

*L. J. [unclear]*

Dec 5, 1977

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**SUPERINTENDENTS' MANAGEMENT INSTITUTE**

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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!

APPROACH PATTERNS:

1. Improve capabilities
2. Gain control
3. Create - Don't adapt
4. Experiment
5. Expand conceptual grasp
6. Don't deadhead - Keep learning
7. Solve problems
8. Define objectives

GLOSSARY OF TERMS USED IN  
PROJECT PLANNING AND MANAGEMENT

Administrative

Usually considered to be supportive of executive operations in an organization. Very simply, administrative costs may be considered the cost of management.

Authority

The leverage, either vested or earned, that allows an individual in an organization to effectively carry out his responsibilities.

Business model

A graphic depiction of the elements which make up a business entity. The model usually identifies premises, objectives and implementation. It recognizes basic business functions, business activities and manager activities.

Control

Maintaining firm, fair, competent managerial direction of any given situation. Controlling leads to achievement. It is usually accomplished by the invisible use of leverage.

Critical path method

A mathematical modeling technique which allows the user to establish ranges within which resources can or must be used.

Decision table

A tabular display of information regarding a defined situation which permits alternative courses of action to be evaluated by yes or no answers to explicit questions.

Decision - to - action time span

The amount of time required from the point at which a decision is made to the point where the decision is implemented. In a management structure it is important to insure that the full span of time from decision to action is covered from shortest to longest.

Decision tree

A graphic device showing alternate courses of action from a given situation point. The decision tree is used to graphically show the impact of various possible decisions at any given point in the decision process. It can be quantified or unquantified.

Dysfunction - organizational

An organizational problem that hinders or prevents achieving objectives - may be temporary or permanent.

Early finish (EF)

The earliest possible time a task can finish in a network model if all of the tasks preceding it have been completed by their early finish dates.

Early start (ES)

The earliest possible time at which a task can begin in a network model if all tasks preceding it start at their earliest possible starting times.

Education

The teaching and learning process by which principles of doing things are conveyed to the learner.

Effective

Of a nature that accomplishes identifiable end objectives in accordance with an action plan, and achieves worthwhile peripheral goals resulting from intermediate accomplishments.

Elapsed duration

The estimated or actual amount of calendar or clock time an activity requires to accomplish considering all directly and indirectly related influences upon the task activity. This includes temporary work delays and stoppages due to influencing actions on the task.

Ex'e-cutive

The executing arm of the organization. This is the group and activities that are closest to the flow of expense and income in achieving the organization's prime objectives. It is closely related to line operations.

Fabrication facilities

Usually considered to be the physical location where materials and equipment are prepared and assembled ready for use.

Goals

Similar to objectives but quite often applied to individual effort rather than group or company effort.

Goals - dependent

Targets to be achieved, but affected by major influences beyond the manager's control. (Note: dependent goals, while beyond a manager's control, may be well within his company's ability to achieve. Lack of correlation between company and individual effort in achieving a manager's dependent goals may cause severe organizational dysfunctions.)

Goals - direct control

Targets achieved by managing conditions well within the direct influence of the manager.

Histogram

A graphic depiction of quantity plotted against various elements such as item function, item name or time.

Hygiene

The elements in a given situation that are acceptable to an individual but do not necessarily motivate him. These same factors, if unacceptable, act as negative influences upon the individual.

Interfaces

Points at which different but related activities exert direct influences upon each other. Interfaces are often the influence points where direct control goal activities contact dependent goal activities. Poor management of interface situations usually causes problems.

Late finish (LF)

The latest allowable time in a network model that a task can be completed without forcing those tasks that follow it past their latest allowable starting dates.

Late start (LS)

The latest allowable time at which a task in a network model can start without forcing the tasks that follow it past their latest allowable starting dates.

Leverage

The effective use of vested and earned authority to solve problems and achieve objectives.

Life cycle cost

The total cost of a system over its entire defined life.

Line activities

Those organizational activities that are most closely identified with the flow of basic expense and income related to the prime objectives of the organization.

Line of action

A sequential statement of the activities necessary to conceive, design, build and operate an environment.

Manage

To define, assemble and direct the application of resources.

Management by exception (MX)

A measuring and monitoring system that sounds an alarm to the manager when problems have or are about to arise, and remains silent when there are no problems. The system explicitly identifies the problem area, thus permitting the effective manager to manage the exception while leaving smoothly running operations to continue running smoothly.

Managerial grid

A numerical grid which positions a manager in a matrix by defining his concern for people as compared to his concern for production. This grid has been highly developed by Blake & Mouton and is useful in establishing managerial systems that are both desirable and needed.

Money flow

The flow of income and expense plotted in amounts of money against time.

Monitoring

Measurement of current project conditions and position against the standard of performance.

Motivation

The elements of a given situation that encourage and make effective, successful and meaningful the activities of those engaged.

Network plan

A graphic statement of the action standard of performance expected to be used in achieving project objectives.

Network planning

A graphic technique of showing the necessary and desired actions needed to achieve end, intermediate and peripheral objectives.

Objectives - end

Those objectives that are realized from and upon total completion of the project work.

Objectives - intermediate

Those objectives achieved at specific and identifiable stages of the project, i. e. partial occupancy of a building, or turn-over of a mechanical system for temporary heat.

Objectives - long range

Usually applied to organizational objectives to be achieved within a 5 to 10 year period. Sometimes called strategic objectives.

Objectives - medium range

Organizational objectives to be achieved within a 1 to 5 year period. Sometimes called tactical objectives.

Objectives - peripheral

Those objectives realized on an ongoing basis through the life of the project and achieved as an indirect result of project activities. Peripheral objectives may be personal, professional, technical, financial or social. Examples of peripheral objectives might include staff promotion, profitable subcontractor operations or specialized experience.

Objectives - short range

Organizational goals to be achieved between now and 1 year. Sometimes called operational or short term tactical objectives.

Ongoing organization

The arrangement and interrelationships of people charged with maintaining supportive actions provided by the ongoing elements of a company. Examples of functions contained in the ongoing organization are estimating, administration, legal, sales and purchasing.



Organization

The arrangement of resources (talent, skill, money, time, space, people, et al) that has evolved or been selected to accomplish the functions, activities, manager activities and goals of a business or institution.

Planning

Establishing and arranging the necessary and desired actions leading to end, intermediate and peripheral objectives.

Problem

A deviation from an accepted standard of performance.

Profiling

A selective, flexible, dynamic operable system of screening projects, people, activities and other elements of a project to achieve optimum results, as defined by established plans and objectives.

Profit - education

Company and project fulfillment of learning goals held by individuals or groups involved.

Profit - financial

Fundamentally, the difference between organizational cash income and organizational cash expense. Further definitions of financial profit are complex and often unique to an organization or project.

Profit - self actualization

Personal fulfillment realized after basic needs of shelter, safety, protection, love and freedom from hunger are achieved.

Profit - socio-economic

Company, group or individual achievement of social objectives within a financially profitable situation.  
(Note: very difficult to explicitly define.)

Profit - value system

Company and project fulfillment of personal, professional, technical, social and financial values held important by individuals and groups.

Project

A set of work actions having identifiable end objectives.

Project Manager

That individual responsible for full implementation of a project through the authority and resources given him by his organization. Usually the project manager is most concerned with supportive action which brings resources to the point of effective use.

Project organization

The arrangement and interrelationships of people charged with implementing the end, intermediate and peripheral objectives of the project.

Project stages

A sequential definition of the action steps to be taken in successfully carrying out a project.

Project superintendent

The individual, usually in a construction program, who is most directly responsible for the expenditure of funds to carry out the project. The project superintendent is responsible for executive actions.

Question - direct

One asked with strong indications as to specifically who should reply.

Question - overhead

One asked of a group without indication as to who is to reply.

Question - relay

One passed along to someone else other than the party originally asked.

Question - reverse

One returned to the questioner by rephrasing or rewording the original question.

Relations - formal functional

Project relationships that concern distribution and use of data, information and decisions that flow along formally defined transmission lines. Formal functional communications are usually written and are normally one to many or many to one in nature. Formal relations are precisely defined and most day to day business is accomplished within the formal relation framework.

Relations - informal functional

The natural channels along which organizationally related material is most easily, comfortably and quickly transmitted. The informal relation usually exists by consent and is stimulated to maximum effectiveness by a mutual profit gained from the relation. There is little, if any, authority normally expressed in informal relations. Communication is usually oral and one to one. Often informal relations define the hidden organizational structure.

Relations - occasional or temporary

Those created when extraordinary or unusual management demands arise. The temporary relationship is, by its nature, unstable and should seldom be adopted as a permanent active arrangement. Extensive use of informal functional relationships creates business dysfunctions, breaks down morale and causes internal tensions difficult to resolve.

Relations - reporting

The official channels through which each individual conveys or is given raises, appraisals and evaluations; is fired, assigned, reassigned, and is provided professional, vocational and personal identity. Usually is a one to one communication. The true organizational superior of an employee is usually that individual with whom he maintains a reporting relation.

Relations - staff

Those business relations through which a person or group provides advisory services necessary to accomplish goals. Staff personnel usually act in a consulting capacity with little or no authority relative to those outside the staff group.

Resources

The tools of the supportive and ex'e-cutive manager. Resources can include manpower, talent, tools, equipment, time, money, experience, space, materials, as well as intangibles such as enthusiasm, morale and leverage.

Responsibility

The assignment, spoken or understood, that a person in an organization has as his part in maintaining the organization's health and continued vitality.

Schedule

A graphic or written tabulation of project activities showing where they are to start and finish. The schedule is derived from the plan of action and the network model by locking the tasks and the resources they require into a specific time position.

Span of control

The number of organizationally related individuals a manager directly controls. Span of control is signified by the number of one to one relations a manager maintains.

Staff

A supportive unit of any organization in which the basic function is usually advisory in nature. Staff functions are occasionally defined as overhead or non-production. They are considered to be the opposite of line activities.

Standard of performance

A well defined, explicitly stated, approved and accepted statement of the measurement object to be used as a gage of performance and goal achievement.

Structured organization

An arrangement of business elements that tends toward highly defined, formal functional definition. The structured organization, depending upon degree, can work exceptionally well or not at all. It tends to lead toward high overhead, excessive management layering and quite often, particularly in subsidized sectors, management paralysis. It is beneficial in that when well used, it tends to eliminate confusion and misconceptions regarding the role of the individual in the organization.

Talent

A capacity for achieving identifiable success. Usually talent is considered one of the abstract resources.

Time

The clock or calendar position assigned to activities. Usually in network systems time is measured in elapsed working days.

Total float (TF)

The amount of discretionary time available to a task in a network model. The total float is the difference between the early and late starts and finishes. It is one of the most important elements in the use of network systems.

Training

The teaching and learning processes by which specific, explicit methods and systems of doing something are conveyed to the learner.

Translation

Recasting standard of performance information and data into graphic, narrative, mental, oral or other form to insure optimum use by all involved.

Unstructured organization

An arrangement that encourages interrelations tending toward informal operations, minimal paper work, loosely defined reporting relations and high dependence upon individual initiative. It should be noted that the informal nature of this kind of organization demands continued challenge and excitement infused from the outside to maintain economic strength without being subsidized. Usually subsidization of the unstructured activity brings it to an end.

Value engineering

A simulation technique that encourages identification of the best function for the least cost (not only financial) in a given technical decision situation.

SUGGESTED BIBLIOGRAPHY OF MANAGEMENT RELATED BOOKS

- Managing Yourself Creatively  
Hawthorn Books, Inc.  
260 Madison Avenue  
New York, New York (paperback)  
Ted Pollock
- The Nine Master Keys of Management  
McGraw-Hill Book Company  
330 West 42nd Street  
New York, New York 10036  
Lester R. Bittel
- It All Depends  
University of Alabama Press  
University, Alabama  
Harvey Sherman
- Management - Tasks, Responsibilities, Practices  
Harper & Row, Publishers, Inc.  
10 East 53rd Street  
New York, New York 10022  
Peter F. Drucker
- The Managerial Grid  
Gulf Publishing Company  
Houston, Texas 77001  
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330 West 42nd Street  
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Kepner & Tregoe

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Top Management Planning

George R. Steiner

The Macmillan Company  
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New York, New York 10022

Management By Exception

Lester R. Bittel

McGraw-Hill Book Company  
330 West 42nd Street  
New York, New York 10036

Critical Path Method

Radcliff, Kawal,  
Stephenson

Cahners Publishing Company, Inc.  
Boston, Mass. 02116

Effective Psychology for Managers

Mortimer R. Feinberg

Prentice Hall, Inc.  
Englewood Cliffs, New Jersey

The Time Trap

R. Alec MacKenzie

Amacom  
135 W. 50th Street  
New York, New York 10020

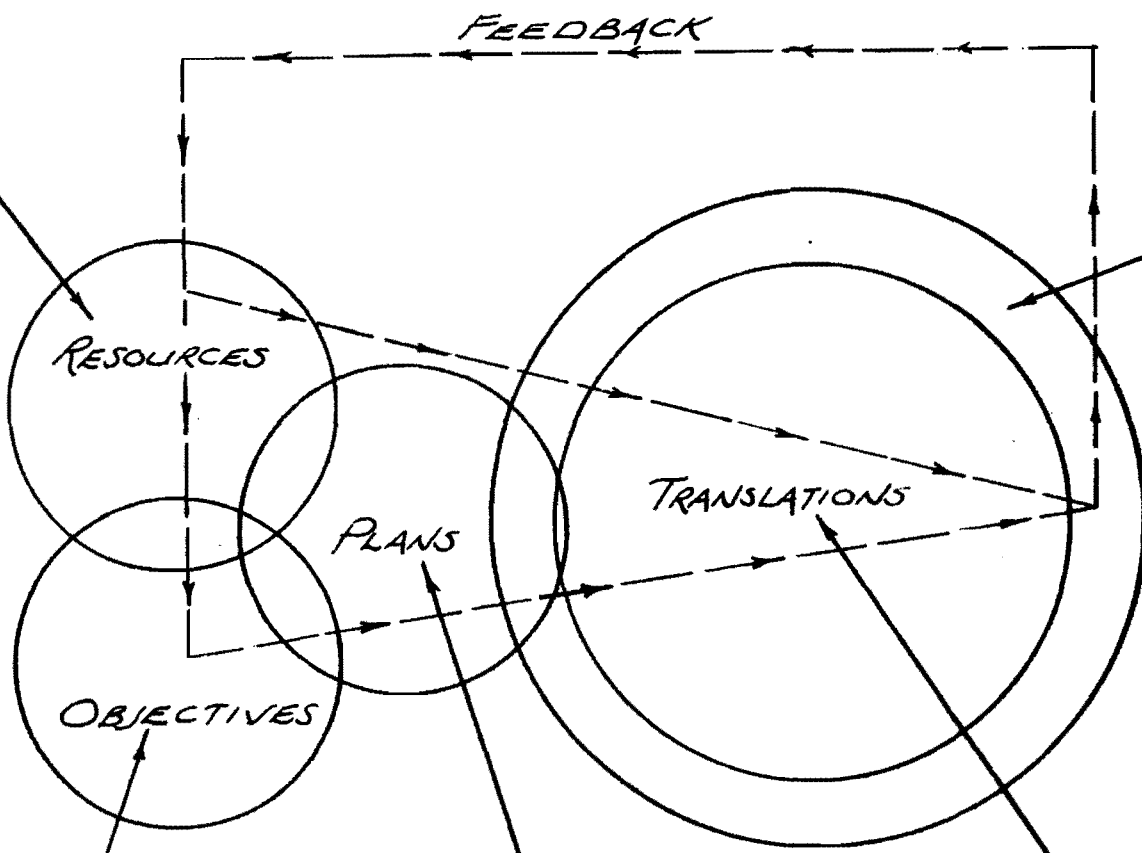
Management - Theory & Practice

Ernest Dale

McGraw-Hill Book Company  
330 West 42nd Street  
New York, New York 10036



People  
 Money  
 Space  
 Time  
 Talent  
 Enthusiasm  
 Equipment  
 Materials  
 Etc.



Monitoring  
 Controlling  
 Correcting

PICTURE  
OF A  
PROJECT

Political  
 Value System  
 Social  
 Economic  
 Self Actualized  
 Operating  
 Educational  
 Etc.

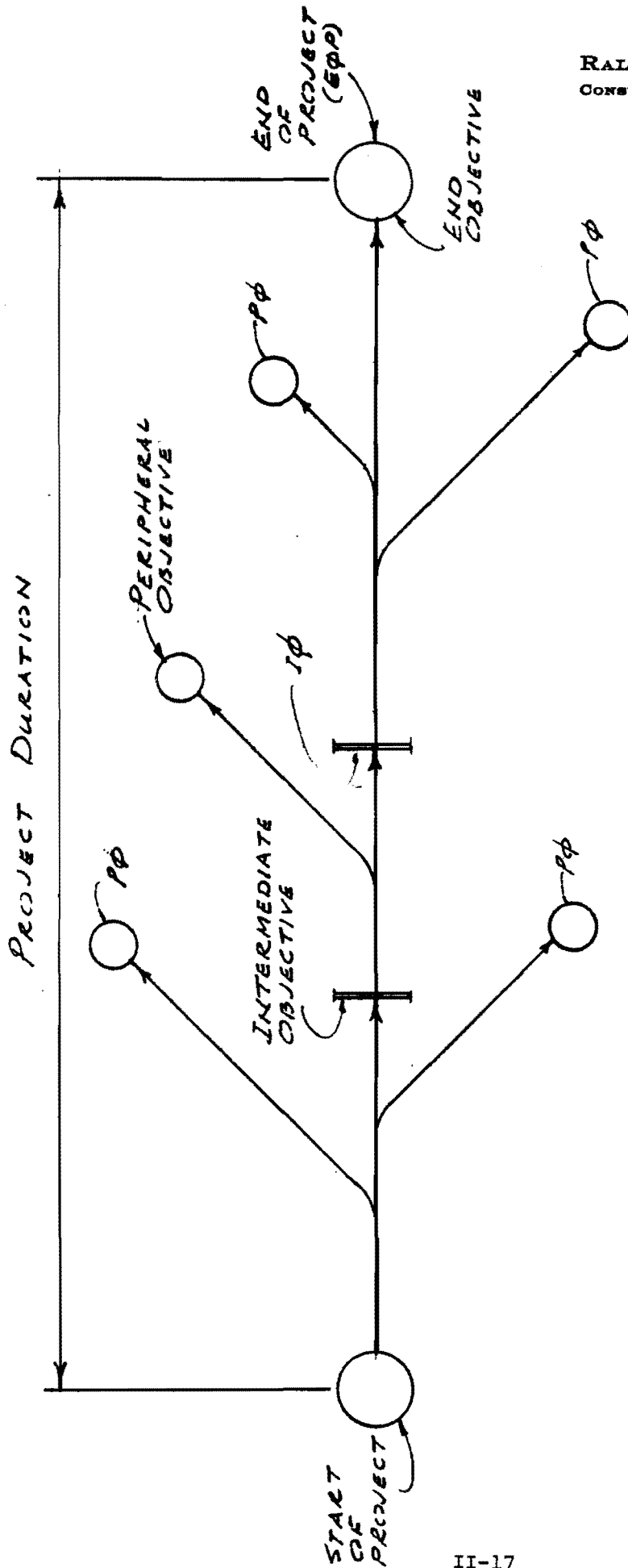
Drawings  
 Networks  
 Flow Charts  
 Specifications  
 Estimates  
 Organizational Models  
 Etc.

Bar Chart  
 Slant Charts  
 Oral Instruction  
 Decision Tables  
 Narratives  
 Etc.

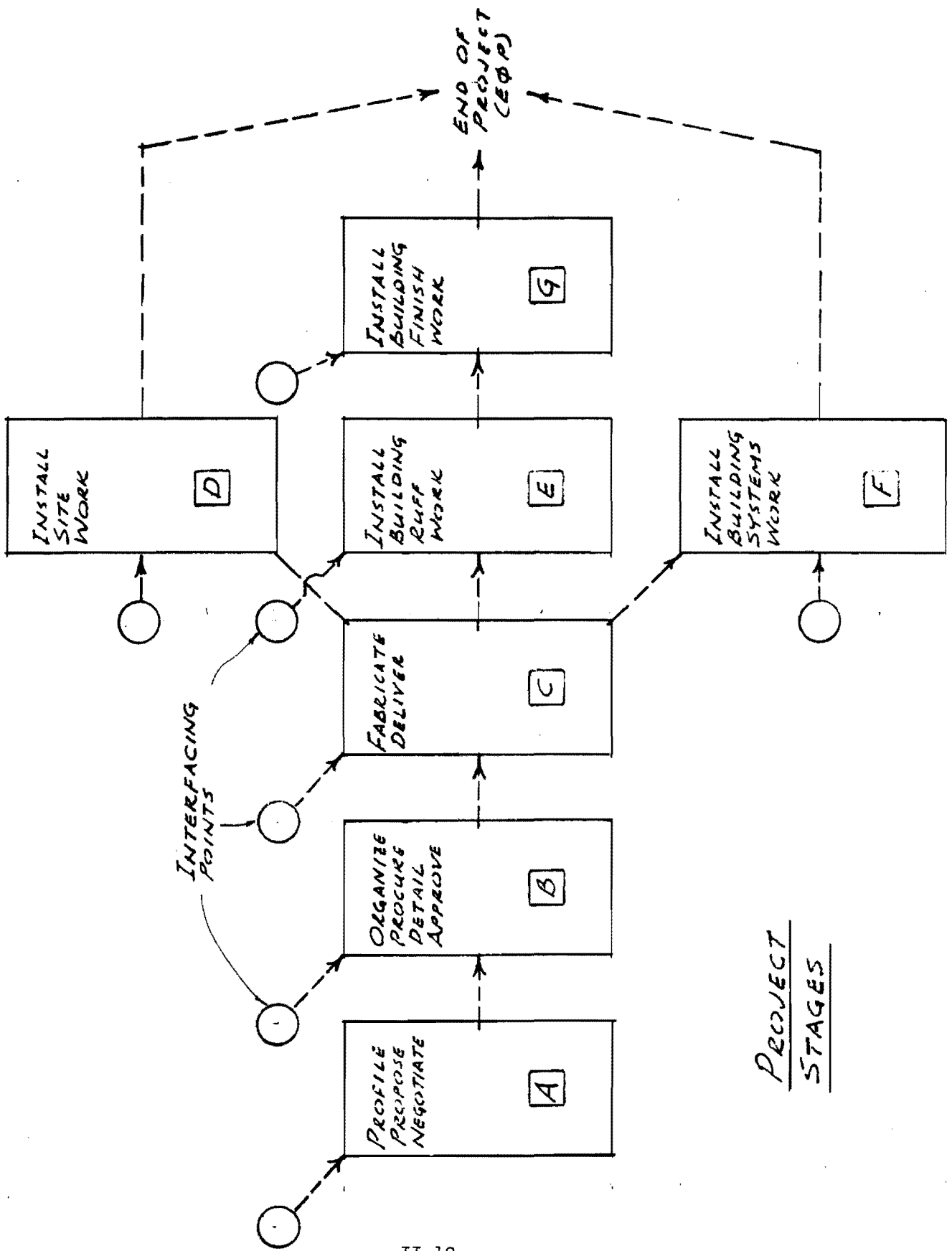
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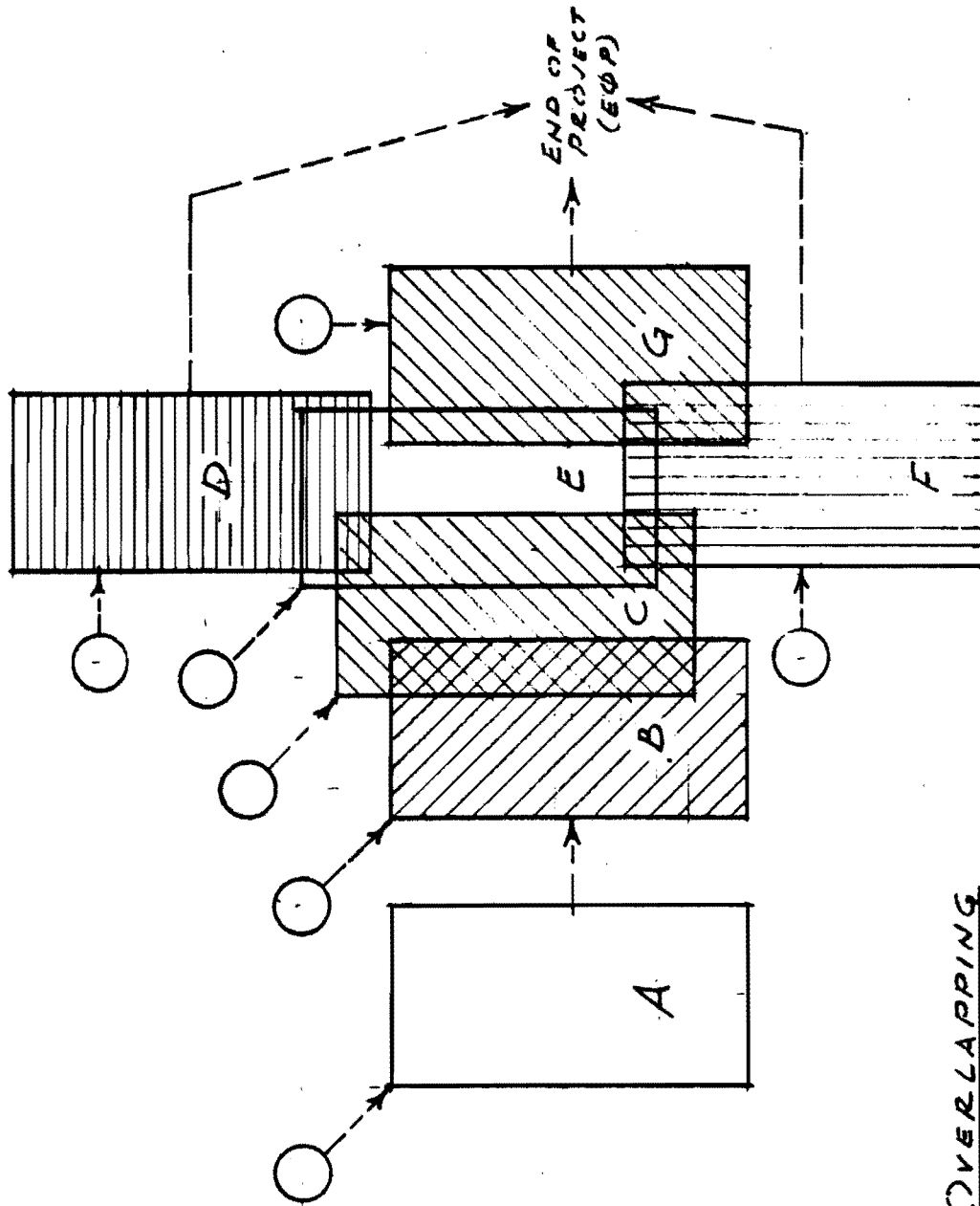
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END, INTERMEDIATE &  
PERIPHERAL OBJECTIVES

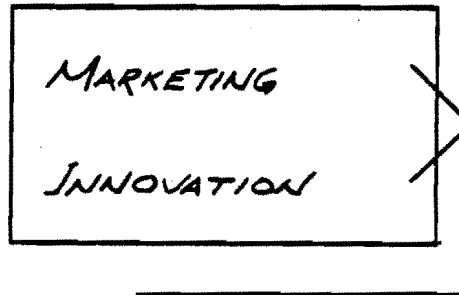




OVERLAPPING  
PROJECT  
STAGES

# ELEMENTS OF BUSINESS & MANAGEMENT

PRIME  
FUNCTIONS



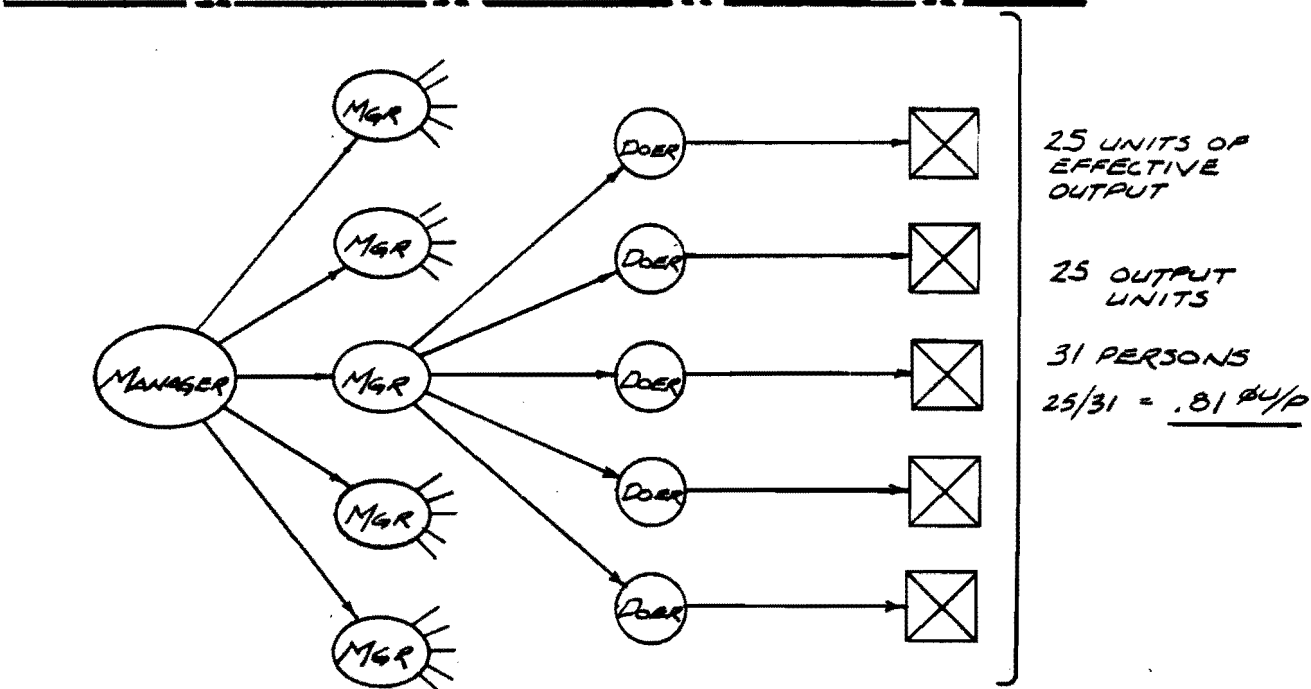
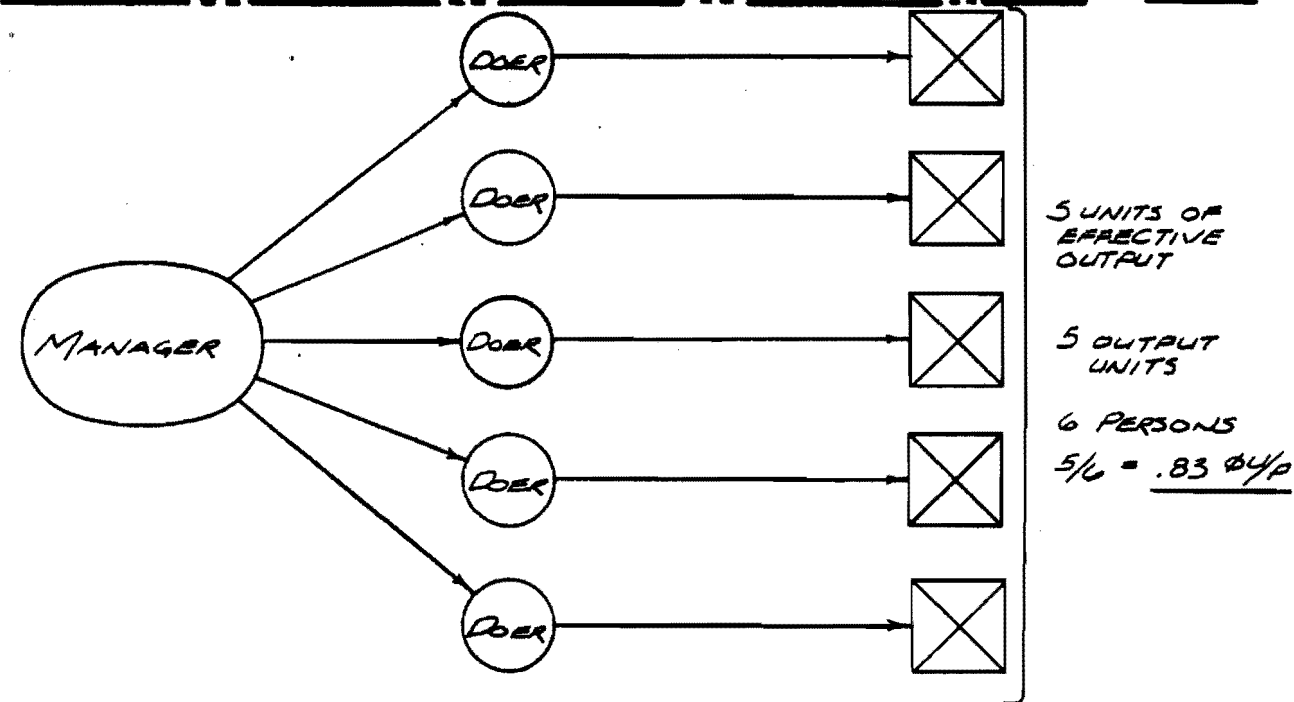
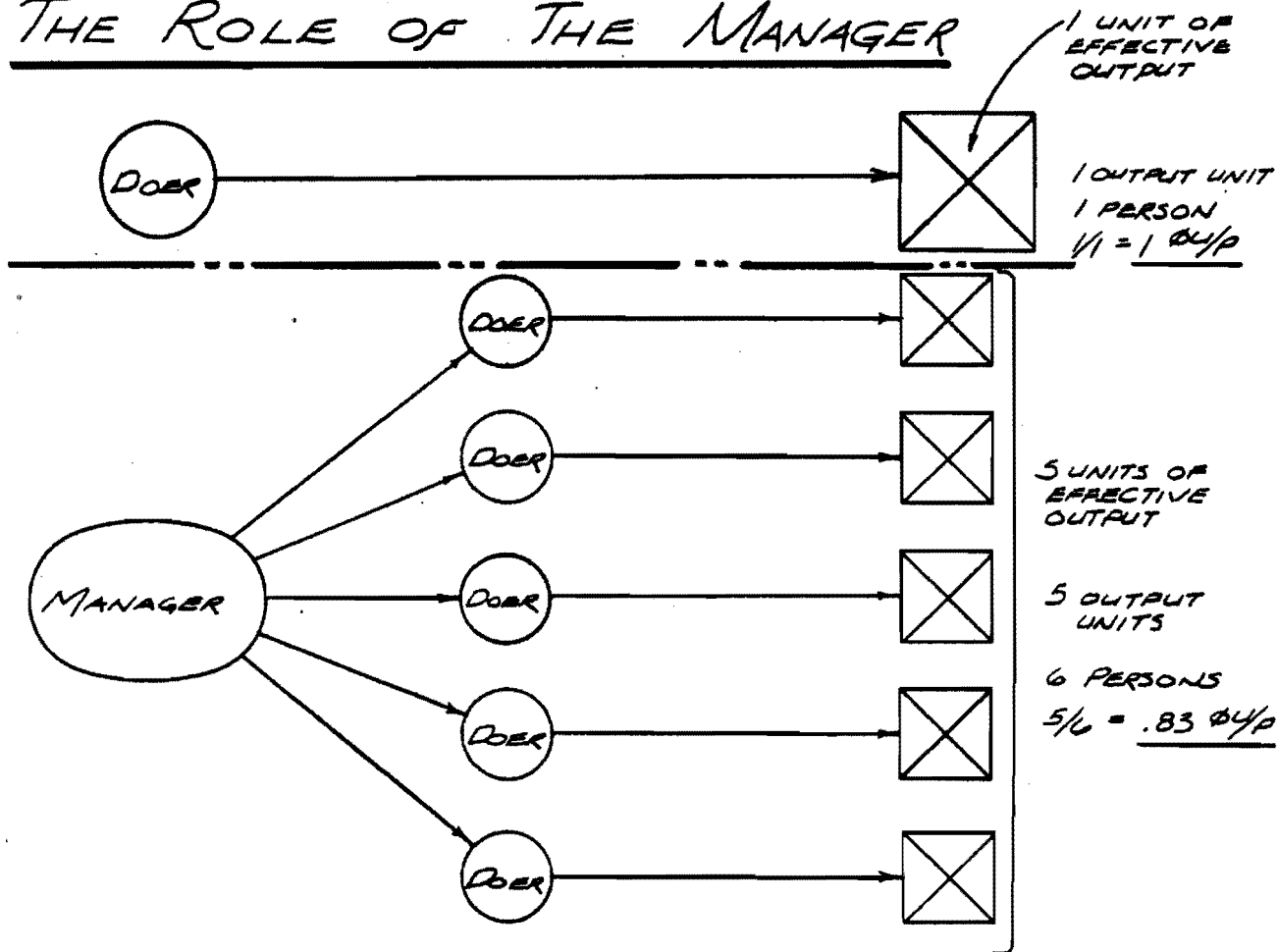
BUSINESS  
ACTIVITIES

SUPPORTIVE	EXECUTIVE
ADMINISTRATION NON PRODUCTION OVERHEAD STAFF ONGOING BACK UP FRONT END BURDEN	OPERATIONS PRODUCTION DIRECT LINE PROJECT ON LINE CLOSING COSTS

MANAGEMENT  
ACTIONS

PLANNING	P
ORGANIZING	Ø
STAFFING	S
DIRECTING	D
CONTROLLING	C
REPRESENTING	R

# THE ROLE OF THE MANAGER



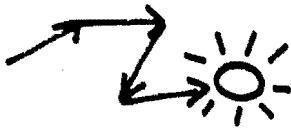
PROJECT MANAGEMENT  
AN EXPLORATORY LOOK

- Definition:
- Project - A set of work actions having identifiable objectives.
  - Effective - Of a nature that accomplishes identifiable objectives in accordance with the action plan, and achieves specified peripheral goals resulting from intermediate actions.
  - Manage - To direct the application of available resources.

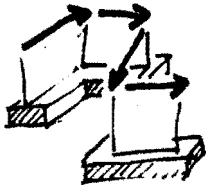
Question?: What is different about project organization as compared to the ongoing parent organization?

1. Project organization is usually temporary (relatively).
2. Project organization may be on a different base than the ongoing parent organization.
3. Project authority positions tend to be vested first and earned later.

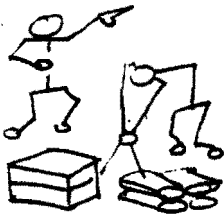
What is it?: A project seems to have the following characteristics (features) and requirements.



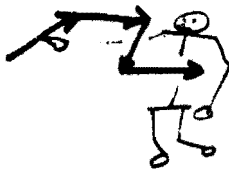
1. Its objectives must be clearly defined.
2. The desired course of action from start to finish is (and if it isn't, should be) explicitly stated as a standard of performance (if you can't plan it, you can't do it!)
3. The resources required to do each action from beginning to end are identified and made countable.



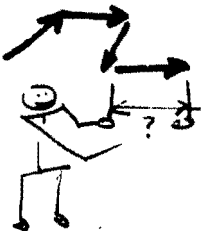
4. An organization structure should be (or is best) built under (not over) the resource framework to give the resource frame quality, continuity and monitorability.



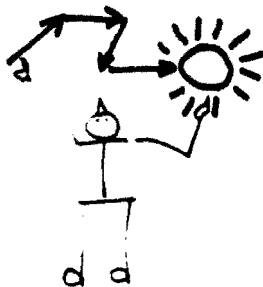
5. The resources needed to do the project can be assembled and put to work.



6. A method of isolating, identifying and correcting deviations from the standards of expected performance has to be devised and applied.

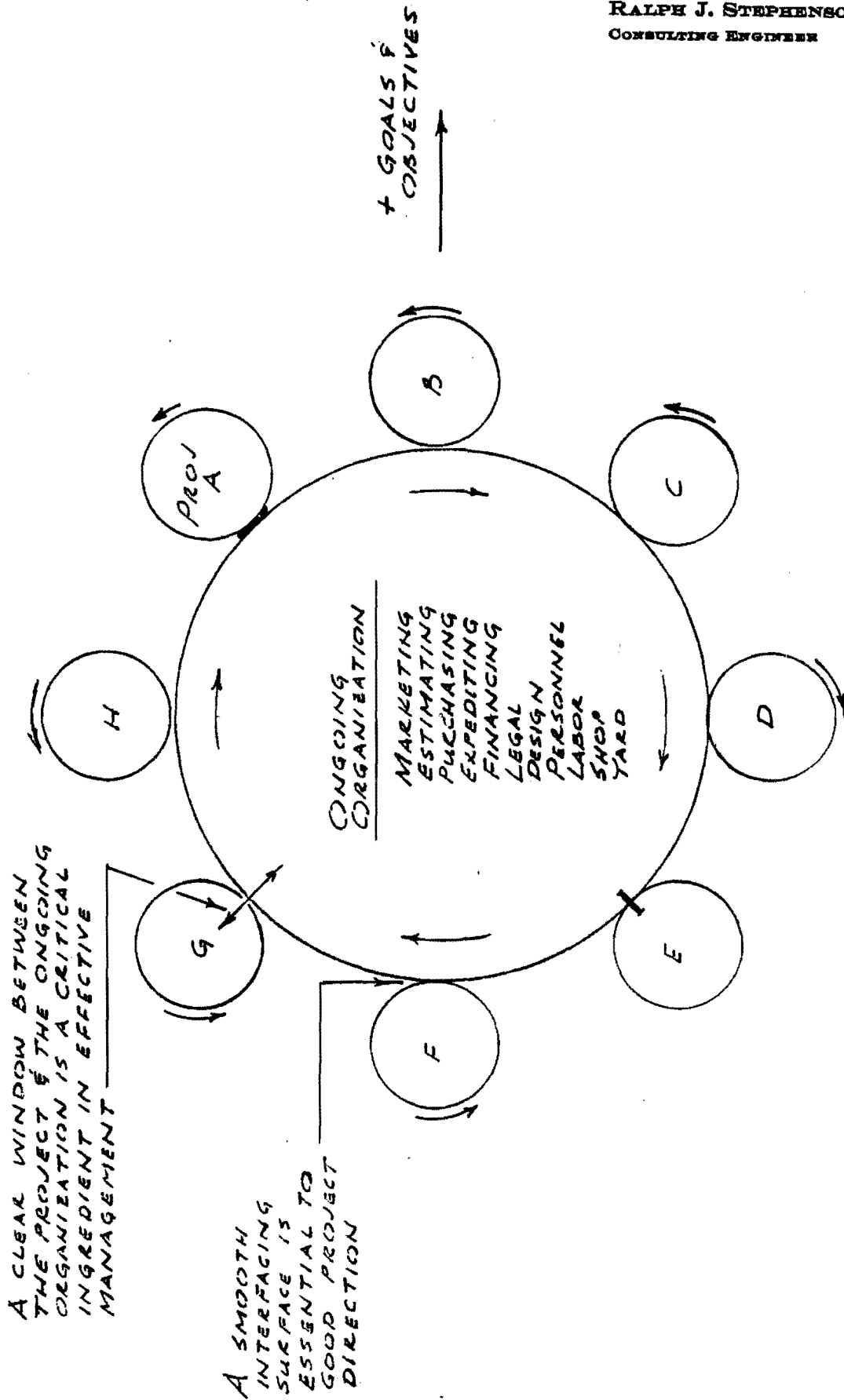


7. The performance should be measured to reward competence, and correct and improve lesser efforts as the project proceeds and upon its completion.



8. Outside management (ongoing management) usually sets both the starting and ending of the project.



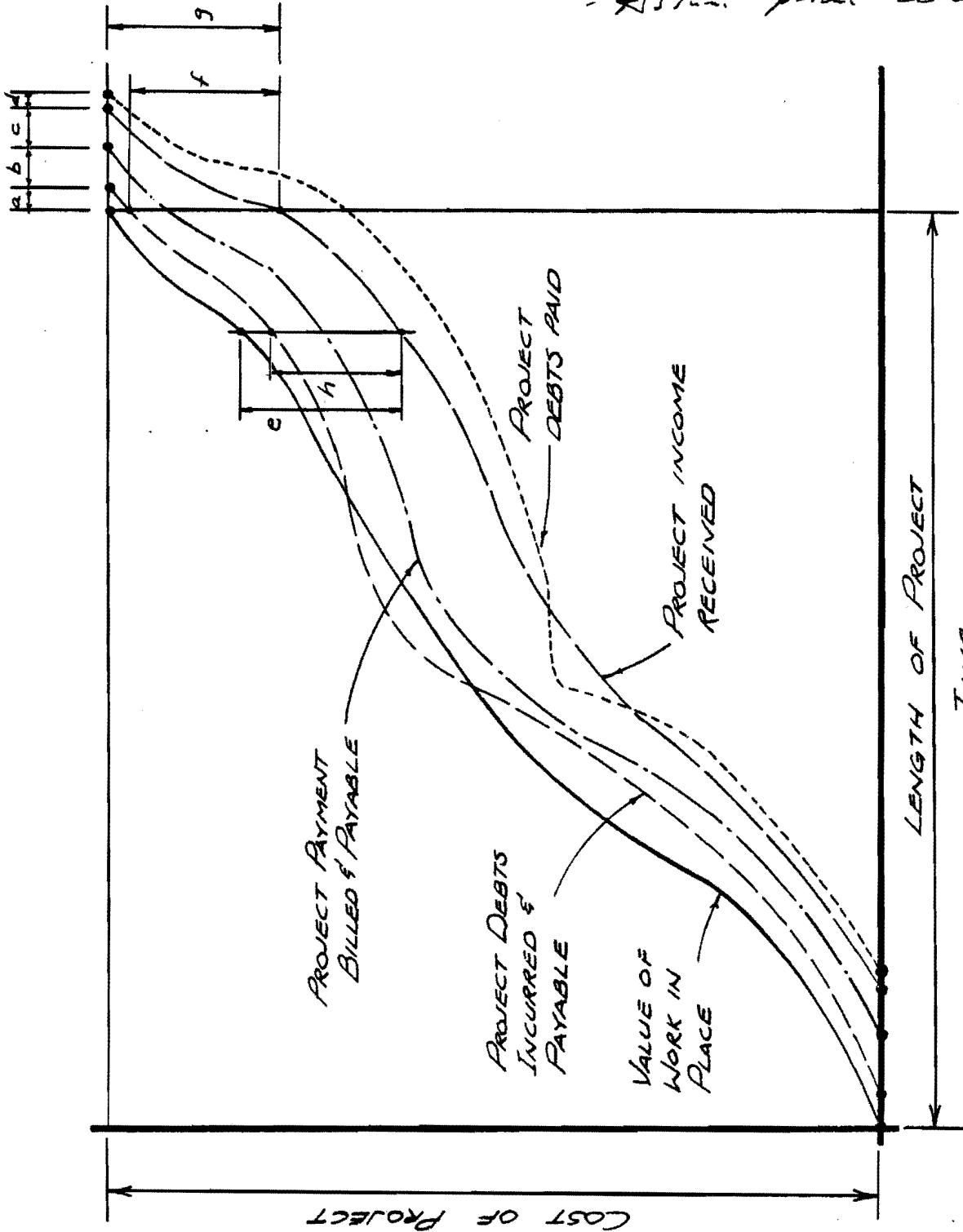


THE RELATION OF PROJECT  
MANAGEMENT TO  
ONGOING MANAGEMENT

WHAT FACTORS INFLUENCE PROFIT?

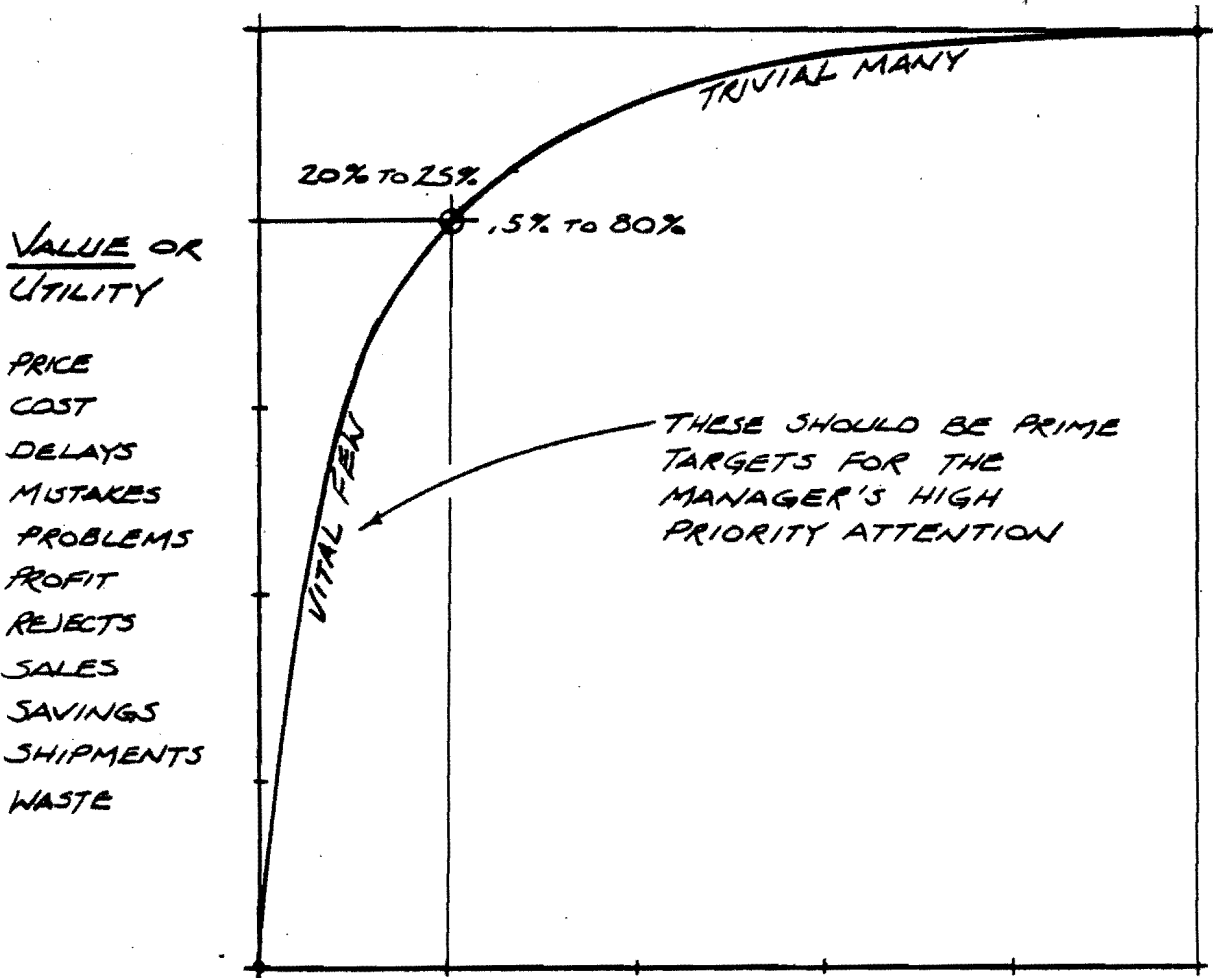
Business Volume	Size of Project
Field Efficiency (Effectiveness)	Quality of Dwgs & Specs
Office Efficiency (Effectiveness)	Location
Executive Competence	Labor Relations
Executive Interest	Caliber of Field Managers
Diversity of Operation (Hedging)	Expediting Effectiveness
Types of Contracts	Project Planning
Quality of Estimating	Project Scheduling
Unit Costs	Withheld Amounts
Area Work Volume	Availability of Labor
Season of Year	Billing Procedures
Local Economy	Inventory Practices
National Economy	Internal Education
Governmental Policies	Internal Training
Caliber of Participating Contractors	Type of Business
Caliber of Competing Contractors	Experience
Caliber of Suppliers	Reputation
Delivery Dates	Staff Honesty
Amount of Warranty Work	Caliber of Purchasing Skills
Caliber of Owner or Client	Profiling Procedures
Type of Project	Organizational Plans

- Have clear definition of the dimension
- Assume prime contractor



PROJECT MONEY FLOW

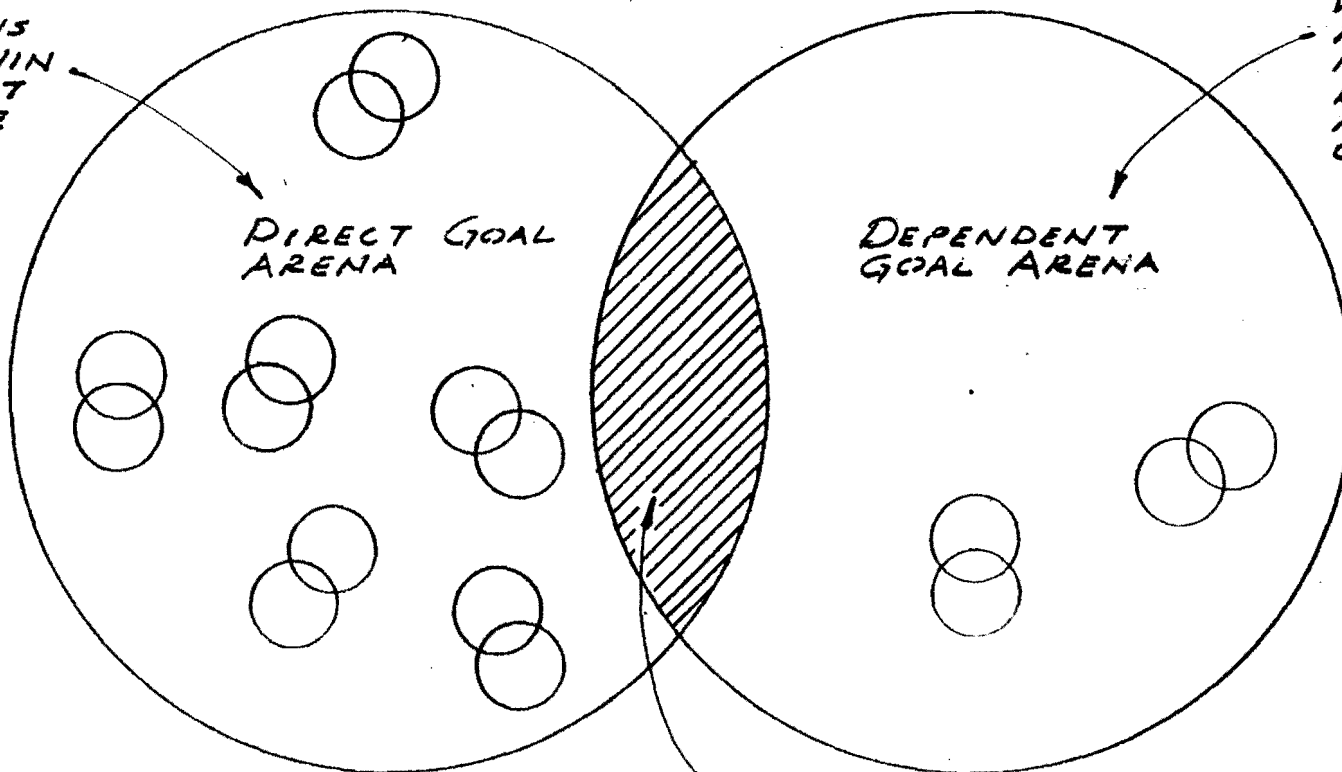
PARETOS LAW - IN AN OBJECT/VALUE SITUATION ONLY A FEW OF THE OBJECTS ACCOUNT FOR THE GREATEST PART OF THE VALUE.



OBJECTS OR RESOURCES

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

TARGETS TO BE  
ACHIEVED BY  
MANAGING  
CONDITIONS  
WELL WITHIN  
THE DIRECT  
INFLUENCE  
OF THE  
MANAGER



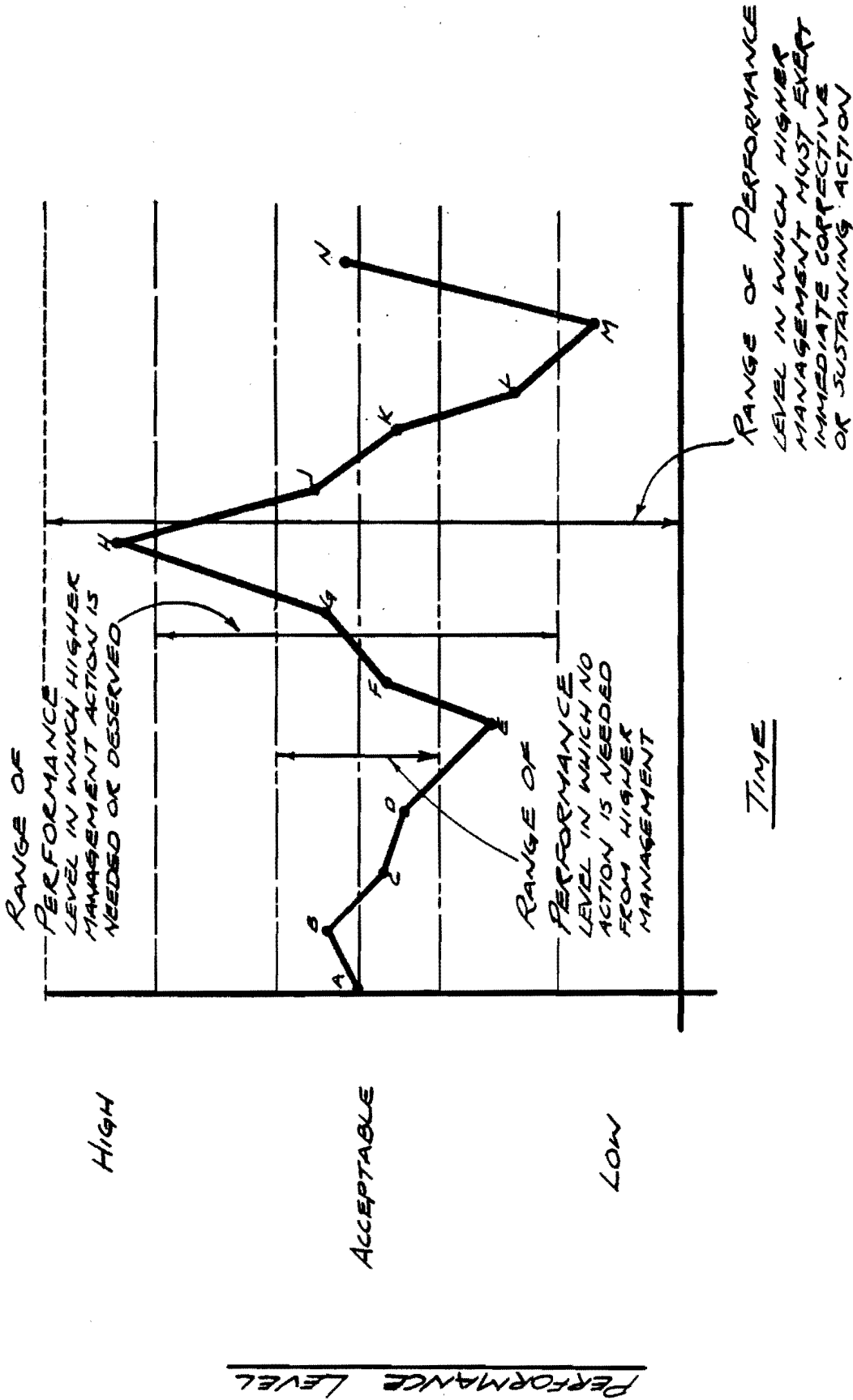
DIRECT GOAL  
ARENA

DEPENDENT  
GOAL ARENA

TARGETS TO BE  
ACHIEVED BUT  
WHICH ARE  
AFFECTED BY  
MAJOR INFLUENCES  
BEYOND THE  
MANAGER'S  
CONTROL

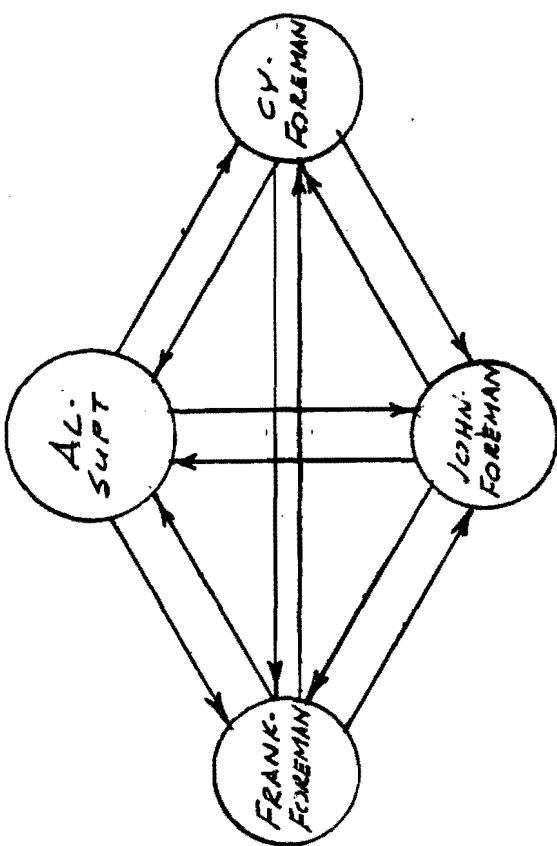
THIS INTERSECTION IS  
WHERE THE GOOD PM  
IS USUALLY FOUND TO  
EXCEL: MANAGING THE  
INTERFACES BETWEEN  
DIRECT GOALS & DEPENDENT  
GOALS.

## THE DIG/DEG INTERSECTION



MANAGEMENT BY EXCEPTION (MX) AND  
PERFORMANCE LEVEL ACTIONS

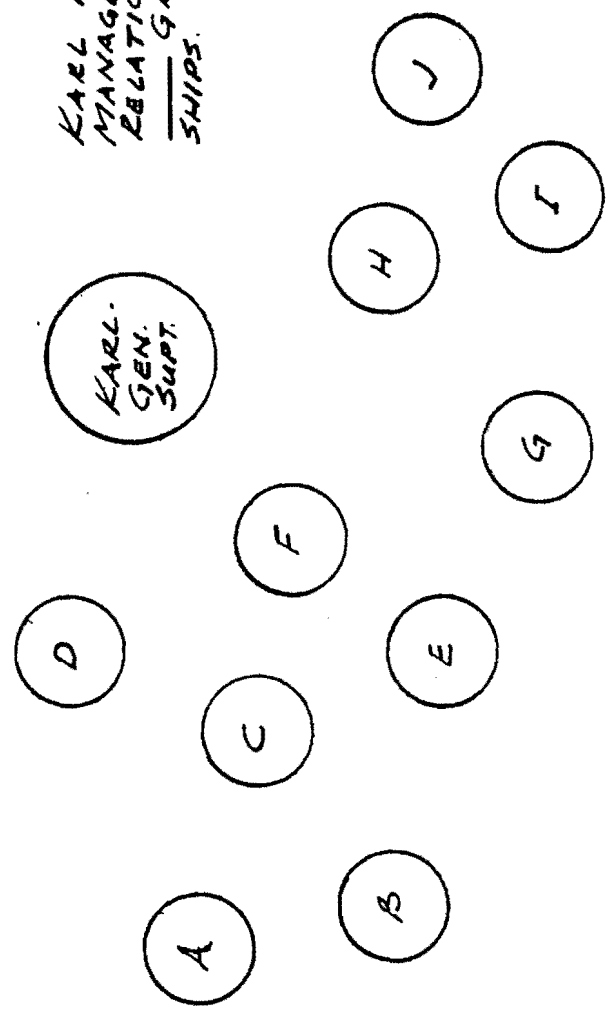
AL MANAGES  
INDIVIDUAL  
RELATIONSHIPS  
 & GROUP  
RELATIONSHIPS.

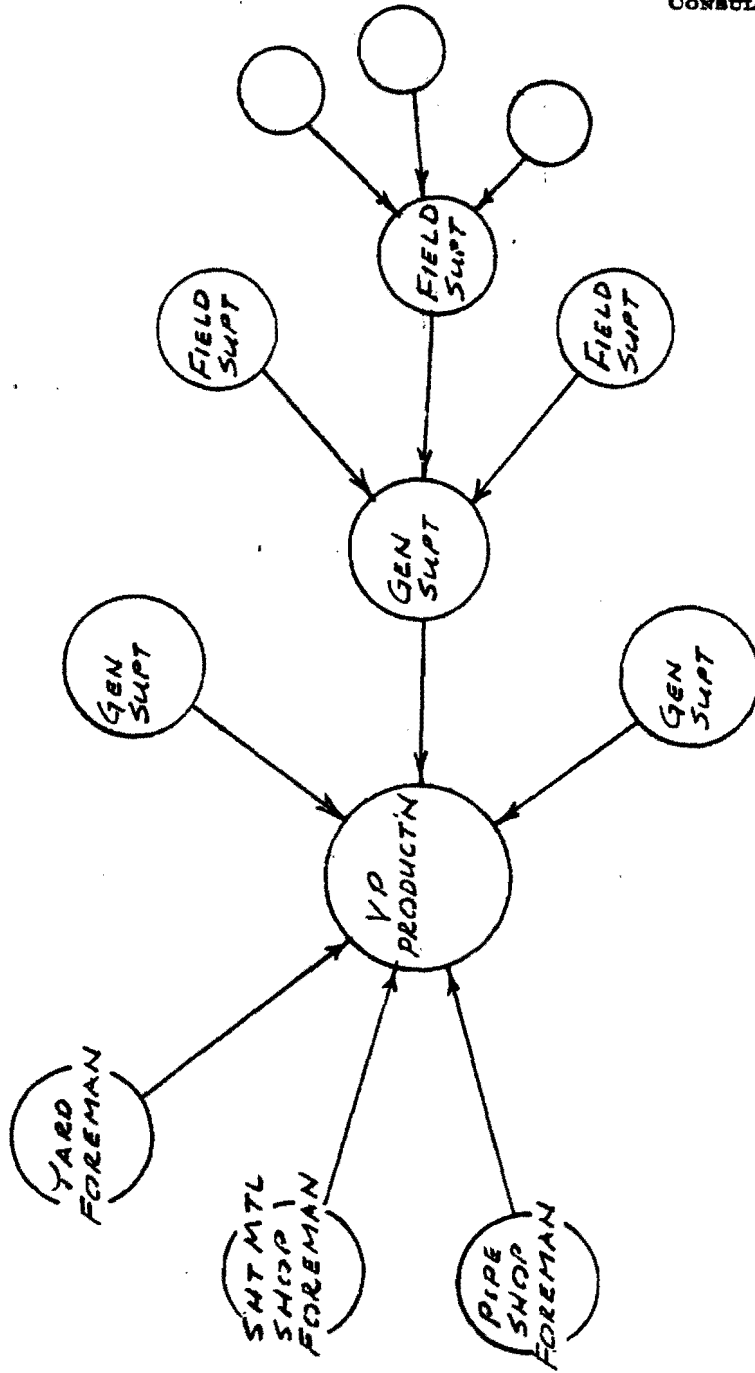


SPAN OF  
MANAGEMENT  
PRINCIPLES

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KARL MAY HAVE TO  
 MANAGE INDIVIDUAL  
RELATIONSHIPS &  
GROUP RELATION-  
SHIPS.





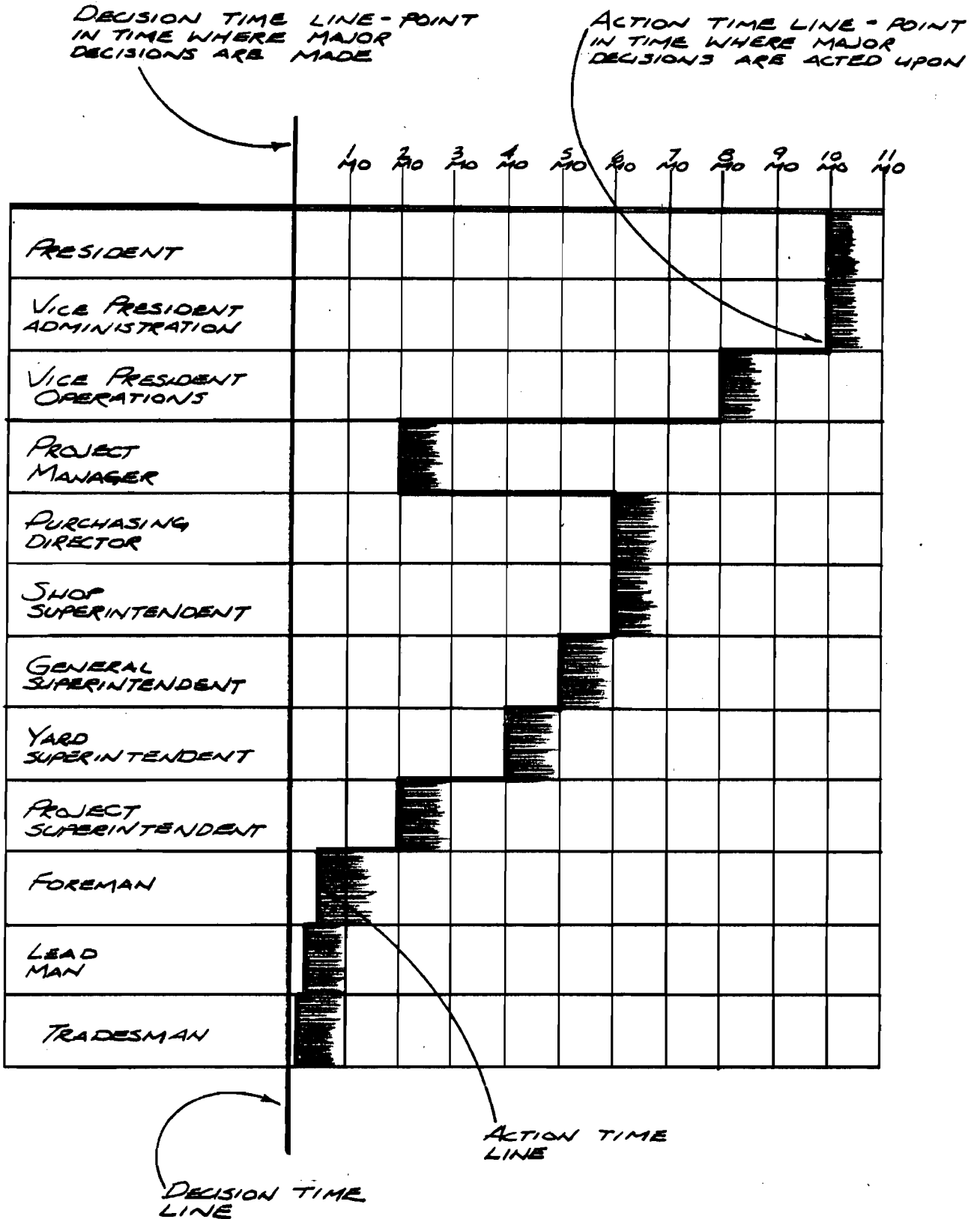
RELATIONSHIPS

↑ FORMAL  
 - - - REPORTING  
 - - - INFORMAL  
 || STAFF

EXAMPLE OF BASIC FUNCTIONAL  
DEPARTMENT RELATIONSHIPS (INDIVIDUAL)



# DECISION TO ACTION TIME SPAN



Claim Prone Job Characteristics

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

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

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

Claim prone job characteristics may include:

- a. A wide spread in proposal prices.
- b. Issuance of a large number of pre-bid addenda and instructions.
- c. For subcontractors, a poor general contractor reputation if the project is being built by one prime.
- d. For projects with separate primes, poor other prime contractor reputations.
- e. More than four to six prime contractors involved (applicable on normal building work only).
- f. Poor reputation of architect/engineer preparing contract documents.
- g. Excessive how-to-do-it emphasis in contract drawings and specifications.

Claim Prone Job Characteristics  
(continued)

- h. Non-liable party involvement in responsible positions, i.e. non-liable construction manager.
- i. Large numbers of allowance items.
- j. Zero (or excessively small) tolerance specifications.
- k. Poorly defined authority and responsibility patterns in the offices of the architect/engineer, the owner, the general contractor or other prime contractors.
- l. Inexperienced specialty contractors.
- m. Excessive number of pre-selected suppliers for key material and equipment.
- n. Large dollar amount or numbers of owner purchased equipment.
- o. Location in strike prone areas.
- p. Location in jurisdictionally sensitive areas.
- q. Heavy use specified for untried products and equipment.
- r. Non-liable party involvement in establishing delivery commitments, i.e. construction manager, architect/engineer, owner representative.
- s. Involvement of politically accountable owners, architect/engineers or other contractors.
- t. Multi responsibility payment structures.
- u. Excessively long time periods to award contracts after a proposal.  
  
(Note: This often occurs in public work where many non-project approvals and agencies are involved.)
- v. Poor owner reputation.

NETWORK PLANNING MINITEXT

Symbols

1. Arrow or task  $\longrightarrow$   
A single definable action (or a single grouping of a number of definable actions) requiring resources.
2. Circle or node  $\bigcirc$   
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.

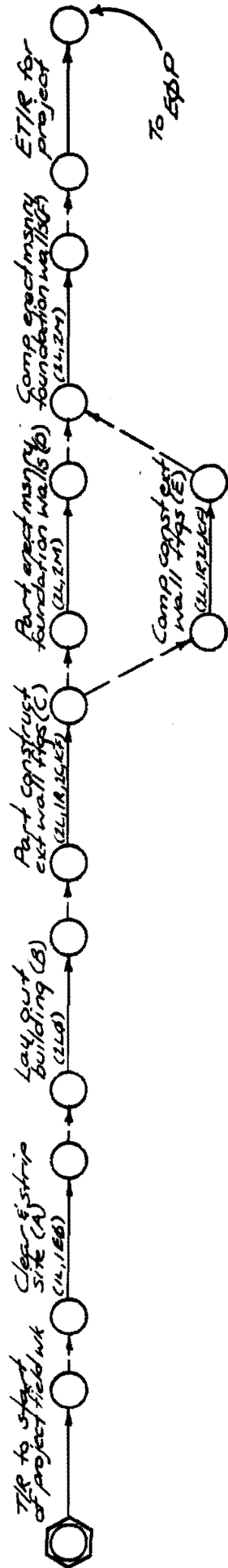
Rules for Numbering Nodes

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.

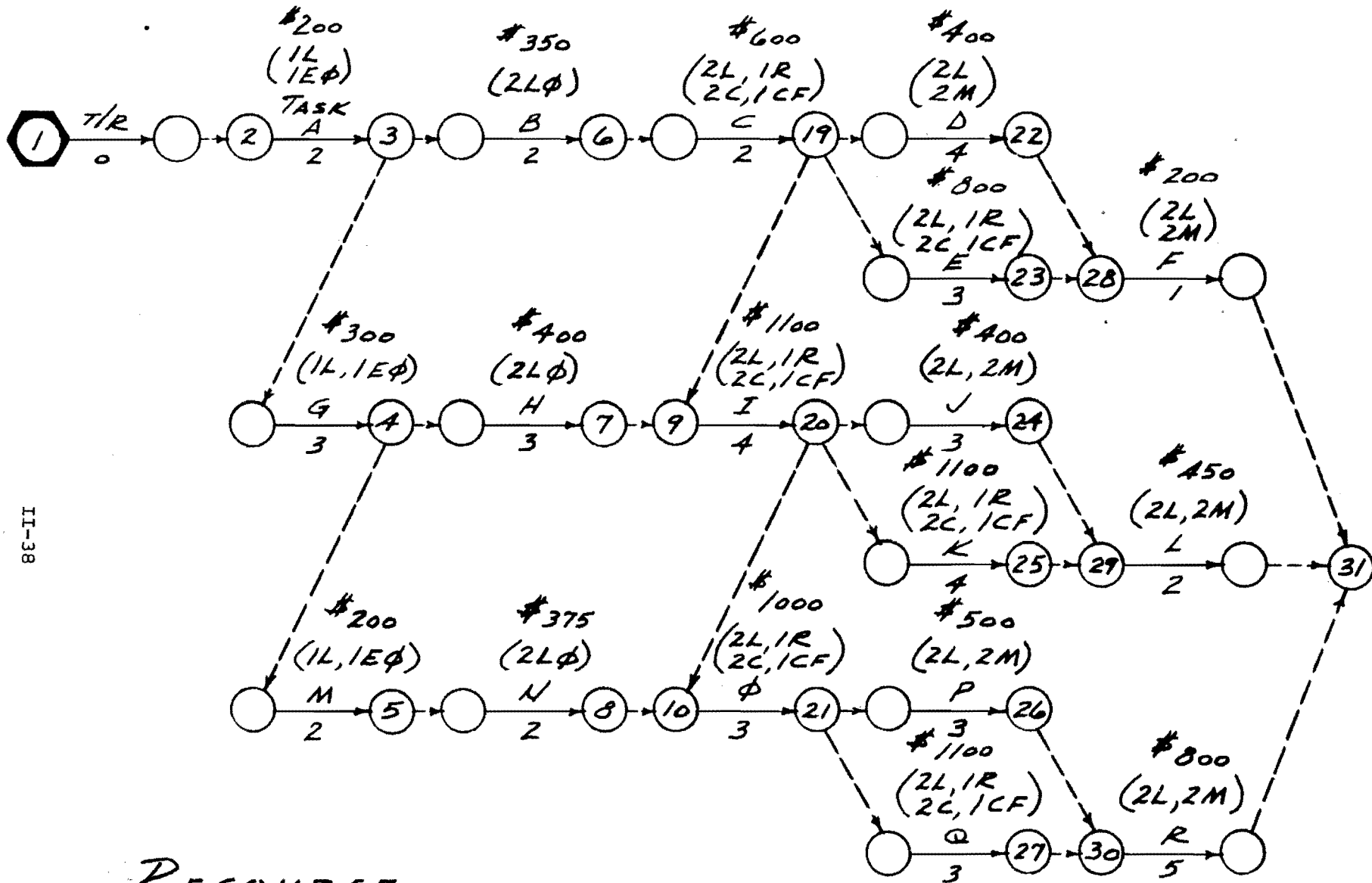
j is the end node number designation.



RESOURCE CODE

- L Labors
- EQ Equipment operators
- LP Layout engineers
- R Reinforcing steel workers
- C Carpenters
- CF Cement finishers
- M Masons

RESOURCE ALLOCATION



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RESOURCE

ALLOCATION

RESERVED NODE NOS.

- 11 15
- 12 16
- 13 17
- 14 18

RALPH J. STEPHENSON, P.E.  
MAY 29, 1968

H/O 25

SM. i

R J STEPHENSON, P.E. 15064 WARWICK DETROIT, MICH 48223 PH 313-273-5026

6E-II

DATE W/D	DATE W/D	DATE W/D	DATE W/D	DATE W/D	DATE W/D	DATE W/D	DATE W/D	DATE W/D	DATE W/D	DATE W/D
JAN 1977	15 52	26 104	09 155	21 207	JAN 1978	15 307	26 359	09 410	23 462	
03 1	16 53	27 105	10 156	24 208	03 256	16 308	30 360	10 411	24 463	
04 2	17 54	31 106	11 157	25 209	04 257	17 309	31 361	11 412	25 464	
05 3	18 55	JUNE	12 158	26 210	05 258	20 310	JUNE	14 413	26 465	
06 4	21 56	01 107	15 159	27 211	06 259	21 311	01 362	15 414	27 466	
07 5	22 57	02 108	16 160	28 212	09 260	22 312	02 363	16 415	30 467	
10 6	23 58	03 109	17 161	31 213	10 261	23 313	05 364	17 416	31 468	
11 7	24 59	06 110	18 162	NOV	11 262	24 314	06 365	18 417	NOV	
12 8	25 60	07 111	19 163	01 214	12 263	27 315	07 366	21 418	01 469	
13 9	28 61	08 112	22 164	02 215	13 264	28 316	08 367	22 419	02 470	
14 10	29 62	09 113	23 165	03 216	16 265	29 317	09 368	23 420	03 471	
17 11	30 63	10 114	24 166	04 217	17 266	30 318	12 369	24 421	06 472	
18 12	31 64	13 115	25 167	07 218	18 267	31 319	13 370	25 422	07 473	
19 13	APR	14 116	26 168	08 219	19 268	APR	14 371	28 423	08 474	
20 14	01 65	15 117	29 169	09 220	20 269	03 320	15 372	29 424	09 475	
21 15	04 66	16 118	30 170	10 221	23 270	04 321	16 373	30 425	10 476	
24 16	05 67	17 119	31 171	11 222	24 271	05 322	19 374	31 426	13 477	
25 17	06 68	20 120	SEP	14 223	25 272	06 323	20 375	SEP	14 478	
26 18	07 69	21 121	01 172	15 224	26 273	07 324	21 376	01 427	15 479	
27 19	08 70	22 122	02 173	16 225	27 274	10 325	22 377	05 428	16 480	
28 20	11 71	23 123	06 174	17 226	30 275	11 326	23 378	06 429	17 481	
31 21	12 72	24 124	07 175	18 227	31 276	12 327	26 379	07 430	20 482	
FEB	13 73	27 125	08 176	21 228	FEB	13 328	27 380	08 431	21 483	
01 22	14 74	28 126	09 177	22 229	01 277	14 329	28 381	11 432	22 484	
02 23	15 75	29 127	12 178	23 230	02 278	17 330	29 382	12 433	24 485	
03 24	18 76	30 128	13 179	25 231	03 279	16 331	30 383	13 434	27 486	
04 25	19 77	JULY	14 180	28 232	06 280	19 332	JULY	14 435	28 487	
07 26	20 78	01 129	15 181	29 233	07 281	20 333	03 384	15 436	29 488	
08 27	21 79	05 130	16 182	30 234	08 282	21 334	05 385	18 437	30 489	
09 28	22 80	06 131	19 183	DEC	09 283	24 335	06 386	19 438	DEC	
10 29	25 81	07 132	20 184	01 235	10 284	25 336	07 387	20 439	01 490	
11 30	26 82	08 133	21 185	02 236	13 285	26 337	10 388	21 440	04 491	
14 31	27 83	11 134	22 186	05 237	14 286	27 338	11 389	22 441	05 492	
15 32	28 84	12 135	23 187	06 238	15 287	28 339	12 390	25 442	06 493	
16 33	29 85	13 136	26 188	07 239	16 288	MAY	13 391	26 443	07 494	
17 34	MAY	14 137	27 189	08 240	17 289	01 340	14 392	27 444	08 495	
18 35	02 86	15 138	28 190	09 241	20 290	02 341	17 393	28 445	11 496	
21 36	03 87	18 139	29 191	12 242	21 291	05 342	18 394	29 446	12 497	
22 37	04 88	19 140	30 192	13 243	22 292	04 343	19 395	JUNE	13 498	
23 38	05 89	20 141	OCT	14 244	23 293	05 344	20 396	02 447	14 499	
24 39	06 90	21 142	03 193	15 245	24 294	08 345	21 397	03 448	15 500	
25 40	09 91	22 143	04 194	16 246	27 295	09 346	24 398	04 449	16 501	
28 41	10 92	25 144	05 195	19 247	28 296	10 347	25 399	05 450	19 502	
MAR	11 93	26 145	06 196	20 248	MAR	11 348	26 400	06 451	20 503	
01 42	12 94	27 146	07 197	21 249	01 297	12 349	27 401	09 452	21 504	
02 43	13 95	28 147	10 198	22 250	02 298	15 350	28 402	10 453	22 505	
03 44	16 96	29 148	11 199	23 251	03 299	16 351	31 403	11 454	26 506	
04 45	17 97	AUG	12 200	27 252	06 300	17 352	AUG	12 455	27 507	
07 46	18 98	01 149	13 201	28 253	07 301	18 353	01 404	15 456	28 508	
08 47	19 99	02 150	14 202	29 254	08 302	19 354	02 405	16 457	29 509	
09 48	20 100	03 151	17 203	30 255	09 303	22 355	03 406	17 458		
10 49	23 101	04 152	18 204		10 304	23 356	04 407	18 459		
11 50	24 102	05 153	19 205		13 305	24 357	07 408	19 460		
14 51	25 103	08 154	20 206		14 306	25 358	08 409	20 461		



R J. STEPHENSON, P.E. 15064 WARWICK DETROIT, MICH 48223 PH 313-273-5026

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DATE W/D	DATE W/D	DATE W/D	DATE W/D	DATE W/D	DATE W/D	DATE W/D	DATE W/D	DATE W/D	DATE W/D
<u>JAN 1979</u>	14 561	25 613	08 664	22 716	<u>JAN 1980</u>	13 816	27 868	07 919	21 971
02 510	15 562	29 614	09 665	23 717	02 765	14 817	28 869	08 920	22 972
03 511	16 563	30 615	10 666	24 718	03 766	17 818	29 870	11 921	23 973
04 512	19 564	31 616	13 667	25 719	04 767	18 819	30 871	12 922	24 974
05 513	20 565	JUNE	14 668	26 720	07 768	19 820	JUNE	13 923	27 975
08 514	21 566	01 617	15 669	29 721	08 769	20 821	02 872	14 924	28 976
09 515	22 567	04 618	16 670	30 722	09 770	21 822	03 873	15 925	29 977
10 516	23 568	05 619	17 671	31 723	10 771	24 823	04 874	18 926	30 978
11 517	26 569	06 620	20 672	NOV	11 772	25 824	05 875	19 927	31 979
12 518	27 570	07 621	21 673	01 724	14 773	26 825	06 876	20 928	NOV
15 519	28 571	08 622	22 674	02 725	15 774	27 826	09 877	21 929	03 980
16 520	29 572	11 623	23 675	03 726	16 775	28 827	10 878	22 930	04 981
17 521	30 573	12 624	24 676	06 727	17 776	31 828	11 879	25 931	05 982
18 522	APR	13 625	27 677	07 728	18 777	APR	12 880	26 932	06 983
19 523	02 574	14 626	28 678	08 729	21 778	01 829	13 881	27 933	07 984
22 524	03 575	15 627	29 679	09 730	22 779	02 830	16 882	28 934	10 985
23 525	04 576	18 628	30 680	12 731	23 780	03 831	17 883	29 935	11 986
24 526	05 577	19 629	31 681	13 732	24 781	04 832	18 884	SEP	12 987
25 527	06 578	20 630	SEP	14 733	25 782	07 833	19 885	02 936	13 988
26 528	09 579	21 631	04 682	15 734	28 783	08 834	20 886	03 937	14 989
29 529	10 580	22 632	05 683	16 735	29 784	09 835	23 887	04 938	17 990
30 530	11 581	25 633	06 684	19 736	30 785	10 836	24 888	05 939	18 991
31 531	12 582	26 634	07 685	20 737	31 786	11 837	25 889	08 940	19 992
FEB	13 583	27 635	10 686	21 738	FEB	14 838	26 890	09 941	20 993
01 532	16 584	28 636	11 687	23 739	01 787	15 839	27 891	10 942	21 994
02 533	17 585	29 637	12 688	26 740	04 788	16 840	30 892	11 943	24 995
05 534	18 586	JLY	13 689	27 741	05 789	17 841	JLY	12 944	25 996
06 535	19 587	02 638	14 690	28 742	06 790	18 842	01 893	15 945	26 997
07 536	20 588	03 639	17 691	29 743	07 791	21 843	02 894	16 946	28 998
08 537	23 589	05 640	18 692	30 744	08 792	22 844	03 895	17 947	DEC
09 538	24 590	06 641	19 693	DEC	11 793	23 845	07 896	18 948	01 999
12 539	25 591	09 642	20 694	03 745	12 794	24 846	08 897	19 949	02 1000
13 540	26 592	10 643	21 695	04 746	13 795	25 847	09 898	22 950	03 1001
14 541	27 593	11 644	24 696	05 747	14 796	28 848	10 899	23 951	04 1002
15 542	30 594	12 645	25 697	06 748	15 797	29 849	11 900	24 952	05 1003
16 543	MAY	13 646	26 698	07 749	18 798	30 850	14 901	25 953	08 1004
19 544	01 595	16 647	27 699	10 750	19 799	MAY	15 902	26 954	09 1005
20 545	02 596	17 648	28 700	11 751	20 800	01 851	16 903	29 955	10 1006
21 546	03 597	18 649	OCT	12 752	21 801	02 852	17 904	30 956	11 1007
22 547	04 598	19 650	01 701	13 753	22 802	05 853	18 905	OCT	12 1008
23 548	07 599	20 651	02 702	14 754	25 803	06 854	21 906	01 957	15 1009
26 549	08 600	23 652	03 703	17 755	26 804	07 855	22 907	02 958	16 1010
27 550	09 601	24 653	04 704	18 756	27 805	08 856	23 908	03 959	17 1011
28 551	10 602	25 654	05 705	19 757	28 806	09 857	24 909	04 960	18 1012
MAR	11 603	26 655	08 706	20 758	29 807	12 858	25 910	07 961	19 1013
01 552	14 604	27 656	09 707	21 759	MAR	13 859	28 911	08 962	22 1014
02 553	15 605	30 657	10 708	24 760	03 808	14 860	29 912	09 963	23 1015
05 554	16 606	31 658	11 709	26 761	04 809	15 861	30 913	10 964	24 1016
06 555	17 607	AUG	12 710	27 762	05 810	16 862	31 914	13 965	26 1017
07 556	18 608	01 659	15 711	28 763	06 811	19 863	AUG	14 966	29 1018
08 557	21 609	02 660	16 712	31 764	07 812	20 864	01 915	15 967	30 1019
09 558	22 610	03 661	17 713		10 813	21 865	04 916	16 968	31 1020
12 559	23 611	06 662	18 714		11 814	22 866	05 917	17 969	
13 560	24 612	07 663	19 715		12 815	23 867	06 918	20 970	



Item	Code	Contractor or Vendor	Code	Lead Time Req'd.-wkg.dys.					Earliest		Latest		Best		Actual		Remarks
				Detail	Approve	Fabric	Deliver	Total	DTO	DOJ	DTO	DOJ	DTO	DOJ	DO	DOJ	
Struct Steel	5	Frey Erectors	4	10	4	10	2	26	5/23	6/29	5/23	6/29	5/23	6/29			
Alum sash	11	Bell Bros.	9	9	5	12	2	28	6/17	7/28	6/27	8/5	6/17	7/28			
Excavation	3	Mate Bros.	2	—	—	—	—	2	5/12	5/16	5/12	5/16	5/12	5/16			
Roofing	9	Cicotte Roofing	8	—	—	—	—	15	6/24	7/18	7/21	8/11	6/24	7/18			
Brick	10	Richardson Inc.	6	—	—	—	1	1	5/13	5/16	5/16	5/17	5/13	5/16			Sample wall
Plastering	16	Robert Plastering	15	—	—	—	—	10	7/11	7/25	8/4	8/18	7/14	7/28			

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**Abbreviations**

Fabric = Fabricate

Wkg = Working

Dys = Days

Requird = Required

DTO = Date to order (calendar)

DOJ = Date on job (calendar)

DO = Date ordered (calendar)

**Purchasing Schedule Example**

*Ralph J. Stephenson*

