% comp.	----	in 4 working days
109 - 116		50% comp.	----	in 2 working days
110 - 117		80% comp.	----	in 2 working days
112 - 119		10% comp.	----	in 4 working days
133 - 139		50% comp.	----	in 4 working days
134 - 140		Comp.	Sept. 21	----
135 - 151		Comp.	Sept. 17	----
2 - 3		Comp.	Sept. 1	----
2 - 4		Comp.	Sept. 7	----
2 - 5		Comp.	Sept. 9	----
2 - 6		80% comp.	----	in 5 working days

NETWORK MODEL FOR NEW OFFICE FACILITY HIGHLAND AND MORAN
KEITH, IOWA

VICTORIA MECHANICAL COMPANY

PROJECT NO 76-10 ISSUE NO. 1 DATED APRIL 26, 1976

RALPH J STEPHENSON P E - CONSULTANT

DATES ARE SHOWN AS MONTH,DAY,YR '0' IN TFT COL INDICATES CRITICAL ITEM

I	J	DAYS	RSP	LOC CD	AND DESCRIPTION	COST:	NODE SEQUENCE E/S	L/S	E/F	L/F	TF
1	2	106	0		T/R TO START OF PROJECT		1026	1026	5316	5316	0
2	3	65	0	1	T/R POUR OUT 1ST FL SOG		6016	6226	8316	9226	15
2	4	69	0	2	T/R TO POUR OUT 2ND DECK		6016	6166	9076	9226	11
2	5	58	0	R	T/R TO C ER RF MTL DECK		6016	7206	8206	10086	34
2	6	70	0	R	T/R TO C LAY INSUL & RFG		6016	7166	9086	10226	32
2	7	102	0		T/R TO C EXT MSNRY&GLZNG		6016	6016	10226	10226	0
3	101	0	0		D		9016	9286	8316	9276	18
3	102	0	0		D		9016	9246	8316	9236	16
3	103	0	0		D		9016	10016	8316	9306	21
3	104	0	0		D		9016	10066	8316	10056	24
3	105	0	0		D		9016	9236	8316	9226	15
3	106	0	0		D		9016	9306	8316	9296	20
4	101	0	0		D		9086	9286	9076	9276	14
4	102	0	0		D		9086	9246	9076	9236	12
4	103	0	0		D		9086	10016	9076	9306	17
4	104	0	0		D		9086	10066	9076	10056	20
4	105	0	0		D		9086	9236	9076	9226	11
4	106	0	0		D		9086	9306	9076	9296	16
5	132	0	0		D		8236	10146	8206	10136	37
5	133	0	0		D		8236	10116	8206	10086	34
5	134	0	0		D		8236	10196	8206	10186	40
5	135	0	0		D		8236	10196	8206	10186	40
5	136	0	0		D		8236	10126	8206	10116	35
5	137	0	0		D		8236	10186	8206	10156	39
6	125	0	0		D		9096	10256	9086	10226	32
7	125	0	0		D		10256	10256	10226	10226	0
101	107	6	6	1	P INS SPRINKLER PIPG	2880	9086	9286	9156	10056	14
102	108	8	2	1	P INS SHT MTL DCT&FTINGS	4800	9086	9246	9176	10056	12
103	109	3	1	1	P INS DMSTC WTR PPG-CLG	720	9086	10016	9106	10056	17
104	110	4	1	1	P INS HTG&CLNG PPG IN CLG	960	9086	10066	9136	10116	20
105	111	9	1	1	INS TO/R PLUMBG RISERS	2160	9086	9236	9206	10056	11
106	112	4	3	1	P INS RUFF ELEC CNDT&FDRS		9086	9306	9136	10056	16
107	113	0	0		D		9166	10066	9156	10056	14
107	114	5	6	1	C INS SPRINKLER PIPG	2400	9166	10126	9226	10186	18
107	132	0	0		D		9166	10146	9156	10136	20
107	132	0	0		D		9166	10146	9156	10136	20
108	113	0	0		D		9206	10066	9176	10056	12
108	115	8	2	1	C INS SHT MTL DUCT&FTTNGS	4800	9206	10076	9296	10166	13
108	133	0	0		D		9206	10116	9176	10086	15
108	133	0	0		D		9206	10116	9176	10086	15
109	113	0	0		D		9136	10066	9106	10056	17
109	116	3	1	1	C INS DMSTC WTR PPG-CLG	720	9136	10146	9156	10166	23
109	134	0	0		D		9136	10196	9106	10186	26

				LOC			NODE SEQUENCE				
I	J	DAYS	RSP	CD	AND DESCRIPTION	COST	E/S	L/S	E/F	L/F	TF
109	134	0	0		D		9136	10196	9106	10186	26
110	117	5	1	1	C INS HTG&CLNG PPG IN CLG	1200	9146	10126	9206	10186	20
110	135	0	0		D		9146	10196	9136	10186	25
110	135	0	0		D		9146	10196	9136	10186	25
111	113	0	0		D		9216	10066	9206	10056	11
111	136	0	0		D		9216	10126	9206	10116	15
111	136	0	0		D		9216	10126	9206	10116	15
112	113	0	0		D		9146	10066	9136	10056	16
112	119	3	3	1	C INS RUFF ELEC CNDT&FDRS		9146	10146	9166	10186	22
112	137	0	0		D		9146	10186	9136	10156	24
112	137	0	0		D		9146	10186	9136	10156	24
113	118	6	4	1	ER INT MSNRY PARTNS		9216	10066	9286	10136	11
114	120	0	0		D		9236	10196	9226	10166	18
115	120	0	0		D		9306	10196	9296	10186	13
116	120	0	0		D		9166	10196	9156	10186	23
117	120	0	0		D		9216	10196	9206	10186	20
118	121	3	5	1	P ER STUDS FOR DRY WALL		9296	10146	10016	10186	11
119	120	0	0		D		9176	10196	9166	10186	22
120	122	0	0		D		9306	10196	9296	10166	13
121	122	0	0		D		10046	10196	10016	10186	11
121	124	3	5	1	C ER STUDS FOR DRY WALL		10046	10226	10066	10266	14
122	123	4	1	1	P INS IN WLL MECH/ELEC WK	1920	10046	10196	10076	10226	11
122	123	4	3	1	P INS IN WLL MECH/ELEC WK	1920	10046	10196	10076	10226	11
123	125	0	0		D		10086	10256	10076	10226	11
123	126	0	0		D		10086	10276	10076	10266	13
124	126	0	0		D		10076	10276	10066	10266	14
124	161	0	0		D		10076	10286	10066	10276	15
124	161	0	0		D		10076	10286	10066	10276	15
125	128	5	5	1	P HANG DRY WALL		10256	10256	10296	10296	0
126	127	3	1	1	C INS IN WLL MECH/ELEC WK	1440	10066	10276	10126	10296	13
126	127	3	3	1	C INS IN WLL MECH/ELEC WK	1440	10086	10276	10126	10296	13
127	128	0	0		D		10136	11016	10126	10296	13
127	163	0	0		D		10136	11026	10126	11016	14
127	163	0	0		D		10136	11026	10126	11016	14
128	129	5	5	1	COMP HANG DRY WALL		11016	11016	11056	11056	0
129	130	0	0		D		11086	11086	11056	11056	0
129	166	0	0		D		11086	11086	11056	11056	0
129	166	0	0		D		11086	11086	11056	11056	0
130	131	4	1	1	INS FIN TUBE PIPING	960	11086	11086	11116	11116	0
131	400	12	0	1	ET/R		11126	11126	11306	11306	0
131	170	0	0		D		11126	11246	11116	11236	8
131	170	0	0		D		11126	11246	11116	11236	8
132	138	6	6	2	P INS SPRINKLER PIPING	2880	9166	10146	9236	10216	20
133	139	8	2	2	P INS SHT MTL DUCT FTTNGS	4800	9206	10116	9296	10206	15
134	140	3	1	2	P INS DMSTC WTR PPG-CLG	720	9136	10196	9156	10216	26
135	151	3	1	2	P INS HTG&CLNG PPG IN CLG	720	9146	10196	9166	10216	25
136	153	8	1	2	INS TO/R PLMG RISERS	1920	9216	10126	9306	10216	15
137	152	4	3	2	P INS RUFF ELEC CNDT&FDRS		9146	10186	9176	10216	24
138	153	0	0		D		9246	10226	9236	10216	20
138	154	5	6	2	C INS SPRINKLER PIPG	2400	9246	10266	9306	11016	22
139	153	0	0		D		9306	10226	9296	10216	16
139	155	8	2	2	C INS SHT MTL DUCT&FTTNGS	4800	9306	10216	10116	11016	15
140	153	0	0		D		9166	10226	9156	10216	26
140	156	3	1	2	C INS DMSTC WTR PPG-CLG	720	9166	10286	9206	11016	30

I	J	DAYS	RSP	LOC CD	AND DESCRIPTION	COST	NODE SEQUENCE E/S	L/S	E/F	L/F	TF
151	153	0	0		D		9176	10226	9166	10216	25
151	157	2	1	2	C INS HTG&CLNG PPG IN CLG	480	9176	10296	9206	11016	30
152	153	0	0		D		9206	10226	9176	10216	24
152	159	3	3	2	C INS RUFF ELEC CNDT&FDRS		9206	10286	9226	11016	26
153	158	4	4	2	ER INT MSNRY PARTNS		10016	10226	10066	10276	15
154	160	0	0		D		10016	11026	9306	11016	22
155	160	0	0		D		10126	11026	10116	11016	15
156	160	0	0		D		9216	11026	9206	11016	30
157	160	0	0		D		9216	11026	9206	11016	30
158	161	0	0		D		10076	10286	10066	10276	15
159	160	0	0		D		9236	11026	9226	11016	26
160	163	0	0		D		10126	11026	10116	11016	15
161	162	3	5	2	P ER STUDS FOR DRY WALL		10076	10286	10116	11016	15
162	163	0	0		D		10126	11026	10116	11016	15
162	165	4	5	2	C ER STUDS FOR DRY WALL		10126	11046	10156	11096	17
163	164	4	1	2	P INS IN WLL MECH/ELEC WK	1920	10136	11026	10186	11056	14
163	164	4	3	2	P INS IN WLL MECH/ELEC WK	1920	10136	11026	10186	11056	14
164	166	0	0		D		10196	11086	10186	11056	14
164	167	0	0		D		10196	11106	10186	11096	16
165	167	0	0		D		10186	11106	10156	11096	17
166	168	6	5	2	P HANG DRY WALL		11086	11086	11156	11156	0
167	168	4	1	2	C INS IN WLL MECH/ELEC WK	1920	10196	11106	10226	11156	16
167	168	4	3	2	C INS IN WLL MECH/ELEC WK	1920	10196	11106	10226	11156	16
168	169	6	5	2	C HANG DRY WALL		11166	11166	11236	11236	0
169	170	0	0		D		11246	11246	11236	11236	0
170	171	4	1	2	INS FIN TUBE PIPG	960	11246	11246	11306	11306	0
171	400	0	0		ET/R		12016	12016	11306	11306	0
0	0	0					0	0	0	0	0

NETWORK MODEL FOR NEW OFFICE FACILITY HIGHLAND AND MORAN
KEITH, IOWA

VICTORIA MECHANICAL COMPANY

PROJECT NO 76-10 ISSUE NO. 1 DATED APRIL 26, 1976

RALPH J STEPHENSON P E - CONSULTANT

DATES ARE SHOWN AS MONTH,DAY,YR '0' IN TFT COL INDICATES CRITICAL ITEM

I	J	DAYS	RSP	LOC CD	AND DESCRIPTION	COST	EARLY STRT SEQ E/S	L/S	E/F	L/F	TF
1	2	106	0		T/R TO START OF PROJECT		1026	1026	5316	5316	0
2	3	65	0	1	T/R POUR OUT 1ST FL SOG		6016	6226	8316	9226	15
2	4	69	0	2	T/R TO POUR OUT 2ND DECK		6016	6166	9076	9226	11
2	5	58	0	R	T/R TO C ER RF MTL DECK		6016	7206	8206	10066	34
2	6	70	0	R	T/R TO C LAY INSUL & RFG		6016	7166	9086	10226	32
2	7	102	0		T/R TO C EXT MSNRY&GLZNG		6016	6016	10226	10226	0
101	107	6	6	1	P INS SPRINKLER PIPG	2880	9086	9266	9156	10056	14
102	108	8	2	1	P INS SHT MTL DCT&FTINGS	4800	9086	9246	9176	10056	12
103	109	3	1	1	P INS DMSTC WTR PPG-CLG	720	9086	10016	9106	10056	17
104	110	4	1	1	P INS HTG&CLNG PPG IN CLG	960	9086	10066	9136	10116	20
105	111	9	1	1	INS TO/R PLUMBG RISERS	2160	9086	9236	9206	10056	11
106	112	4	3	1	P INS RUFF ELEC CNDT&FDRS		9086	9306	9136	10056	16
109	116	3	1	1	C INS DMSTC WTR PPG-CLG	720	9136	10146	9156	10186	23
134	140	3	1	2	P INS DMSTC WTR PPG-CLG	720	9136	10196	9156	10216	26
110	117	5	1	1	C INS HTG&CLNG PPG IN CLG	1200	9146	10126	9206	10186	20
112	119	3	3	1	C INS RUFF ELEC CNDT&FDRS		9146	10146	9166	10186	22
135	151	3	1	2	P INS HTG&CLNG PPG IN CLG	720	9146	10196	9166	10216	25
137	152	4	3	2	P INS RUFF ELEC CNDT&FDRS		9146	10186	9176	10216	24
107	114	5	6	1	C INS SPRINKLER PIPG	2400	9166	10126	9226	10186	18
132	138	6	6	2	P INS SPRINKLER PIPING	2880	9166	10146	9236	10216	20
140	156	3	1	2	C INS DMSTC WTR PPG-CLG	720	9166	10286	9206	11016	30
151	157	2	1	2	C INS HTG&CLNG PPG IN CLG	480	9176	10296	9206	11016	30
108	115	8	2	1	C INS SHT MTL DUCT&FTINGS	4800	9206	10076	9296	10186	13
133	139	8	2	2	P INS SHT MTL DUCT FTINGS	4800	9206	10116	9296	10206	15
152	159	3	3	2	C INS RUFF ELEC CNDT&FDRS		9206	10286	9226	11016	28
113	118	6	4	1	ER INT MSNRY PARTNS		9216	10066	9286	10136	11
136	153	8	1	2	INS TO/R PLMG RISERS	1920	9216	10126	9306	10216	15
138	154	5	6	2	C INS SPRINKLER PIPG	2400	9246	10266	9306	11016	22
118	121	3	5	1	P ER STUDS FOR DRY WALL		9296	10146	10016	10186	11
139	155	8	2	2	C INS SHT MTL DUCT&FTINGS	4800	9306	10216	10116	11016	15
153	158	4	4	2	ER INT MSNRY PARTNS		10016	10226	10066	10276	15
121	124	3	5	1	C ER STUDS FOR DRY WALL		10046	10226	10066	10266	14
122	123	4	1	1	P INS IN WLL MECH/ELEC WK	1920	10046	10196	10076	10226	11
122	123	4	3	1	P INS IN WLL MECH/ELEC WK	1920	10046	10196	10076	10226	11
161	162	3	5	2	P ER STUDS FOR DRY WALL		10076	10286	10116	11016	15
126	127	3	1	1	C INS IN WLL MECH/ELEC WK	1440	10086	10276	10126	10296	13
126	127	3	3	1	C INS IN WLL MECH/ELEC WK	1440	10086	10276	10126	10296	13
162	165	4	5	2	C ER STUDS FOR DRY WALL		10126	11046	10156	11096	17
163	164	4	1	2	P INS IN WLL MECH/ELEC WK	1920	10136	11026	10186	11056	14
163	164	4	3	2	P INS IN WLL MECH/ELEC WK	1920	10136	11026	10186	11056	14
167	168	4	1	2	C INS IN WLL MECH/ELEC WK	1920	10196	11106	10226	11156	16
167	168	4	3	2	C INS IN WLL MECH/ELEC WK	1920	10196	11106	10226	11156	16
125	128	5	5	1	P HANG DRY WALL		10256	10256	10296	10296	0

I	J	DAYS	RSP	LOC CD	AND DESCRIPTION	COST	EARLY STRT SEQ E/S	L/S	E/F	L/F	TF
128	129	5	5	1	COMP HANG DRY WALL		11016	11016	11056	11056	0
130	131	4	1	1	INS FIN TUBE PIPING	960	11086	11086	11116	11116	0
166	168	6	5	2	P HANG DRY WALL		11086	11086	11156	11156	0
131	400	12	0	1	ET/R		11126	11126	11306	11306	0
168	169	6	5	2	C HANG DRY WALL		11166	11166	11236	11236	0
170	171	4	1	2	INS FIN TUBE PIPG	960	11246	11246	11306	11306	0

NETWORK MODEL FOR NEW OFFICE FACILITY HIGHLAND AND MORAN
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VICTORIA MECHANICAL COMPANY

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RALPH J STEPHENSON P E - CONSULTANT

DATES ARE SHOWN AS MONTH,DAY,YR '0' IN TFT COL INDICATES CRITICAL ITEM

I	J	DAYS	RSP	LOC CD	AND DESCRIPTION	COST	LATE E/S	STRT L/S	SEQ E/F	L/F	TF
1	2	106	0		T/R TO START OF PROJECT		1026	1026	5316	5316	0
2	7	102	0		T/R TO C EXT MSNRY&GLZNG		6016	6016	10226	10226	0
2	4	69	0	2	T/R TO POUR OUT 2ND DECK		6016	6166	9076	9226	11
2	3	65	0	1	T/R POUR OUT 1ST FL SOG		6016	6226	8316	9226	15
2	6	70	0	R	T/R TO C LAY INSUL & RFG		6016	7166	9086	10226	32
2	5	58	0	R	T/R TO C ER RF MTL DECK		6016	7206	8206	10086	34
105	111	9	1	1	INS TO/R PLUMBG RISERS	2160	9086	9236	9206	10056	11
102	108	8	2	1	P INS SHT MTL DCT&FTTNGS	4800	9086	9246	9176	10056	12
101	107	6	6	1	P INS SPRINKLER PIPG	2880	9086	9286	9156	10056	14
106	112	4	3	1	P INS RUFF ELEC CNDT&FDRS		9086	9306	9136	10056	16
103	109	3	1	1	P INS DMSTC WTR PPG-CLG	720	9086	10016	9106	10056	17
104	110	4	1	1	P INS HTG&CLNG PPG IN CLG	960	9086	10066	9136	10116	20
113	118	6	4	1	ER INT MSNRY PARTNS		9216	10066	9286	10136	11
108	115	8	2	1	C INS SHT MTL DUCT&FTTNGS	4800	9206	10076	9296	10186	13
133	139	8	2	2	P INS SHT MTL DUCT FTTNGS	4800	9206	10116	9296	10206	15
107	114	5	6	1	C INS SPRINKLER PIPG	2400	9166	10126	9225	10166	18
110	117	5	1	1	C INS HTG&CLNG PPG IN CLG	1200	9146	10126	9206	10166	20
136	153	8	1	2	INS TO/R PLMG RISERS	1920	9216	10126	9306	10216	15
109	116	3	1	1	C INS DMSTC WTR PPG-CLG	720	9136	10146	9156	10166	23
112	119	3	3	1	C INS RUFF ELEC CNDT&FDRS		9146	10146	9166	10166	22
118	121	3	5	1	P ER STUDS FOR DRY WALL		9296	10146	10016	10166	11
132	138	6	6	2	P INS SPRINKLER PIPING	2880	9166	10146	9236	10216	20
137	152	4	3	2	P INS RUFF ELEC CNDT&FDRS		9146	10186	9176	10216	24
122	123	4	1	1	P INS IN WLL MECH/ELEC WK	1920	10046	10196	10076	10226	11
122	123	4	3	1	P INS IN WLL MECH/ELEC WK	1920	10046	10196	10076	10226	11
134	140	3	1	2	P INS DMSTC WTR PPG-CLG	720	9136	10196	9156	10216	26
135	151	3	1	2	P INS HTG&CLNG PPG IN CLG	720	9146	10196	9166	10216	25
139	155	8	2	2	C INS SHT MTL DUCT&FTTNGS	4800	9306	10216	10116	11016	15
121	124	3	5	1	C ER STUDS FOR DRY WALL		10046	10226	10066	10266	14
153	158	4	4	2	ER INT MSNRY PARTNS		10016	10226	10066	10276	15
125	128	5	5	1	P HANG DRY WALL		10256	10256	10296	10296	0
138	154	5	6	2	C INS SPRINKLER PIPG	2400	9246	10266	9306	11016	22
126	127	3	1	1	C INS IN WLL MECH/ELEC WK	1440	10086	10276	10126	10296	13
126	127	3	3	1	C INS IN WLL MECH/ELEC WK	1440	10086	10276	10126	10296	13
140	156	3	1	2	C INS DMSTC WTR PPG-CLG	720	9166	10286	9206	11016	30
152	159	3	3	2	C INS RUFF ELEC CNDT&FDRS		9206	10286	9226	11016	26
161	162	3	5	2	P ER STUDS FOR DRY WALL		10076	10286	10116	11016	15
151	157	2	1	2	C INS HTG&CLNG PPG IN CLG	480	9176	10296	9206	11016	30
128	129	5	5	1	COMP HANG DRY WALL		11016	11016	11056	11056	0
163	164	4	1	2	P INS IN WLL MECH/ELEC WK	1920	10136	11026	10186	11056	14
163	164	4	3	2	P INS IN WLL MECH/ELEC WK	1920	10136	11026	10186	11056	14
162	165	4	5	2	C ER STUDS FOR DRY WALL		10126	11046	10156	11096	17
130	131	4	1	1	INS FIN TUBE PIPING	960	11086	11086	11116	11116	0

I	J	DAYS	RSP	LOC CD	AND DESCRIPTION	COST	LATE STRT SEQ E/S	L/S	E/F	L/F	TF
166	168	6	5	2	P HANG DRY WALL		11066	11086	11156	11156	0
167	168	4	1	2	C INS IN WLL MECH/ELEC WK	1920	10196	11106	10226	11156	16
167	168	4	3	2	C INS IN WLL MECH/ELEC WK	1920	10196	11106	10226	11156	16
131	400	12	0	1	ET/R		11126	11126	11306	11306	0
168	169	6	5	2	C HANG DRY WALL		11166	11166	11236	11236	0
170	171	4	1	2	INS FIN TUBE PIPG	960	11246	11246	11306	11306	0

NETWORK MODEL FOR NEW OFFICE FACILITY HIGHLAND AND MORAN
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RALPH J. STEPHENSON P E - CONSULTANT

DATES ARE SHOWN AS MONTH,DAY,YR '0' IN TFT COL INDICATES CRITICAL ITEM

I	J	DAYS	RSP	LOC CD	AND DESCRIPTION	COST	LATE FINISH SEQ E/S	L/S	E/F	L/F	TF
1	2	106	0		T/R TO START OF PROJECT		1026	1026	5316	5316	0
2	3	65	0	1	T/R POUR OUT 1ST FL SOG		6016	6226	8316	9226	15
2	4	69	0	2	T/R TO POUR OUT 2ND DECK		6016	6166	9076	9226	11
101	107	6	6	1	P INS SPRINKLER PIPG	2880	9086	9286	9156	10056	14
102	108	8	2	1	P INS SHT MTL DCT&FTTNGS	4800	9086	9246	9176	10056	12
103	109	3	1	1	P INS DMSTC WTR PPG-CLG	720	9086	10016	9106	10056	17
105	111	9	1	1	INS TO/R PLUMBG RISERS	2160	9086	9236	9206	10056	11
106	112	4	3	1	P INS RUFF ELEC CNDT&FDRS		9086	9306	9136	10056	16
2	5	58	0	R	T/R TO C ER RF MTL DECK		6016	7206	8206	10086	34
104	110	4	1	1	P INS HTG&CLNG PPG IN CLG	960	9086	10066	9136	10116	20
113	118	6	4	1	ER INT MSNRY PARTNS		9216	10066	9286	10136	11
107	114	5	6	1	C INS SPRINKLER PIPG	2400	9166	10126	9226	10186	18
108	115	8	2	1	C INS SHT MTL DUCT&FTTNGS	4800	9206	10076	9296	10186	13
109	116	3	1	1	C INS DMSTC WTR PPG-CLG	720	9136	10146	9156	10186	23
110	117	5	1	1	C INS HTG&CLNG PPG IN CLG	1200	9146	10126	9206	10186	20
112	119	3	3	1	C INS RUFF ELEC CNDT&FDRS		9146	10146	9166	10186	22
118	121	3	5	1	P ER STUDS FOR DRY WALL		9296	10146	10016	10186	11
133	139	8	2	2	P INS SHT MTL DUCT FTTNGS	4800	9206	10116	9296	10206	15
132	138	6	6	2	P INS SPRINKLER PIPING	2880	9166	10146	9236	10216	20
134	140	3	1	2	P INS DMSTC WTR PPG-CLG	720	9136	10196	9156	10216	26
135	151	3	1	2	P INS HTG&CLNG PPG IN CLG	720	9146	10196	9166	10216	25
136	153	8	1	2	INS TO/R PLMG RISERS	1920	9216	10126	9306	10216	15
137	152	4	3	2	P INS RUFF ELEC CNDT&FDRS		9146	10186	9176	10216	24
2	6	70	0	R	T/R TO C LAY INSUL & RFG		6016	7166	9086	10226	32
2	7	102	0		T/R TO C EXT MSNRY&GLZNG		6016	6016	10226	10226	0
122	123	4	1	1	P INS IN WLL MECH/ELEC WK	1920	10046	10196	10076	10226	11
122	123	4	3	1	P INS IN WLL MECH/ELEC WK	1920	10046	10196	10076	10226	11
121	124	3	5	1	C ER STUDS FOR DRY WALL		10046	10226	10066	10266	14
153	158	4	4	2	ER INT MSNRY PARTNS		10016	10226	10066	10276	15
125	128	5	5	1	P HANG DRY WALL		10256	10256	10296	10296	0
126	127	3	1	1	C INS IN WLL MECH/ELEC WK	1440	10086	10276	10126	10296	13
126	127	3	3	1	C INS IN WLL MECH/ELEC WK	1440	10066	10276	10126	10296	13
138	154	5	6	2	C INS SPRINKLER PIPG	2400	9246	10266	9306	11016	22
139	155	8	2	2	C INS SHT MTL DUCT&FTTNGS	4800	9306	10216	10116	11016	15
140	156	3	1	2	C INS DMSTC WTR PPG-CLG	720	9166	10286	9206	11016	30
151	157	2	1	2	C INS HTG&CLNG PPG IN CLG	480	9176	10296	9206	11016	30
152	159	3	3	2	C INS RUFF ELEC CNDT&FDRS		9206	10286	9226	11016	28
161	162	3	5	2	P ER STUDS FOR DRY WALL		10076	10286	10116	11016	15
128	129	5	5	1	COMP HANG DRY WALL		11016	11016	11056	11056	0
163	164	4	1	2	P INS IN WLL MECH/ELEC WK	1920	10136	11026	10186	11056	14
163	164	4	3	2	P INS IN WLL MECH/ELEC WK	1920	10136	11026	10186	11056	14
162	165	4	5	2	C ER STUDS FOR DRY WALL		10126	11046	10156	11076	17
130	131	4	1	1	INS FIN TUBE PIPING	960	11086	11086	11116	11116	0

I	J	DAYS	RSP	LOC CD	AND DESCRIPTION	COST	LATE FINISH SEQ E/S	L/S	E/F	L/F	TF
166	168	6	5	2	P HANG DRY WALL		11086	11086	11156	11156	0
167	168	4	1	2	C INS IN WLL MECH/ELEC WK	1920	10196	11106	10226	11156	16
167	168	4	3	2	C INS IN WLL MECH/ELEC WK	1920	10196	11106	10226	11156	16
168	169	6	5	2	C HANG DRY WALL		11166	11166	11236	11236	0
131	400	12	0	1	ET/R		11126	11126	11306	11306	0
170	171	4	1	2	INS FIN TUBE PIPG	960	11246	11246	11306	11306	0

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I	J	DAYS	RSP	LOC CD	AND DESCRIPTION	COST	TOTAL FLT SEQ E/S	L/S	E/F	L/F	TF
1	2	106	0		T/R TO START OF PROJECT		1026	1026	5316	5316	0
2	7	102	0		T/R TO C EXT MSNRY&GLZNG		6016	6016	10226	10226	0
125	128	5	5	1	P HANG DRY WALL		10256	10256	10296	10296	0
128	129	5	5	1	COMP HANG DRY WALL		11016	11016	11056	11056	0
130	131	4	1	1	INS FIN TUBE PIPING	960	11086	11086	11116	11116	0
131	400	12	0	1	ET/R		11126	11126	11306	11306	0
166	168	6	5	2	P HANG DRY WALL		11086	11086	11156	11156	0
168	169	6	5	2	C HANG DRY WALL		11166	11166	11236	11236	0
170	171	4	1	2	INS FIN TUBE PIPG	960	11246	11246	11306	11306	0
2	4	69	0	2	T/R TO POUR OUT 2ND DECK		6016	6166	9076	9226	11
105	111	9	1	1	INS TO/R PLUMBG RISERS	2160	9086	9236	9206	10056	11
113	118	6	4	1	ER INT MSNRY PARTNS		9216	10066	9286	10136	11
118	121	3	5	1	P ER STUDS FOR DRY WALL		9296	10146	10016	10186	11
122	123	4	1	1	P INS IN WLL MECH/ELEC WK	1920	10046	10196	10076	10226	11
122	123	4	3	1	P INS IN WLL MECH/ELEC WK	1920	10046	10196	10076	10226	11
102	108	8	2	1	P INS SHT MTL DCT&FTTNGS	4800	9086	9246	9176	10056	12
108	115	8	2	1	C INS SHT MTL DUCT&FTTNGS	4800	9206	10076	9296	10186	13
126	127	3	1	1	C INS IN WLL MECH/ELEC WK	1440	10086	10276	10126	10296	13
126	127	3	3	1	C INS IN WLL MECH/ELEC WK	1440	10086	10276	10126	10296	13
101	107	6	6	1	P INS SPRINKLER PIPG	2880	9086	9286	9156	10056	14
121	124	3	5	1	C ER STUDS FOR DRY WALL		10046	10226	10066	10266	14
163	164	4	1	2	P INS IN WLL MECH/ELEC WK	1920	10136	11026	10186	11056	14
163	164	4	3	2	P INS IN WLL MECH/ELEC WK	1920	10136	11026	10186	11056	14
2	3	65	0	1	T/R POUR OUT 1ST FL SOG		6016	6226	8316	9226	15
133	139	8	2	2	P INS SHT MTL DUCT FTTNGS	4800	9206	10116	9296	10206	15
136	153	8	1	2	INS TO/R PLMG RISERS	1920	9216	10126	9306	10216	15
139	155	8	2	2	C INS SHT MTL DUCT&FTTNGS	4800	9306	10216	10116	11016	15
153	158	4	4	2	ER INT MSNRY PARTNS		10016	10226	10066	10276	15
161	162	3	5	2	P ER STUDS FOR DRY WALL		10076	10286	10116	11016	15
106	112	4	3	1	P INS RUFF ELEC CNDT&FDRS		9086	9306	9136	10056	16
167	168	4	1	2	C INS IN WLL MECH/ELEC WK	1920	10196	11106	10226	11156	16
167	168	4	3	2	C INS IN WLL MECH/ELEC WK	1920	10196	11106	10226	11156	16
103	109	3	1	1	P INS DMSTC WTR PPG-CLG	720	9086	10016	9106	10056	17
162	165	4	5	2	C ER STUDS FOR DRY WALL		10126	11046	10156	11096	17
107	114	5	6	1	C INS SPRINKLER PIPG	2400	9166	10126	9226	10186	18
104	110	4	1	1	P INS HTG&CLNG PPG IN CLG	960	9086	10066	9136	10116	20
110	117	5	1	1	C INS HTG&CLNG PPG IN CLG	1200	9146	10126	9206	10186	20
132	138	6	6	2	P INS SPRINKLER PIPING	2880	9166	10146	9236	10216	20
112	119	3	3	1	C INS RUFF ELEC CNDT&FDRS		9146	10146	9166	10186	22
138	154	5	6	2	C INS SPRINKLER PIPG	2400	9246	10266	9306	11016	22
109	116	3	1	1	C INS DMSTC WTR PPG-CLG	720	9136	10146	9156	10186	23
137	152	4	3	2	P INS RUFF ELEC CNDT&FDRS		9146	10186	9176	10216	24
135	151	3	1	2	P INS HTG&CLNG PPG IN CLG	720	9146	10196	9166	10216	25

I	J	DAYS	RSP	LOC CD	AND DESCRIPTION	COST	TOTAL FLT SEQ E/S	L/S	E/F	L/F	TF
134	140	3	1	2	P INS DMSTC WTR PPG-CLG	720	9136	10196	9156	10216	26
152	159	3	3	2	C INS RUFF ELEC CNDT&FDRS		9206	10286	9226	11016	28
140	156	3	1	2	C INS DMSTC WTR PPG-CLG	720	9166	10286	9206	11016	30
151	157	2	1	2	C INS HTG&CLNG PPG IN CLG	480	9176	10296	9206	11016	30
2	6	70	0	R	T/R TO C LAY INSUL & RFG		6016	7166	9086	10226	32
2	5	58	0	R	T/R TO C ER RF MTL DECK		6016	7206	8206	10086	34

RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

November 1,

Subject: Monitoring Report #1

New Office Facility

Highland and Moran, Keith, Iowa

Victoria Mechanical Company

Project: 76:10

Monitored from Issue #1 dated April 26,

Date of Monitoring: September 24, (working day 188)

Target Completion Date: November 30, evening (working day 234) for fin tube piping

Actions taken:

- Inspected project
- Reviewed job progress with superintendent
- Evaluated job progress
- Color coded networks

General Summary

As of September 24, (working day 188) the project is basically in healthy condition. An evaluation of the job against late starts and late finishes shows that all major tasks are currently meeting or bettering late starts and late finishes.

Accurate information on exterior masonry and glazing status was not available from the general contractor. This work should be watched carefully since it affects hanging board upon which installation of our fin tube piping depends.

Projecting directly from late start/late finish sequences, it appears activities over the next two weeks should include:

- continuing installation of all major riser and overhead mechanical and electrical work
- installation of interior masonry partitions
- installation of insulation and roofing
- erection of exterior masonry and glazing

RALPH J. STEPHENSON, P. E.
CONSULTING ENGINEER

It is anticipated that on September 29, according to the current early start schedule, studs for drywall are due to start at the first floor. However, looking at installation progress of toilet room plumbing risers, it appears these are lagging early start/early finish targets. Therefore, interior masonry which restrains installation of studs will probably be late and may delay installation of in-wall work past the current desired early target of October 4, (working day 194).

In a conference with the drywall contractor on September 24 (working day 188) he said he would prefer to erect studs and install one side of the board. We told him that this was not a desirable procedure and asked him if he would leave both sides exposed. He agreed, providing we would be liable for any damage to his studs by our work. We agreed.

In summary, the project is moving fairly well. The superintendent is on top of the job and our projections for work over the next week indicate the job should stay healthy.

Ralph J. Stephenson, P.E.

RJS
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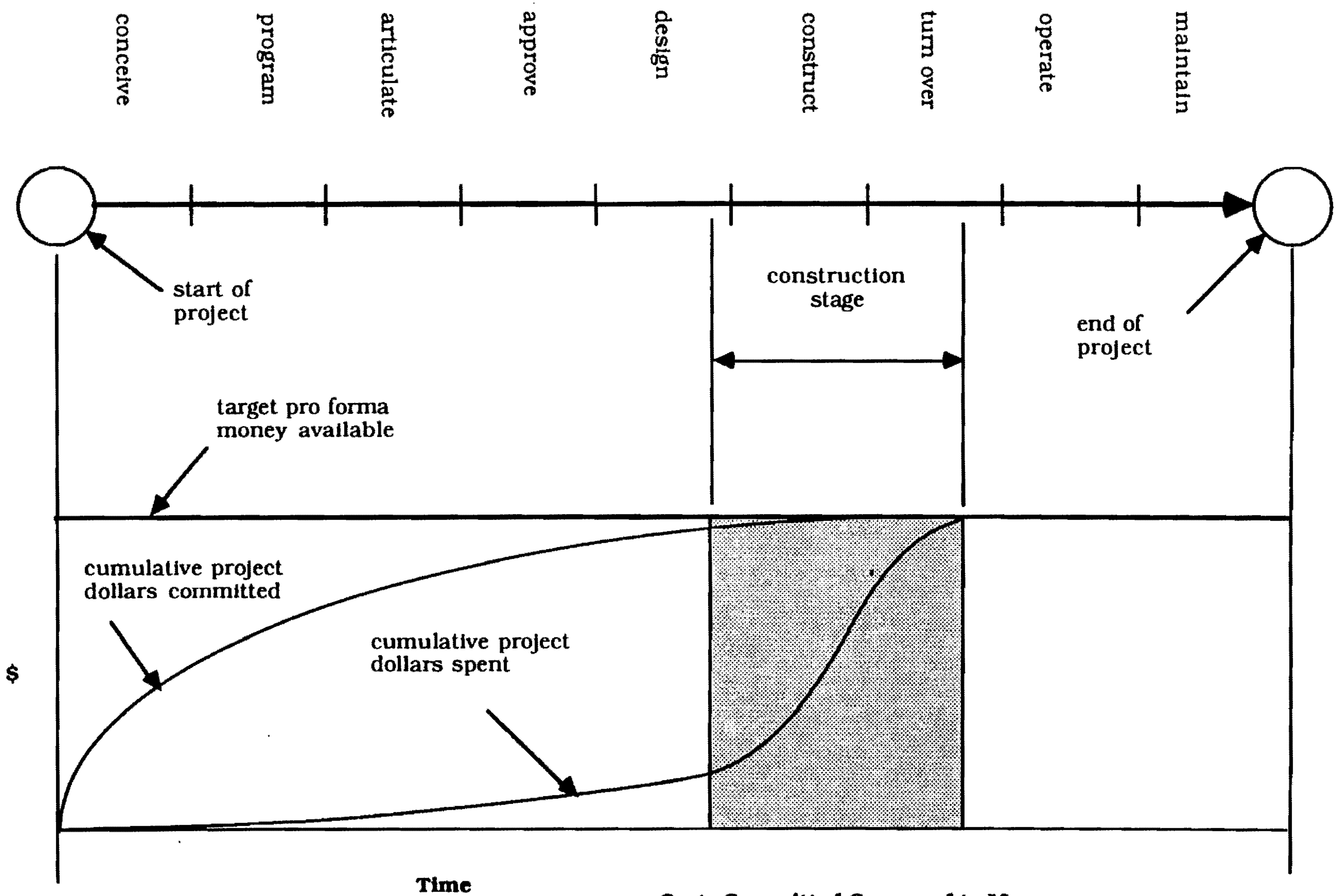
RALPH J. STEPHENSON, P.E.
CONSULTING ENGINEER

Monitoring #2

Project Status as of morning of Oct. 8 (working day 198)

Task	Color Code	Status	Was completed evening of	Will be completed
108 - 115		Comp.	Sept. 30	----
109 - 116		Comp.	Sept. 28	----
110 - 117		Comp.	Sept. 30	----
105 - 111		Comp.	Oct. 5	----
112 - 119		Comp.	Sept. 28	----
132 - 138		Comp.	Oct. 6	----
133 - 139		Comp.	Oct. 1	----
136 - 153		10% comp.	----	in 6 working days
137 - 152		Comp.	Sept. 30	----
138 - 154		10% comp.	----	in 20 working days (material problems)
139 - 155		50% comp.	----	in 3 working days
140 - 156		Comp.	Sept. 27	----
151 - 157		Comp.	Oct. 5	----
152 - 159		Comp.	Oct. 7	----
2 - 6		Comp.	Oct. 4	----
2 - 7		70% comp.	----	in 15 working days



Costs Committed Compared to Money Spent on Construction Projects

Ralph J. Stephenson PE
Consulting Engineer

Costs Committed vs. Money Spent

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

Penalties and losses may include such items as:

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

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

APPLY SITUATIONAL THINKING

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

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

Some basic ideas related to situational thinking

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

• B. Most inadequate managerial decisions are a result of

1. Failure to include enough significant factors for the time available to make the decision
2. Delaying action until after cause-effect relations have changed

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

• D. Five situational failings the excellent manager must guard against

1. Views too narrow - mental tunnel vision
2. Assessments too subjective
3. Missing moving targets
4. Failing to allow for momentum
5. Trying to control the impossible

• E. To think situationally

1. Find the overall picture - get out to the boundaries of the biggest picture available to you
2. Look at the edges of the situation as well as at the center
3. Identify and explore areas of minimum information
4. Seek and locate significant internal and external relationships
5. Use time as an asset, just like you use labor, materials, or money
6. Pretest decisions whenever possible
7. Constantly strive to increase the number and range of your informal interfaces

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