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Controlling a large interdisciplinary international research project.

Thomas W. Brinker

CONTROLLING A LARGE INTERDISCIPLINARY

INTERNATIONAL RESEARCH PROJECT

-by

Thomas W. Brinker

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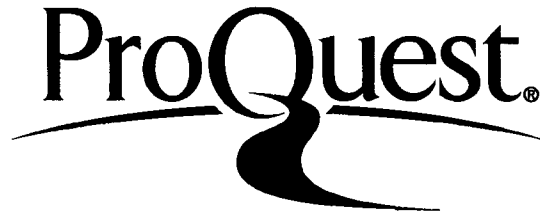
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CERTIFICATE OF APPROVAL

This thesis is accepted and approved in partial

fulfillment of the requirements for the degree of Master of

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ABSTRACT

This thesis presents the application of three control information systems for a large international, interdisciplinary research project using as a case study the "Planning and Design of Tall Buildings" research project. The three controlling techniques examined for implementation in the systems' design are: (1) PERT (Project Evaluation and Review Technique), (2) Gantt chart, and (3) procedural control. The areas of the project in which PERT, Gantt and procedural control were applicable and subsequently employed consist of the MONOGRAPH Activity, Implementation Activity and Computer Systems, respectively. These applications aid the project management in both its decision-making and follow-up activities.

In addition to the application of the three control techniques, the methodology and necessary environment required for each are presented. Each of project's phases or subdivisional areas, is classified under the appropriate applicable control technique. Thus, the thesis provides methods and direction for future control information system design and implementation for the Tall Building Project. Application of the results can also be transported to other large interdisciplinary research projects.

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND MATERIAL

With the increasing number of large interdisciplinary, international research projects better means of management and control are demanded. The increasing complexity of the research projects require more sophisticated controlling mechanisms. The planning, design and implementation of controlling techniques are presented in the thesis for the control of large interdisciplinary, international research projects. To fulfill this plan, the "Planning and Design of Tall Buildings" research project will be used as a case study.

Urban problems caused by a soaring population increase, deteriorating inner cities, and endlessly-sprawling suburbs have heightened the acute demand to create a more harmonious urban habitat for man. To meet that demand with the greatest economy of land and other resources requires a thorough examination of every phase of building tall -- from design to construction.

In 1969, the American Society of Civil Engineers
(ASCE) and the International Association for Bridge and Struc-
tural Engineering (IABSE) established the Joint Committee on
Tall Buildings to study and report on all aspects of the plan-
ning and design of tall buildings. This was the beginning of
the "Planning and Design of Tall Buildings" project headquartered
at Fritz Engineering Laboratory, Lehigh University. The original
thrust of the project was toward structural and engineering de-
sign practice. Since then, the Joint Committee has developed
an organizational – managerial system to coordinate activity on
the 28 phases (See Appendix A) of the project, ranging from data
storage to implementation of a planning and design data base and
bibliographic service. In 1973, as planning and environmental
criteria became increasingly stressed, the Joint Committee in-
vited several other major professional organizations to join
the founding organizations as "Professional Society Sponsors":
the American Institute of Architects (AIA), American Institute
of Planners (AIP), International Federation for Housing and
Planning (IFHP), and the International Union of Architects (UIA).
Strong ties were established with HUD, ECCS, CIB, CEB, FIP, NAE,
NBS, Gosstroy, and the Chicago Committee on High-Rise Buildings.
(See Appendix B) In 1974, UNESCO admitted the Joint Committee
as a consulting non-governmental organization. (1)

Since its inception, the Joint Committee has grown to 1380 members and 1000 liaison contacts from 79 countries and organized into 42 technical committees and 18 advisory committees. Representing 15 professions and over 1100 organizations, the members of the Joint Committee form an international network of information exchange, contributing their expertise and receiving in turn the results of Joint Committee findings. These results are put to use immediately in current planning and design throughout the world.

Perhaps the principal activity of the Joint Committee, and the original focus around which it was organized, is the completion in 1976 of the MONOGRAPH. Developing from the preliminary report of the first International Conference, to the PREPRINTS and the PROCEEDINGS, the MONOGRAPH serves to channel international cooperation into a central activity. It fulfills part of the Joint Committee objective of disseminating the latest research findings on tall buildings. (2)

The MONOGRAPH itself is arranged into five volumes: Planning and Environmental Criteria (Volume PC); Systems and Concepts (Volume SC); Criteria and Loading (Volume CL); Structural Design of Tall Steel Buildings (Volume SB); and Structural Design of Tall Concrete and Masonry Buildings (Volume CB). Subject areas of the MONOGRAPH include philosophy and history of

tall buildings, service systems, structural and loading systems, safety, foundations, design methods, and limit states.

Following publication of the MONOGRAPH, the Joint Committee will continue to facilitate the utilization of its documentation. Toward this end, the Joint Committee is developing a comprehensive planning and design data base and bibliographic service. The computerized bibliography (about 5000 references are now computerized in the Tall Buildings program, and another 3000 through NTIS) will make available a world-wide listing of literature pertinent to all aspects of tall building design.

A further stage of information dissemination provides for making available reports and major publications on tall buildings to specialists, a library of films and recordings, and a continually updated slide file which contains over 4,000 slides.

The Joint Committee continues to sponsor a series of national, regional, and international conferences as one of its major activities. As of July 1975, over 30 regional conferences had been held in 25 countries on six continents. These conferences provide information generated by the work of the Joint Committee, and give each country the opportunity to contribute its own expertise and guides for new research.

Personnel from the Tall Buildings program from around the world gathered with humanists, social scientists, architects, planners, and city officials at Lehigh University August 21-26, 1972 at the only international conference held by the Joint Committee to date. The result of the six days of exchange of design concepts was 29 volumes of PREPRINTS and the publication in June, 1973 of the five-volume PROCEEDINGS by ASCE and IABSE, which were later translated into French.

Under the direction of Dr. Lynn S. Beedle and Co-Director, Dr. Le-Wu Lu, the Tall Buildings Project utilizes the experience of Dr. George Driscoll, Dr. Ti Huang, Dr. Lambert Tall, and the highly qualified staff and assistants of Fritz Lab consisting of three research assistants, five graduate and undergraduate students, and a number of both full-time and part-time secretaries. By recognizing the needs of people and their cultures in the total urban system, the Joint Committee seeks to improve the quality of urban life through better planning and design of tall buildings.

1.2 STATEMENT OF PROBLEM

1.2.1 Description of Present Management System

There are two organizations managed by the project director. One is the international organization largely made

up of volunteer professionals. The other is the headquarters
group, which manages the international organization and pro-
cesses its paperwork. This thesis will concentrate its study
on the headquarters management system of the Tall Buildings Pro-
ject. Any reference, hence to project management will be re-
ferring to the headquarter management of the project.

The management philosophy of the Tall Buildings pro-
ject is the "traditional approach," (3) however, in 1974 the pro-
ject began to emphasize the employ the "systems approach" to its
management. Overall, the project as a whole can be judged suc-
cessful by its output and the support and response of its mem-
bers throughout the world and participating cities and countries.

Each phase of the project is headed by a "coordinator",
followed by a supervisor, and a staff consisting of a combina-
tion of post-doctoral candidates, para-professionals, research
assistants, secretarial personnel, and part-time graduate and
undergraduate student workers. The three coordinators represent
the top management of the project. The supervisors, which con-
sist of faculty members, top management people, post-doctoral
candidates, and para-professionals, are directly responsible for
the line functions of their particular phase. The limited num-
ber of persons employed by the project hold different positions
in various phases. (4)

A management control mechanism currently employed by
the project is that of project meetings. Approximately once a
week, a supervisors' meeting is held. Represented at this meet-
ing is each supervisor of every phase. This meeting is chaired
by the project director and its discussion consists of project
business at the supervisor level. The agenda for each meeting
consists of reporting on the progress of each phase and general
upper level project business and decision-making. Besides the
supervisors' meeting, weekly staff meetings are also held. These
meetings are again chaired by the project director and are
attended by all staff members and supervisors. The discussion
at this meeting consists of more specific reporting on each
phase.

In addition to these weekly staff and supervisor meet-
ings, smaller monthly phase meetings are held consisting of the
director, supervisor, and the phase's supporting staff. In
these meetings, very specific topics are discussed and decisions
are made for a particular phase.

A typical span of control is small, approximately
three to seven. (3) However, of the 33 reporting areas of the
28 phases and phase-expansions, one coordinator is responsible
for 13, another responsible for 11, and the director responsible

for 9. The project director has final decision-making authority in all 33 areas. The effectiveness of the span of control is dependent on the amount of communication required between the supervisor and his subordinates, with the information processing limits of the human as the limiting variable. (3) Thus, with the project's large span of control, there are possibilities for control problems.

The timing and scheduling of needed work and information is critical. Because of the vast size and extent of the project, a potential for loss of control exists. The work loads for some staff members are not uniform, as would be desired, but cyclical. That is, the work loads alternate between periods of light and heavy loads. The principal reason for this is the fact that management does not have accurate time estimates for completing the various phases and related phase activities, which in turn results in the problem of meeting deadlines. Another management problem exists because the project (due to its nature) depends heavily on volunteer input from its world-wide membership. There is also a rapid turnover of personnel leading to problems of "who to get information from" and "who does what". Phasing problems sometimes arise because of special or misunderstood requests or instructions, creating delays and hampering coordination on activities. In addition to all this,

the objectives of the phases are continually updated leading to changes in the program. All of this points to the need of tighter control and standards for the project activities. (5)

1.2.2 Recognized Needs and Wants

The need exists for an improved management information system to aid in the control and decision-making functions of the project. The system should monitor and assist in coordinating the phases (critical and non-critical) and should provide information concerning the control and supervision of the project on a timely basis for decision-making. In total, the system should (1) provide for more immediate awareness of problems or opportunities, (2) permit more timely consideration of increasingly complex relationships, (3) assist in decision implementation, and (4) assist in the utilization of resources (facilities, personnel, time, money).

1.3 OBJECTIVE

The principal objective of this thesis is to provide a management information control system which will assist project management in its decision-making and follow-up activities for a large, interdisciplinary research project using as a case study the "Planning and Design of Tall Buildings" research project.

1.4 PROPOSED SOLUTION

Because of the nature of the Tall Buildings project, it cannot procure accurate time estimates, has trouble scheduling work and meeting deadlines, and continually updates its phases' objectives. What is needed are management control techniques that (1) are functional in the project environment, (2) can cope with and handle the problems existing, and (3) provide management with positive assistance in its administrative functions. Of all the management control techniques available, PERT (Project Evaluation and Review Technique) (6,7), Gantt, and procedure control appear to be best qualified for the given situation.

PERT will provide the project management with control at any point in time and at the proper level, utilizing an integrated system of forced planning and evaluation. Because of PERT's dynamic nature, it can inform management of delays which could require immediate remedial decision to keep on schedule and to meet final deadlines. The use of PERT will improve the planning function of the project by forcing the project's personnel to identify all project activities that must be performed.

Control of the project activities will also improve since PERT highlights and monitors critical activities. Progress can be reported as often as the project management desires. PERT forces the development of a logical and comprehensive plan for program completion and permits realistic rescheduling of activities to counteract any problems that might arise.

PERT will accept uncertainties as part of the system and is consequently readily adaptable to unforeseen changes in the program. To cope with this uncertainty factor PERT utilizes a weighted time calculated from three time estimates for each activity:

a = the optimistic time;

m = the most likely time;

b = the pessimistic time.

PERT then considers these three time estimates as parameters of a Beta distribution, with a and b as the extreme values, low and high, respectively, and m considered as the modal value. (See Figure 1.1) After the three time estimates are made, t_e, expected time for an activity, can be computed from the following:

$$t_e = \frac{a + 4m + b}{6}$$

Also, σ_e, the standard deviation, and V_e, the variance, for each activity can be calculated:

$$\sigma_{t_e} = \frac{b - a}{6}$$

$$V_{t_e} = (\frac{b - a}{6})^2$$
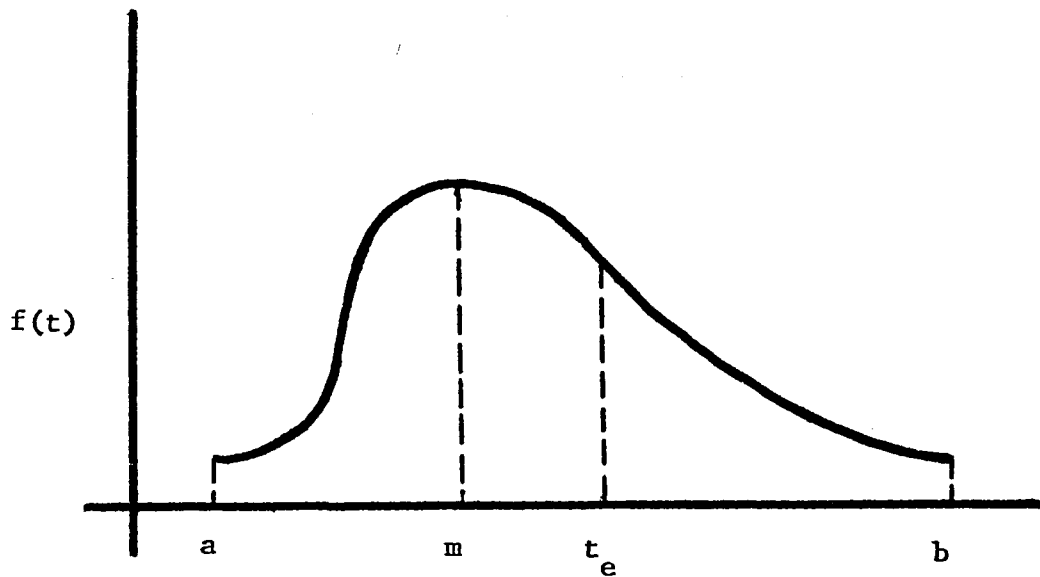
Figure 1.1 PERT Beta Distribution

The project activities will be abstracted into a PERT

Network which is a "flow diagram consisting of the activities

and events which must be accomplished to reach the program ob-

jectives, showing their logical and planned sequence of accom-

plishment, interdependencies, and interrelationships." (7) An

event is a specific, definable accomplishment in a program plan,

recognizable at a particular instant in time. Events do not

consume time or resources. The events are related to one another

by activities. Each activity is a time-consuming task connect-

ing events, but the beginning or end of an activity (an event)

is assumed to be instantaneous, that is, not to consume time.

Activities utilize resources – manpower, equipment, material,

etc; therefore, they represent work to be done. (8)

The other two control techniques, Gantt and procedure

control, are fully described in chapter 2.

As a by-product of employing PERT, Gantt and procedure

control as controlling aids, better utilization of the project's

resources (facilities, personnel, time, money) can be gained.

The project management's involvement in designing the system

will be necessary so that the system's objectives and goals will

conform with those of the project and its upper management.

CHAPTER 2

THE PROJECT AND ITS PHASES' OBJECTIVES AND GOALS

2.1 THE TALL BUILDING PROJECT

2.1.1 Project Description

The "Joint Committee on Tall Buildings" formed in 1969
set as its ultimate objective the creation of a more harmonious
urban habitat for man through improved planning and design of
tall buildings. The Tall Building project seeks therefore "to
stimulate research and its application to design practice, and to
facilitate a continual exchange between research workers, design
professionals, and key decision-makers." (2)

The major objectives of the program have been organized
into the following six categories and are identified as "thrusts"
in the Tall Building project terminology (See Appendix C for
further detailed description): (2)

(1) To create an international source of information
on all aspects of planning and design, construc-
tion, management, and operation of tall buildings;

(2) To utilize the findings of the Joint Committee;

(3) To determine the planning and environmental
criteria for the impact of tall buildings on the

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urban environment;

(4) To exchange tall building data between developed

countries so that industrial nations can rapidly

incorporate advances identified elsewhere;

(5) To identify approaches for developing countries

that will enable them to avoid the errors that

have occurred inadvertently in countries with a

longer record of experience; and

(6) To identify and stimulate needed research in the

area of tall buildings.

A significant interaction exists among the "thrusts"
themselves and all together have the important impact and focus:
An improved urban environment. (See Figure 2.1) The activities
or subdivisions of the project, besides being interrelated
amongst themselves, are also very much a part of and interest
greatly with the "thrusts". (See Figure 2.2)

THE MAJOR THRUSTS OF THE PROGRAM

INTERNATIONAL
INFORMATION
SOURCE

PLANNING &
ENVIRONMENTAL
CRITERIA

EXCHANGE BETWEEN
DEVELOPED
COUNTRIES

UTILIZATION
OF
FINDINGS

A
BETTER
URBAN
ENVIRONMENT

RESEARCH

APPROACHES FOR
DEVELOPING
COUNTRIES
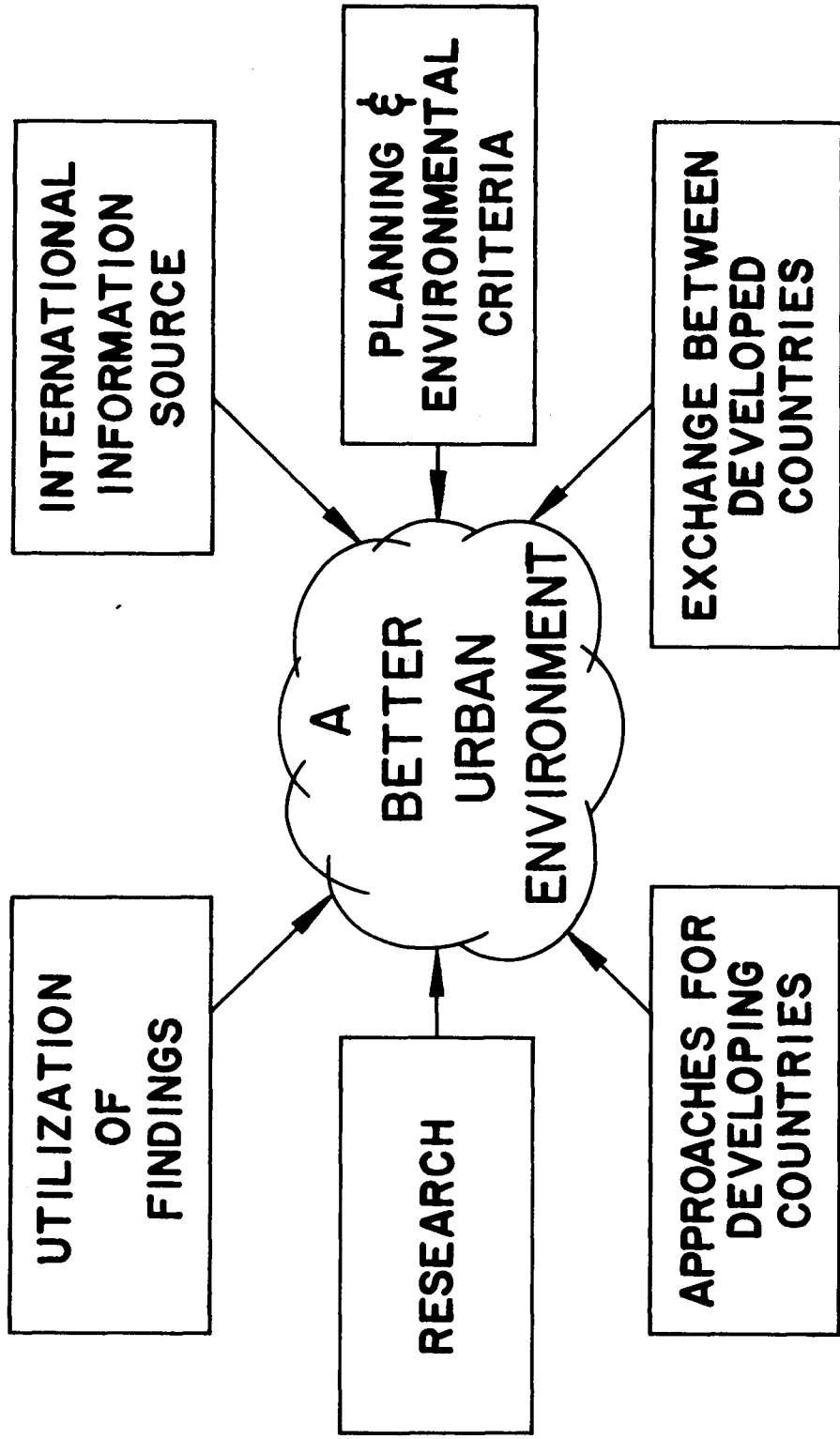
Figure 2.1

INTERACTIONS BETWEEN THRUSTS & ACTIVITIES

ACTIVITIES

- PREPARATION OF MONOGRAPH
- IMPLEMENTATION
- RESEARCH
- PLANNING & DESIGN DATA BASE
- INTERNATIONAL CONFERENCES
- REGIONAL & NATIONAL CONF.
- SYMPOSIA, WORKSHOPS, TECHNICAL SESSIONS
- INFORMATION
- BUILDING CHARACTERISTICS SURVEY
- FIELD OBSERVATIONS
- INTERNATIONAL INTERACTIONS

THRUSTS

- INTERNATIONAL INFORMATION SOURCE
- UTILIZATION OF FINDINGS
- PLANNING & ENVIRONMENTAL CRITERIA
- EXCHANGE BETWEEN DEVELOPED COUNTRIES
- APPROACHES FOR DEVELOPING COUNTRIES
- RESEARCH

Figure 2.2

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The Tall Building program uses some terminology peculiar
to that program to describe various management terms; appropriate
terminology definitions are:

activity
- an area or type of "phase" of the
project which is non-routine and is
very goal-and objective-oriented.

phase
- a subdivision or breakdown of the
project; one of the 28 activities or
management/administration operations.

support function - an area or "phase" of the project
which is routine and/or functional.

thrust
- a major objective of the project
itself.

roster
- a list of names, individuals or or-
ganizations.

schedule
- a chronological sequence of events
or target dates; a chart, table, or
list of elements such as responsi-
bilities, objectives, or planned
activities.

procedure
- a check list or flow diagram which
prescribes the necessary tasks or
steps involved with getting some-
thing done.

Additional terminology with definitions used in this document are:

goal   – a quantified intermediate or short range attainment planned in order to reach or meet an ultimate objective.

objective – long range planned attainment.

For further descriptions and additional project terminology definitions, see references 9 and 10.

2.1.2 The Project's Components

The Tall Buildings project currently has 28 phases. These phases can be categorized into two types: activities and support or functional areas. (See Appendix A) The phases classified as activities are those which are directly involved with the thrusts of the project. These phases are very goal and objective oriented. Also, the activities of the project are involved with both headquarter and international participation. The functional or support areas are those phases which are involved only with headquarter operations. These include the routine and management areas of the project.

2.1.3 Control Techniques for the Phases of the Project

The various types of phases, activities, functional areas, and combinations of the two, call for different techniques

needed for control of the particular phase. One technique that will be employed is PERT. This control technique is applicable to those phases which are very active, require resource control, have many interrelated responsibilities, and are very goal or objective oriented. Thus the phases which are classified as "activities" will be considered for PERT control.

Another technique that may be employed is the use of Gantt control. (11) This technique emphasizes bar charts which show time spans during which certain activities must be carried out. Periodic milestones are noted so that a particular instant in time a review can be made of what accomplishments have been made to date and whether or not the activities of the particular phase are on schedule. This control technique may be considered for those phases which have sequential activities that must be scheduled properly. The Gantt Chart illustrates planned work activities versus actual accomplishments on the same time scale. (12)

A third technique applied will be a procedure controlled system. This technique is more adaptable to the functional or support areas. These phases are concerned primarily with routine operations. Formal procedures will control the activities and routine responsibilities by forcing them to comply with predetermined standards.

2.2 PHASE O: PROJECT DIRECTION

2.2.1 Description

Phase O acts as the overall coordinating function of the Tall Building program. This is the phase from which the project director performs his various functions. Activities of this phase consist of maintaining contact with the Joint Committee and internal headquarter management systems, identifying goals, priorities, and objectives of the project, and integrating Lehigh University research on tall buildings. The phase performs these functions through staff meetings, supervisor meetings, Editorial Committee meetings, and Steering Group meetings. (13) See Appendix D for further detailed descriptions of the phase.

2.2.2 Objective

Phase O strives to meet the goals and objectives determined by the Joint Committee of the international organization by providing the leadership and the internal organization direction of the project headquarter operations.

2.2.3 Goals

To date no definite goals have been established by the project management and thus are needed to apply any means of control to the phase.

2.3 PHASE 1: MEMBERSHIP

2.3.1 Description

Phase 1 seeks out and suggests to committee chairmen the names of prospective members for vacant positions in the international project organization. Upon doing this for a vacant position, the phase then sends invitations to the approved candidates for membership and handles the invitation replies. Phase 1 keeps and updates relevant schedules and rosters recording the membership status of the project. (13) See Appendix D for further detailed descriptions of the phase.

2.3.2 Objective

The objective of Phase 1 is to maintain international participation and involvement in Joint Committee work at the international level and to staff key personnel for membership of different countries and committees. (13,14)

2.3.3 Goals

Goals presently identified for Phase 1 are as follows:

1) Verification of all project members' addresses (by April, 1976); and

2) Establish a National Committee on Tall Buildings in countries in which Regional Conferences were held within six months of conference.

2.4 PHASE 3: MINUTES AND MEETINGS

2.4.1 Description

Phase 3 is responsible for the coordinating, gathering, and collecting of material and papers for all meetings and conferences. Two weeks before any given meeting, Phase 3 has a consultation with the project's director and co-director to determine the "take list". This list of rosters, schedules, and reports is then properly updated and the phase collects and prepares the package for the meeting. Phase 3 is also involved with the Lehigh Interest Area. Thus, the phase is concerned with contacting people who may be interested in the Joint Committee, and arranges and records the minutes of meetings of the peoples. The phase then reviews the minutes to determine possible research areas. (13) Phase 3 is also concerned with monitoring and controlling the progress of each activity and phase. See Appendix D for further detailed description of the phase.

2.4.2 Objective

The principal objective of Phase 3 is to have the most current discussions and information present at all Tall Buildings meetings and conferences by providing (that is, collecting, organizing, and distributing) each meeting with the most updated documents used and needed. Phase 3 has another objective to

accomplish exchange of information that can lead to further re-
search activity. The phase also aims to record progress for each
phase.

2.4.3 Goals

Presently no goals exist.

2.5 PHASE 4:   INTERNATIONAL CONFERENCES

2.5.1 Description

The various duties of Phase 4 center around the organi-
zation and presentation of major international conferences. So
far, the phase has dealt almost exclusively with the conference
held at Lehigh University, Bethlehem, Pa. USA, August 21-26, 1972,
the only international conference held to date. Its activities
for that conference included arranging for housing, meals, and
transportation for conference members, inviting speakers, re-
serving auditoriums, and planning for receptions, tours, audio-
visual facilities, and medical treatment. See Appendix D for
further detailed descriptions of the phase.

2.5.2 Objective

The objectives of this phase include to organize and
present international conferences on tall buildings and to bring
together technical specialists, architects, planners, humanists,

social scientists, and governmental representatives for dialogue
and exchange of ideas pertaining to tall buildings; to collect
updated information for the MONOGRAPH; and to stimulate future
research. (13,14)

2.5.3 Goals

Future international conferences, planned to cover
major themes and to take place on about a 2-year cycle, will
serve as a focus to collect updated material for future editions
of the MONOGRAPH. The next planned international conference is
set for 1977. UNESCO has indicated a strong interest in cooper-
ating in a conference with the theme "Life and Work Habitat for
the Year 2000". (15)

2.6 PHASE 5: GENERAL PROCEDURES

2.6.1 Description

This phase of the Tall Buildings project has the pur-
pose of developing procedures for coordinating headquarters ser-
vices and operations (generally routine) through the development
of procedures, schedules, and rosters. Formal step-by-step pro-
cedures are designed for routine operations in all phases of the
project. The phase is also responsible for maintaining and up-
dating existing procedures. See Appendix D for further detailed
descriptions of the phase.

2.6.2 Objective

The principal objective of Phase 5 is to establish and
provide formal standardized procedures, rosters and schedules for
all headquarters activities involved in the project, coordinating
effectively all functions and activities. (13,14)

2.6.3 Goals

No goals are presently identified in Phase 5.

2.7 PHASE 5C: COMPUTER SYSTEMS

2.7.1 Description

Computerized systems have been and are being developed
to assist in the management of the large project. The three
major current system packages are involved with committee rosters
and addresses, indexing of project slides, and creation of a
data base for a survey of tall building characteristics. The
project has an extensive committee organization subject to dy-
namic changes in voluntary personnel and requiring frequent
varied mass mailings. The system is designed and operated to
maintain rosters, provide mailing labels, and provide a variety
of printed lists of frequently requested information. The sys-
tems for slides and building characteristics surveys also provide
for printed representations of stored date in various required

arrangements. Also, many smaller, independent programs and data bases are maintained.

In addition to maintaining the three major computerized systems, new software is developed for fulfilling the objectives of new desired tasks and the phase serves as a consulting function to any phase which uses or might desire Phase 5C service. See Appendix D for further detailed descriptions of the phase.

2.7.2 Objectives

The objectives of Phase 5C include (1) to provide computerized data processing service to all phases of the project in which it is needed; (2) to operate and maintain the membership data base of the project as dynamically as Membership (Phase 1) is able to handle address changes; and (3) to eliminate all of the independent so-called data bases, and create one large data base containing all the project's pertinent data. (13)

2.7.3 Goals

The goals of Phase 5 include (1) to keep the project's address data base up-to-date to no more than one week behind the incoming changes to Membership (Phase 1), and (2) to fulfill all computer requests within one week of the order placed. This includes mailing labels for mailings to project committees,

computerized schedules, and all other computerized output available from the phase.

2.8 PHASE 6: EDITORIAL

2.8.1 Description

The Editorial phase of the Tall Buildings project is concerned with calling and preparing for editorial meetings to discuss the MONOGRAPH. After the meetings, the phase is responsible for the follow-up of the discussion of the meeting. At Regional Conference Editorial Meetings, needs and inputs are identified for the MONOGRAPH. See Appendix D for further detailed descriptions of the phase.

2.8.2 Objective

The objective of Phase 6 includes to organize the editorial committee, to develop the authors standards, and to organize editorial meetings. (14) At the Regional Conference Editorial Meetings, the phase strives to make the input for the MONOGRAPH more international. The objective of the Executive Editorial Group is to monitor the progress of the MONOGRAPH.

2.8.3 Goals

The principal goal of this phase is the publication of the MONOGRAPH in 1976.

2.9   PHASE 7:   FINANCE

2.9.1   Description

Phase 7 prepares the proposals and budgets, and pro-
cures sponsors for the various phases of the project. (14)   The
phase also administers the distribution of funds as authorized
to project personnel and to authorized Joint Committee members
for expenses incurred in travel or other activities of the Joint
Committee.   See Appendix D for further detailed descriptions of
the phase.

2.9.2   Objective

The objective of this phase is to procure financial
sponsors for the Tall Buildings project and then to allocate and
budget the funds throughout the project's operations.

2.9.3   Goals

No goals exist for this phase.

2.10   PHASE 7S: STAFF

2.10.1   Description

Phase 7S is responsible for keeping record of all per-
sonnel related to project headquarter activities.   The record not

only includes the names of the current staff, but also the re-
sponsibilities of each person, plus his supervisor and subordi-
nates. The phase also handles all the personnel records and is
responsible for the correspondence regarding hiring of staff.
See Appendix D for further detailed descriptions of the phase.

2.10.2 Objective

The objective of Phase 7S is to keep the project direc-
tor aware of the project's staffing responsibilities and needs.

2.10.3 Goals

Phase 7S strives to update the staff records within
two weeks of a change in personnel and do a complete update re-
garding responsibilities every two months. Another goal of the
phase is to create a cumlative list of persons associated with
the project since its inception by March of 1976.

2.11 PHASE 8: REGIONAL CONFERENCES

2.11.1 Description

The Regional/National Conference phase at headquarters
is responsible for giving assistance in planning and scheduling
of these conferences to host countries throughout the world. To
date, more than 30 of these such conferences have been held under

the auspices of the program. They have taken place on six continents and in 25 countries. (15,16) Activities of the phase begin with making preliminary contacts with host countries, and then following through in announcing, guiding preparation for, and promoting participation in the conference. During the conference, effort is made to capitalize on contacts with specialists and experts. After the conference, Phase 8 follows through with dissemination of findings - PREPRINTS and PROCEEDINGS. Phase 8 also guides the establishing of National Committees. The phase participates in the selection of authors and speakers, and provides expense funds to allow some key people to attend and contribute to the Regional Conferences. See Appendix D for further detailed descriptions of the phase.

2.11.2 Objective

The objectives of these conferences themselves include (1) to give a country the opportunity to contribute its expertise to the program and to indicate new needs not yet anticipated, and (2) to provide information coming out of the work of the Joint Committee. (15)

At headquarters, Phase 8 has the objectives to provide guidance, advice and assistance in the organization of conferences of national or regional scope and scale, and with international participation and to ensure the implementation of these

conferences findings. (11) See Appendix D for further detailed description of the phase.

2.11.3 Goals

Goals for this phase include the continuation of Regional/National Conferences and collection and dissemination of their results. In the immediate future, 1976, are plans for conferences in the Soviet Union, Iran, Israel, and Hong Kong, with major themes such as "tall buildings for developing countries" and "high-rise housing".

2.12 PHASE 9: SYMPOSIA, WORKSHOPS, AND TECHNICAL SESSIONS

2.12.1 Description

Because of the need to stimulate professional exchange of plans, objectives and problems, technical meetings have taken on greater importance. Phase 9 selects sessions in which the Joint Committee can participate, advise in topic selection and invite speakers to workshops and symposia. The phase organizes the technical sessions in problems related to tall buildings. See Appendix D for further detailed descriptions of the phase.

2.12.2 Objective

Phase 9 strives to expand, utilize, and communicate the Joint Committee work and findings by organizing symposia,

workshops and technical sessions on topics related to tall build-
ings and by coordinating Joint Committee participation in pro-
fessional society meetings. (13)

2.12.3 Goals

It is planned to coordinate Phase 9 with the Implemen-
tation phase (Section 2.26). (15)

2.13 PHASE 10B: BIBLIOGRAPHY

2.13.1 Description

A preliminary bibliography and a supplementary biblio-
graphy have been available for several years; but the current
activity of Phase 10B centers around the preparation of a compu-
terized bibliographic service. This entails the identification
of data sources, collection of bibliographic information, de-
velopment of computer programs, and continual updating of the
data base. So far, over 5000 references are now computerized;
these consist of "key-work profiles" (which help direct persons
to information on specific topics) and abstracts. Plans call for
the marketing of the service to be managed by Lehigh University
and an agency like NTIS. At that time the service will be avail-
able to all Joint Committee members and other planning and design
professionals. (13) See Appendix D for further detailed descrip-
tions of the phase.

2.13.2 Objective

The objective of Phase 10B is to collect, store, and make available for retrieval a worldwide listing of literature pertinent to all aspects of tall buildings, and to maintain and update this information in a computerized storage and retrieval system whose services include listing of articles by subject and author, a 'current awareness' service, and the periodic issuing of printed supplements. (15)

2.13.3 Goals

No quantitative goals exist for this phase.

2.14 PHASE 10F: FILMS

2.14.1 Description

This phase handles all the films and tapes related to the Tall Building project. Phase 10F is responsible for distribution of these audio-visual productions. Also, because of this distribution function, the phase is responsible for billing and collection for use of its material. Storage and maintenance of the audio-visual productions along with providing to the proper sources, lists of available audio-visual productions are additional functions of the phase. As the project director dictates, acquisition of new audio-visual productions is made. To publicize

both the project and high-rise construction, promotional opportunities are also sought by the phase. See Appendix D for further detailed descriptions of the phase.

2.14.2 Objective

The objective of Phase 10F is to broaden the exposure of the Tall Building project via the audio-visual media of communication. This is accomplished by maintaining an audio-visual library and distributing/lending these productions to Joint Committee members and the general public.

2.14.3 Goals

No definite or quantitative goals have been established yet for this phase.

2.15 PHASE 10L: LIBRARIES

2.15.1 Description

To deal more systematically with a great number of libraries around the world, Phase 10L has listed them in several groups: "Tall Buildings" libraries (Category 1), university libraries (Category 2), professional and commercial libraries (Category 3), and all other libraries (non-Category 1). In cooperation with the supervisors of Phase 10R and Phase 12, Phase 10L has created a plan of organized distribution to Category 1

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libraries. The phase maintains an inventory of what tall build-

ing literature each Category 1 library has, and periodically re-

views this inventory with the libraries. For the other cate-

gories of libraries, this phase maintains a profitable or break-

even inventory control, and makes periodic promotion announce-

ments of new reports in cooperation with the supervisors of Phase

10R and 12, and with NTIS. (13) See Appendix D for further de-

tailed descriptions of the phase.

2.15.2 Objective

    The objective of Phase 10L is to ensure that an ade-

quate supply of literature pertaining to Tall Building work is

available for distribution at all times and to gain liaison with

"tall buildings libraries" and with university, public and com-

mercial libraries pertaining to Tall Building work and findings.

2.15.3 Goals

    No definite or quantitative goals have been established

yet for Phase 10L.

2.16 PHASE 10P: PUBLICATIONS

2.16.1 Description

    Phase 10P is responsible for the publication of

documents on the Tall Building project. The phase follows
through on this process from rough draft to typing to proof read-
ing to mailing of final publication. The phase must make sure
that the document is in correct format following a standard. See
Appendix D for further detailed descriptions of the phase.

2.16.2 Objective

The objective of Phase 10P is to process all reports
and documents in the project.

2.16.3 Goals

No quantified goals exist for this phase.

2.17 PHASE 10R: REPORTS

2.17.1 Description

Phase 10R begins with storing, and maintaining current
inventories of, reports resulting from and related to Joint Com-
mittee work. In addition, this phase is aware of new "non-pro-
ject" reports that are relevant to Joint Committee work, and at
the director's request can acquire copies of them in bulk. Phase
10R distributes reports and publications to selected Editorial
Committee members, and to the general public and key interest
groups upon request. Billing and collection for this service is

handled by Phase 10R. This phase also assists in promoting and distributing Regional/National Conference PROCEEDINGS. Recommendations for direct mail promotion are made to the project director. (13) See Appendix D for further detailed descriptions of the phase.

2.17.2 Objective

The objectives of Phase 10R are to make available to key specialists who are working on the MONOGRAPH and other major publications of the Joint Committee the needed documents developed as a result of the program and to acquire selected reports and publications of potential value to these specialists; and to maintain such reports. (13)

2.17.3 Goals

Presently, no definite or quantitative goals exist for this phase.

2.18 PHASE 10S: SLIDES

2.18.1 Description

Phase 10S is concerned mainly with maintaining a slide-indexing data base. Approximately 4000 tall building related slides, each having a unique index number, are contained in the file. Information about each slide (e.g. the subject of the

slide) is marked on the slide and its duplicate, and the slide
is filed. To key-code slide information, keywords and slide
numbers are punched onto computer cards and added to the inde-
pendent data base. From this data base, Phase 10S runs slide
programs and distributes slide indexes. The phase indexes the
slide backlog, and continually modifies existing slide-indexing
programs. (13) See Appendix D for further detailed descriptions
of the phase.

2.18.2 Objective

This phase strives to assemble, index and store at
Fritz Lab in an orderly manner, so that the slides may be easily
identified and retrieved, the most extensive set of slides in the
world on the subject of tall buildings. (13)

2.18.3 Goals

No goals have been identified for this phase yet.

2.19 PHASE 11: RESEARCH

2.19.1 Description

Phase 11 prepares questionnaires on present research on
tall buildings, and selects the institutions and organizations to
which to send them. After receiving replies to the question-
naires, this phase reviews and analyzes, and then publishes

results of the survey, thus recording areas for potential research. In addition to preparing the surveys, Phase 11 also gathers information at regional conferences on what investigators are learning, and from this identifies further areas of research. (13,15) See Appendix D for further detailed descriptions of the phase.

2.19.2 Objectives

The objectives of Phase 11 are to conduct a survey of present research and research needs, and to identify economical, sociological, political, cultural, environmental and other fields of research needed for a more harmonious relationship between man and his urban habitat. (13,15)

2.19.3 Goals

To date no goals have been identified for the phase.

2.20 PHASE 12: MONOGRAPH

2.20.1 Description

The MONOGRAPH phase is responsible for the printing and distributing of National and Regional Conference Proceedings, and preparing bulletins and reviewing ballots to accompany the mailings. Through bulletins and reports, Phase 12 stimulates progress

on MONOGRAPH input and solicits material which it then reproduces and distributes. The effective coordination of input requires the development and maintaining of schedules and procedures for monitoring of progress. Thus, Phase 12 also works to establish orderly, timesaving ways of accomplishing MONOGRAPH tasks. It maintains and distributes Joint Committee reports and other control records for MONOGRAPH production: M61, MONOGRAPH Table of Contents, M81, MONOGRAPH Regional Inputs and Needs, and M117, MONOGRAPH Draft 1 - Report Input Control, as well as outline and Draft 1 material. Ultimately, Phase 12 will publish and distribute the MONOGRAPH itself. (13,15)   See Appendix D for further detailed descriptions of the phase.

2.20.2   Objective

The objectives of Phase 12 are to coordinate and facilitate, both internally and externally, those processes which contribute to the production of the MONOGRAPH, and to serve as a vehicle through which international cooperation develops and continues, acting as a clearinghouse, liaison, communicator, collector, distributor, and disseminator of information on the state-of-art of tall building planning, design, construction, and operation, and as a contact with publishers. (13)

2.20.3 Goals

The ultimate goal of Phase 12 is to complete the MONO-GRAPH in 1976, and because of the rapid change in the state-of-art, a follow-up of supplementary material and later updating of the MONOGRAPH on a periodic basis is planned. "Supplements" co-ordinated with international conferences will provide the focus for further work in this phase. Immediate goals leading up to the production of the MONOGRAPH are as follows:

Mar 76   Draft 1 (Rev) completed for all five volumes.

May 76   Draft 2 completed for volume CL.

Jun 76   Draft 2 completed for volumes PC, SC, SB, and CB.

Jun 76   Draft 3 completed for volume CL.

Jul 76   Draft 3 completed for volume SC.

Aug 76   Draft 3 completed for volumes PC, SB, and CB.

Dec 76   All volumes ready for publication.

2.21   PHASE 13:   SEMINARS AND COURSES

2.21.1   Description

       This phase of the project is concerned with sponsoring

seminars about the Tall Buildings project, given by the super-

visors of the project with the view of broadening the knowledge

of the existence of the project.   Topics selected may be of a

technical nature or simply of a descriptive nature illustrating

the work of the Joint Committee. (17)   See Appendix D for further

detailed descriptions of the phase.

2.21.2   Objective

       The aim of Phase 13 is to promote the work of the Joint

Committee by offering and providing seminars and courses on the

characteristics of tall buildings.   The seminars are also meant

to arouse the interest of the attendants who may eventually par-

ticipate actively in the project. (17)

2.21.3   Goals

       No goals have been identified for this phase.

2.22   PHASE 14:   SURVEYS OF BUILDING CHARACTERISTICS

2.22.1   Description

       The two main activities of the phase consist of

updating and adding to the data base on tall building character-
istics, and updating the Project/City Description files, which is
the most important information about the most significant build-
ings and cities. The scope of the tall building characteristic
surveys include such topics as the dimensions, heights, number
of stories, structural systems, and materials used for the build-
ings. Phase 14 processes survey tables from developed computer
programs, and prepares tables and input forms for cities in which
conferences are held and where the director visits on project
business, as well as planning and developing programs for future
surveys. From the surveys and the Project Description file comes
input for the MONOGRAPH, journal articles, the Times, and other
publications. (13) See Appendix D for further detailed descrip-
tions of the phase.

2.22.2 Objective

The objective of Phase 14 is to collect data about tall
buildings throughout the world, and to tabulate and disseminate
this data in a form useful to others. (13)

2.22.3 Goals

No quantitative goals have been identified by this
phase.

2.23 PHASE 15: SYSTEMS

2.23.1 Description

The main theme of this phase is "Systems H", which is
in the process of implementing the "systems approach" into the
project functions. The purpose of Systems H is to (1) formally
coordinate all phases and activities of the project; (2) formu-
late purposes, objectives, and descriptions of all phases; and
(3) aid the management in its "management" functions. (13)

Periodic meetings are scheduled including the project
director, co-director, the research assistant from Phase 15, and
the supervisor and other key persons of a particular phase to be
discussed. At such meetings, policy decisions are made to define
and describe the phase as accurately as possible. See Appendix
D for further detailed descriptions of the phase.

2.23.2 Objective

The overall objective of the Systems phase is to im-
plement the "systems approach" into the management and direction
of the project. (13)

2.23.3 Goals

The goals for this phase are to complete sheets A, C
and M for all phases by March, 1976 and to complete sheets D, T
and W for 50% of the phases by June, 1976. In addition, Phase 15
plans to bring 20% of the phases under "control" by June 1976.

2.24 PHASE 20: PUBLIC INFORMATION

2.24.1 Description

The phase begins with the maintenance of an information
file containing clippings and feature articles on tall buildings
and biographies of key project members, and of a "fact sheet" on
membership statistics, objectives, meetings, and officers. From
these two primary sources of information, Phase 20 composes press
kits for distribution to the press upon request. Phase 20 also
issues press releases on Joint Committee activities, and acts as
a clearinghouse for tall buildings information to media, journals,
and professional groups. The responsibility for maintaining con-
tact with trade publications, public relations agencies of Pro-
fessional Society Sponsors, and national contacts belongs to this
phase. Phase 20 edits and distributes "The Times", and updates
information in the Tall Buildings Brochure ("A Time to Build
Up..."). (13) See Appendix D for further detailed descriptions
of the phase.

2.24.2 Objectives

The objective of Phase 20 is to broaden both the public
and professional awareness of the Tall Buildings project activi-
ties via publicizing the plans, accomplishments, conferences,
lectures and seminars of the Joint Committee through all forms
of mass media, and to supplement project communications through
a newsletter. (13)

2.24.3 Goals

A goal of Phase 20 is to keep all Joint Committee
members and liaison persons informed of Joint Committee activi-
ties. This goal is met every month by publishing an issue of THE
TIMES or TIMES EXTRA.

2.25 PHASE 21: LIAISON

2.25.1 Description

Phase 21 sends letters of invitation for developing
liaison with officers of various organizations. After receiving
names of the liaison representatives designated by the officers,
the phase is responsible for sending confirmation letters and
enclosures, and recording and updating the list of representa-
tives on Roster 21. See Appendix D for further detailed des-
criptions of the phase.

2.25.2 Objective

The objective of Phase 21 is to establish and maintain ties with representatives of professional and governmental organations.

2.25.3 Goals

No goals have been identified for this phase yet.

2.26 PHASE 29: IMPLEMENTATION

2.26.1 Description

Phase 29 is the area of the Tall Buildings project that will implement the findings of the Joint Committee into actual practice. Currently, activity has barely began in this phase. The phase plans to arrange for the participation of some of the key decision-makers of major cities in the project's symposia. Appendix E gives a list of possible ways in which the work of the Joint Committee and its findings can find their way into actual practice. See Appendix D for further detailed descriptions of the phase.

2.26.2 Objective

The objective of Phase 29 is to effectively disseminate data gathered by the Joint Committee to persons and groups

directly or indirectly responsible for making decisions which affect conceptual planning, design and operation of tall buildings. (18)

2.26.3 Goals

To date no goals have been quantified for this phase.

2.27 PHASE 39: LEHIGH RESEARCH

2.27.1 Description

Phase 39 seeks and records information on: (1) research projects on Tall Buildings already completed; (2) on-going research projects; (3) ideas and proposals for research projects; (4) proposals submitted for approval and sponsoring; and (5) proposals not accepted. The phase also conducts surveys of literature related to ideas for possible formal proposals, and prepares proposals for submission to prospective sponsors. (13) See Appendix D for further detailed descriptions of the phase.

2.27.2 Objective

Phase 39 strives to investigate possible areas of research, and to keep a record of all research conducted at Lehigh University related to the Tall Buildings project. (13)

2.27.3 Goals

No goals have been yet identified.

2.28 PHASE 40: PLANNING AND DESIGN DATA BASE

2.28.1 Description

To date not much activity has taken place in Phase 40. In the near future, it is planned to develop a computerized information and data base on the subject of tall buildings.

2.28.2 Objective

The objective of this phase is to coordinate all documented information into accessible form. [14]

2.28.3 Goals

No goals have been identified yet for this phase.

2.29 PHASE 50: SPECIAL PUBLICATIONS

2.29.1 Description

This phase of the project has not yet been developed.

2.30 APPLICATION OF CONTROL TECHNIQUES

After each phase has been defined and quantitative
goals are determined, the kind of control technique then can be
determined for each phase. The three techniques which can be
recommended are PERT, GANTT, and procedure control methods.
Based on the criteria predescribed earlier in this chapter, the
phases were analyzed and assigned an appropriate controlling
technique. A summary of this is shown in Figure 2.3, the Appli-
cation of Control Techniques Matrix.

APPLICATION OF CONTROL TECHNIQUES MATRIX

CONTROL TECHNIQUE

PHASE	TITLE	PERT	GANTT	PROC.	UNDETER.
0	Proj. Direction				
1	Membership				
3	Minutes & Meetings				
4	Intern'l Confs.				
5	General Procedures				
5C	Computer Systems				
6	Editorial				
7	Finance				
7S	Staff				
8	Regional Confs.				
9	Symp., Workshops				
10B	Bibliography				
10F	Films				
10L	Libraries				
10P	Publications				
10R	Reports				
10S	Slides				
11	Research				
12	MONOGRAPH				
13	Sem. & Courses				
14	Surveys of T.B.				
15	Systems				
20	Public Inform.				
21	Liaison				
29	Implementation				
39	Lehigh Research				
40	Data Base				
50	Special Pub.				

Figure 2.3

2.31 SUMMARY

2.31.1 Recommendations for Better Control

One of the major difficulties encountered in the Tall Building project is the lack of quantitative goals defined for the phases. Some phases had qualitative-type goals, but when these goals were tried to be put into a more quantitative nature, persons involved with these phases were unable to do so. It is thus recommended that more time be devoted by the project and its staff to clearly define, document and quantify the phases and their objectives and goals. In some instances, an objective for a given phase is stated in three different sources and each instance different than the others. One standard, acceptable objective for each phase should exist.

As stated previously, the goals for the phases should be quantitative in order for a control system to work effectively. Examples of qualitative goals which need to be quantified by the project management follows:

Phase 9, Symposia, Workshops and Technical Sessions, plans to coordinate its efforts with the Implementation Phase, but "by when" or "how much" is not specified in any documentation.

Phase 10B, Bibliography, has as its goals (1) to co-ordinate the bibliographic information system through a marketing

agency, (2) to stimulate and facilitate the use of the bibliographic service, (3) to update its information as new material becomes available, (4) to develop contacts with computer center outlets around the world to compliment the planned computer-based aspects of the planning and design data base, and to expand the service by the incorporation of additional input from fields of architective planning, operation, and building maintenance. (15) All of these so-called goals are too vague. They must be redefined to be precise measurable statements.

Phase 10F, Films, plans to develop a profitable or break-even inventory system for its distribution, storage and maintenance of its audio-visual productions and activities, but "when" does it plan to do this? The phase also is trying to increase the size of its film library and its distribution and use, but nothing is mentioned referring to "how much".

Phase 10L, Libraries, seeks and communicates with libraries to develop the liaison with them, but "how much" liaison does it want to gain with each library? The phase also plans to develop a scheme for geographical distribution of Tall Buildings libraries, but no mention of "target dates" to begin or complete this plan.

Phase 10R, Reports, has stated as its goals to see that the reports and publications of the Joint Committee are listed by the appropriate international information centers and to promote distribution and sale of each conference's PROCEEDINGS. These goals must also be quantified as to by "when" reports and publications should be listed in centers and "how much" distribution and sale of conference PROCEEDINGS.

Phase 11, Research, intends to initiate a "major area of research" based on an Indonesian conference recommendation on "What people want and need in high-rise housing" but never states "when" it plans to begin this. The phase also desires to accelerate the conduct of specialized research on specific points--primarily through the stimulus of existing agencies. Again no reference to "when" or "how much".

Phase 13, Seminars and Courses, has as its goal to keep personnel informed of the activities currently involved in the Tall Building program. What is needed to quantify this goal is something like lead time from the activity until the news reaches the personnel of the project.

Phase 14, Tall Building Surveys, plans to further develop its survey data of tall buildings but has not specified "how much" additional analysis of the data or "target dates" for the completion of this work.

Phase 29, Implementation, is in its beginning stages. To date a flow diagram of its activities and phases has been developed but no time estimates or target dates have been assigned. (See Figure 2.4) Gantt or PERT control can be applied to this phase. But a time schedule is necessary before either of these techniques can be employed.

IMPLEMENTATION ACTIVITIES
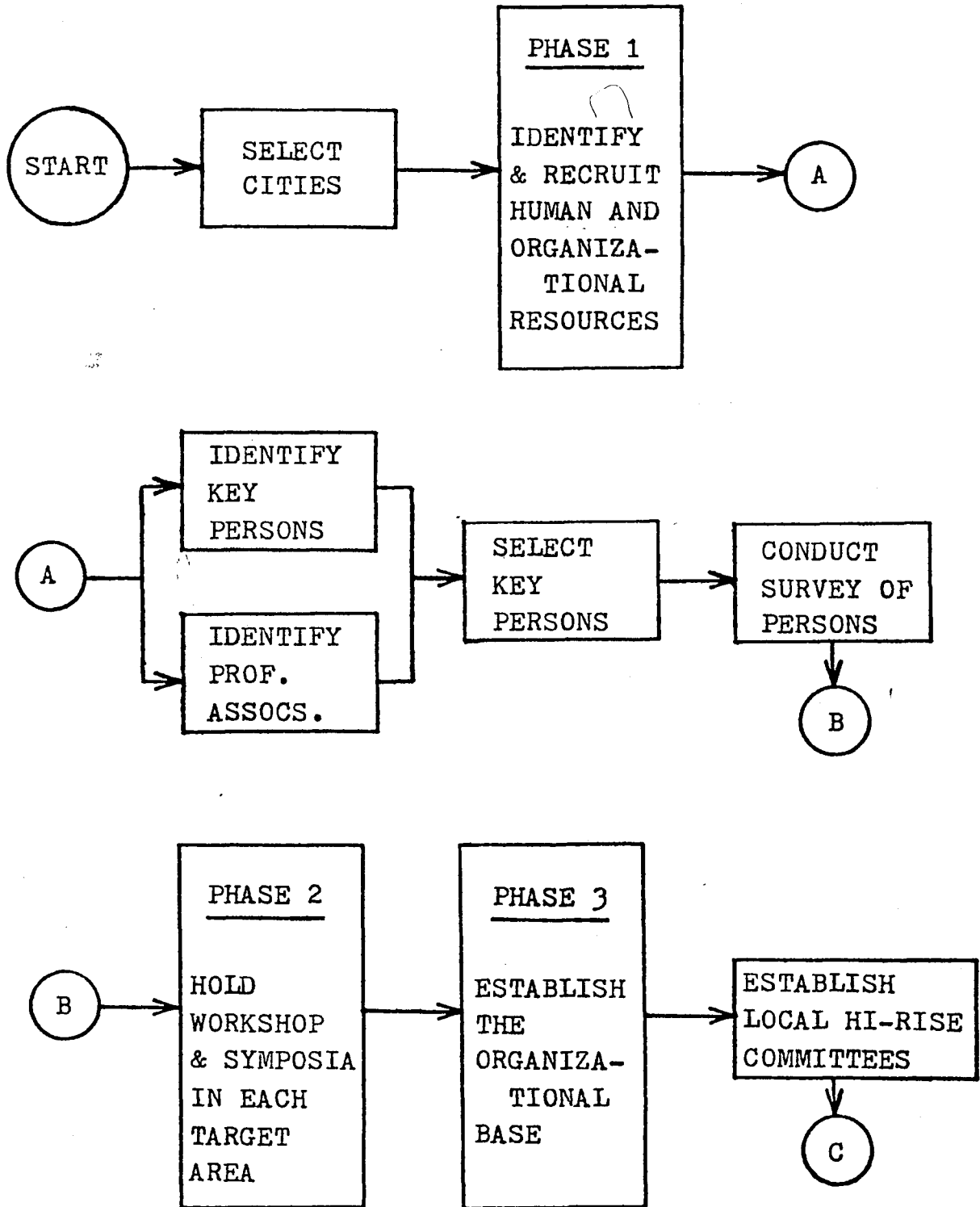
Figure 2.4
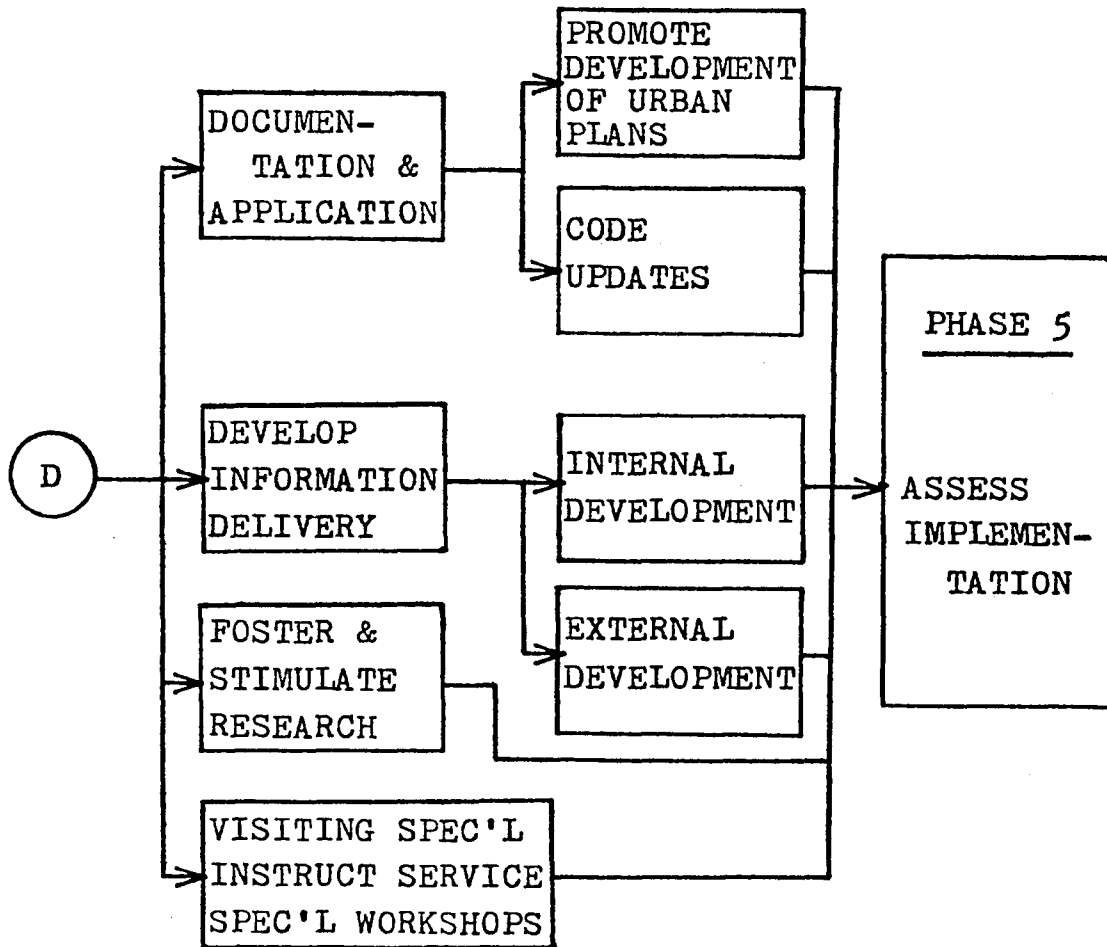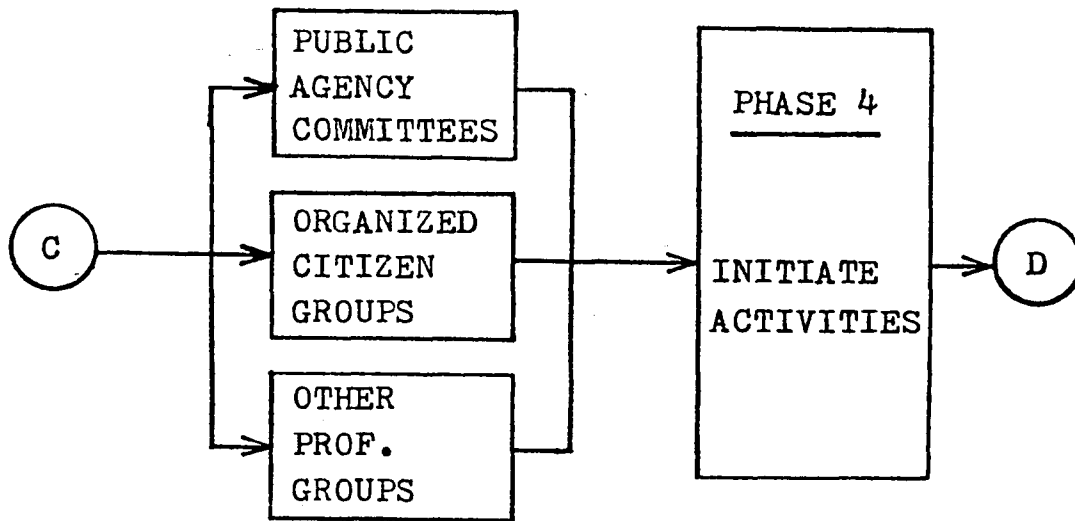
Figure 2.4. Continued

Phase 40, Planning and Design Data Base, plans continuation of additions to the data base, and to develop a computerized data base of tall building related data. Both of these goals must be quantified by the project management before any control technique is applied.

Many of the other phases not mentioned in the section are also in need of quantitative goals.

It is evident that much preliminary work must be completed in just defining the areas of the project and the goals associated with each. This work must be complete before any control technique can be used effectively.

CHAPTER 3

CONTROL SYSTEMS – METHODOLOGY AND IMPLEMENTATION

3.1 GENERAL INTRODUCTION

Management's basic functions consist of planning, decision-making, organizing, staffing and controlling. The control function is the follow-up to planning, it is the check on performance to see if planned goals are being achieved. The control activity will measure deviations from the norm or planned, and initiate corrective action. The steps that should be followed in designing a control system are:

(1) Specifying the standards. These are predetermined goals (target dates, activity durations, milestones) established by the planners.

(2) Measuring actual performance. Accurate and timely recording of performance is necessary for proper control.

(3) Comparing actual performance with expected or predetermined standards.

(4) Reporting of deviations to responsible personnel. This is when management becomes aware of 'how things are going'.

(5) Taking appropriate control action. Two courses

of action must be considered here. First, the

predetermined goals or standards may be unrealistic

and thus must be modified or revised; or second,

the standards are correct in which case either

reorganization of the work activities or realloca-

tion of resources for critical activities is

necessary. In either case, plans must be updated.

If the activities are under control and performance

is acceptable, the proper acknowledgement to

responsible persons is recommended.

In all, the control system should be responsive to the work en-

vironment and be coordinated within the over-all framework of the

organization or project. (3,12,21,22,23)

Presented next are three controlling techniques appli-

cable to the Tall Building Project and an example of implementa-

tion in three different work activities in the project. Pro-

cedural control, PERT control, and Gantt chart control make up the

three. Each has its own characteristics and functions best in a

particular environment.

3.2 PROCEDURE CONTROL

The environment, in which a procedure controlled system is best applicable, is one where the activities and operations are routine in nature. A functional or support area is this kind of environment. Predetermined standards can be developed for routine activities and then monitoring and controlling is possible. Phase 5C, the computer systems area of the Tall Building Project, is a typical example of the prescribed environment necessary for a procedure control system and thus will be used for the sample.

The following documentation is the first of its kind for the phase. All software mentioned and referred to, does presently exist and is used frequently by the project.

The purpose of this documentation is to provide instructions for continued operation of the 5C phase by following the procedures given. Reporting from this system would be best on an exception basis. If something cannot be fulfilled on schedule, the project management should be notified of the situation.

3.2.1 Applying Procedural Control to the Computer Systems Activity

Computer based data processing systems and packages are widely used in the Tall Building project for two reasons:

(1) to organize and classify membership and tall building related information; and

(2) to free staff members from typing mailing labels and retyping project documents when updates occur.

All requests for computer runs are given to the 5C group on the enclosed request forms and entered in the log when received and completed. (See Enclosures 1 and 2 of Appendix F) The SCOPE dayfiles from all successful runs are also filed for future reference.

Many routine requests involve the project's membership and address data base (D369). These requests include (1) mailing label format of addresses, (2) geographical sorting of members, (3) alphabetical sorting of members, (4) organizational sorting of members, and (5) roster reports (which are lists of names of members on the various committee in the project). The requests are accepted with a one week lead time for fulfillment.

At the beginning of every other month a complete listing (13 copies) is processed consisting of an alphabetical sorting, a geographical sorting, and an organizational sorting of every

member involved with the Tall Building project. This complete listing of all the project members and affiliates is referred to as "Roster 20S".

Also, the phase creates new and updated data files of project membership data. The membership phase is responsible for making daily updates to the system and these updates are incorporated permanently into the system every three months. The daily updates to the data base are used for computer runs but kept on card form until the next three-month file creation.

The 5C group is also responsible for all the project's computer needs. Requests for new software are made from the various phases. The 5C group and the requestor set a target date for completion of the package; generally about three to four months are allowed for programming and debugging. Once the software package is running, one of two situations arises, either (1) the requestor takes over the package, that is, he supplies the data and runs the program himself, or (2) the requestor is responsible for supplying the 5C group with proper data and the 5C group runs the program when requested. The deciding factors are the complexity of the package and the computer knowledge and background of the requestor/user.

All computer executions are requested and run on submission of the same request form. (See Enclosure 1 of Appendix F)

From the view of the 5C group most requests, execution of software and programming, are randomly received; however, some are very definite by date and others by project business. These more definite operations can be planned for in advance. These include "Roster 20S" generation every two months and a new data base creation every three months. See Figure 3.1.
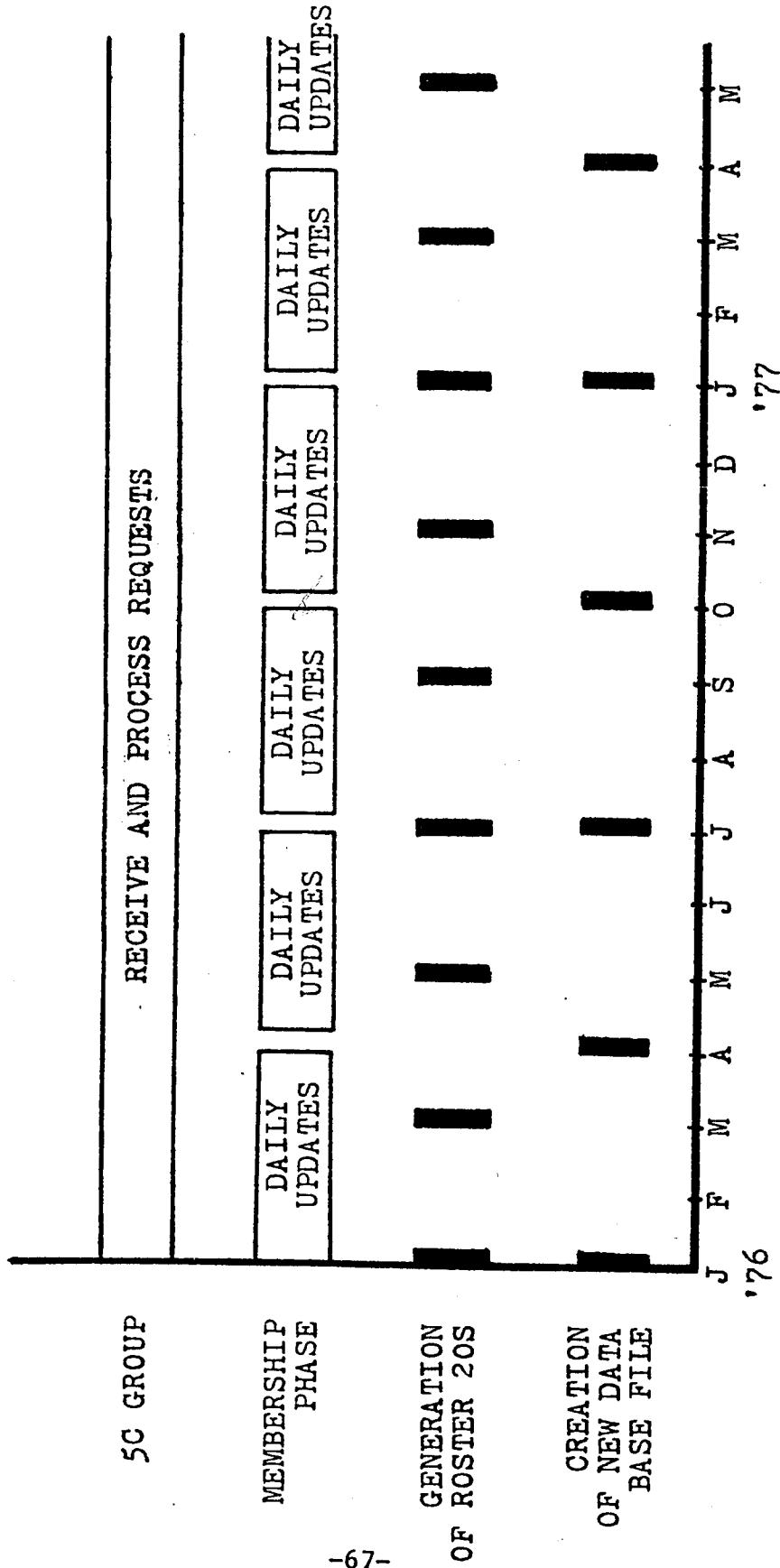
Figure 3.1

Attached as Appendix F is a complete procedure oriented users' manual and guide for all existing or computerized packages under the control of the 5C group.

The computerized packages described in Appendix F include (1) the membership data base, which utilizes the programs BEEDLET, ROSTGEN, DOPROG (Decks 1 thru 4) and Decks A thru E; (2) ADMINISTRATIVE GLOSSARY PACKAGE; (3) PROJECT & CITY DESCRIPTION SYSTEM; (4) M117 PROGRAM; (5) POPULATION PACKAGE; (6) SCHEDULE 2-1 PROGRAM; (7) SCHEDULE 2-2 PROGRAM; and (8) CUMULATIVE 7S PACKAGE.

For each package a brief description of the source program is given along with all necessary documentation for running, updating, maintaining, and/or modifying the program.

The 5C group is responsible for documentation of all future programs written and such documentation should be added to the 5C documentation manual.

3.3 PERT CONTROL

3.3.1 Procedure for Applying PERT Technique

The environment necessary for PERT control to be applicable consists of many interacting, interrelated activities. These activities are very goal-oriented. Target dates and milestones for particular activities are prominent in the environment. The phase to be controlled by the PERT technique is the MONOGRAPH activity, phase 12, because it operates in the proper environment prescribed in chapters one and two for application of the PERT technique.

Any of the Tall Building Project phases which possess this particular environment may be controlled by the PERT technique. The first step in applying PERT to a phase is to identify all the activities which must be performed to achieve the objective or a goal of the phase. Once identified, these activities should then be abstracted into a network flow diagram consisting of the activities from start to finish, showing all the logical and planned sequence of accomplishments, interdependencies, and interrelationships. (7) The completed network should be of the following form:
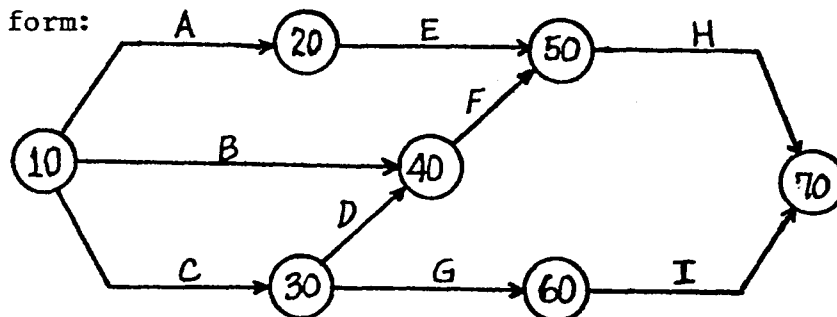
Fig. 3.2
Network of Activities

The activities are described here as A,B,C, thru I. The numbers

10,20, etc. are nodes which aid in the identification of an acti-

vity, e.g. node 10 to node 20 represents activity A.

The next step is to identify or assign time durations

to each activity. PERT requires three time estimates for each

activity, i.e., a, an optimistic, m, most likely and, b, pessi-

mistic estimate. It is permissable to assign like values to a,

m, and b if the activity's duration can be estimate with certainty.

Now, these time estimates can be incorporated into the PERT net-

work of activities. The CDC PERT Manual (19) can be referenced

to use the PERT/TIME (20) computer package available at the Lehigh

University Computing Center. The PERT reference manual at the

Computing Center should be consulted for the current operating

instruction for the PERT software package.

The general deck set-up for using the current package

for analysis of a network of activities is:

```
GDLSB,*Name,B5402,CM12000,T200.
ACCOUNT(R=HIBLDG)
PAGES(199,N)
ATTACH(PERT66,PERT66)
PERT66.
7-8-9
K-Card
L-Card
M-Card
W-Card
X-Card
Y-Card
```

                    (continued)

```
A-Card    ⎤
A-Card    ⎟    all of the activity cards; 1 card per
   ⋮      ⎬              activity
A-Card    ⎟
Z-Card    ⎦
E-O-F
```

For ease of description, the PERT Manual should be referenced to
obtain the parameters and formats for all of the data cards and
for the various output options the package allows.

A desired output is one that forces a predetermined
schedule completion date. From this, the package works backwards
to calculate the necessary schedule of all other activity in order
to meet this completion date. This date is incorporated into the
program via an activity card describing the activity which is to
be completed on a specified date.

3.3.2 Applying PERT to the MONOGRAPH Activity

The MONOGRAPH phase of the project possesses the neces-
sary environment for the PERT control technique.

The MONOGRAPH activity which is studied and analyzed
consists of the activities from headquarters printing Draft 1
(Revised) to headquarters preparing Draft 4 for the publisher.
The MONOGRAPH Flow Diagram – Drafts 1,2,3 and 4, Schedule 6.2.C,
was referenced initially to develop the necessary PERT network
of activities. (See Appendix G) The network is typical for any

chapter of the MONOGRAPH. The only difference is starting date, since some chapters are nearer to completion than others. The completed network is shown in figure 3.3 along with the three time estimates for each activity.
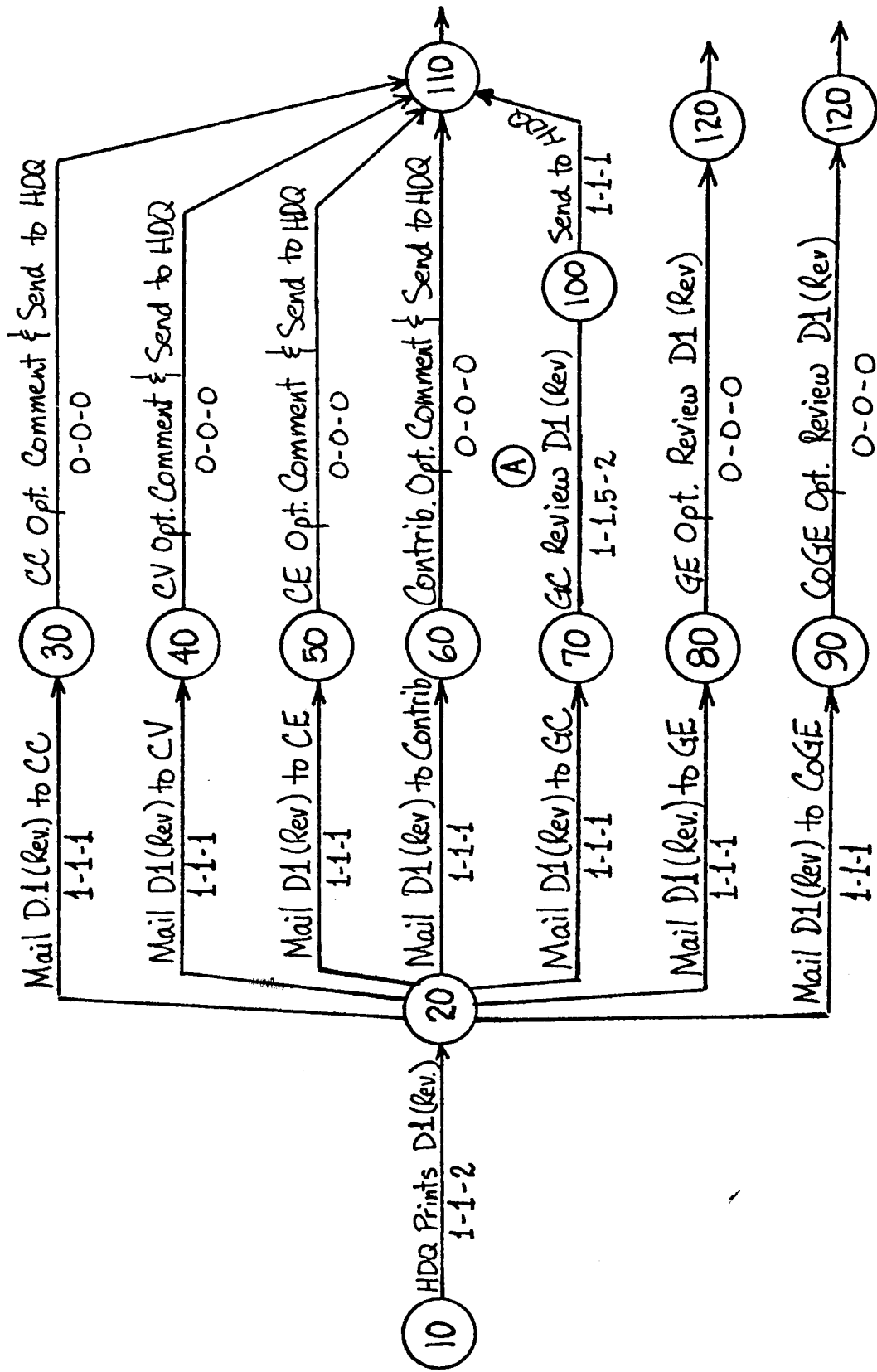
Figure 3.3. MONOGRAPH PERT DIAGRAM – DRAFTS 1,2,3 & 4
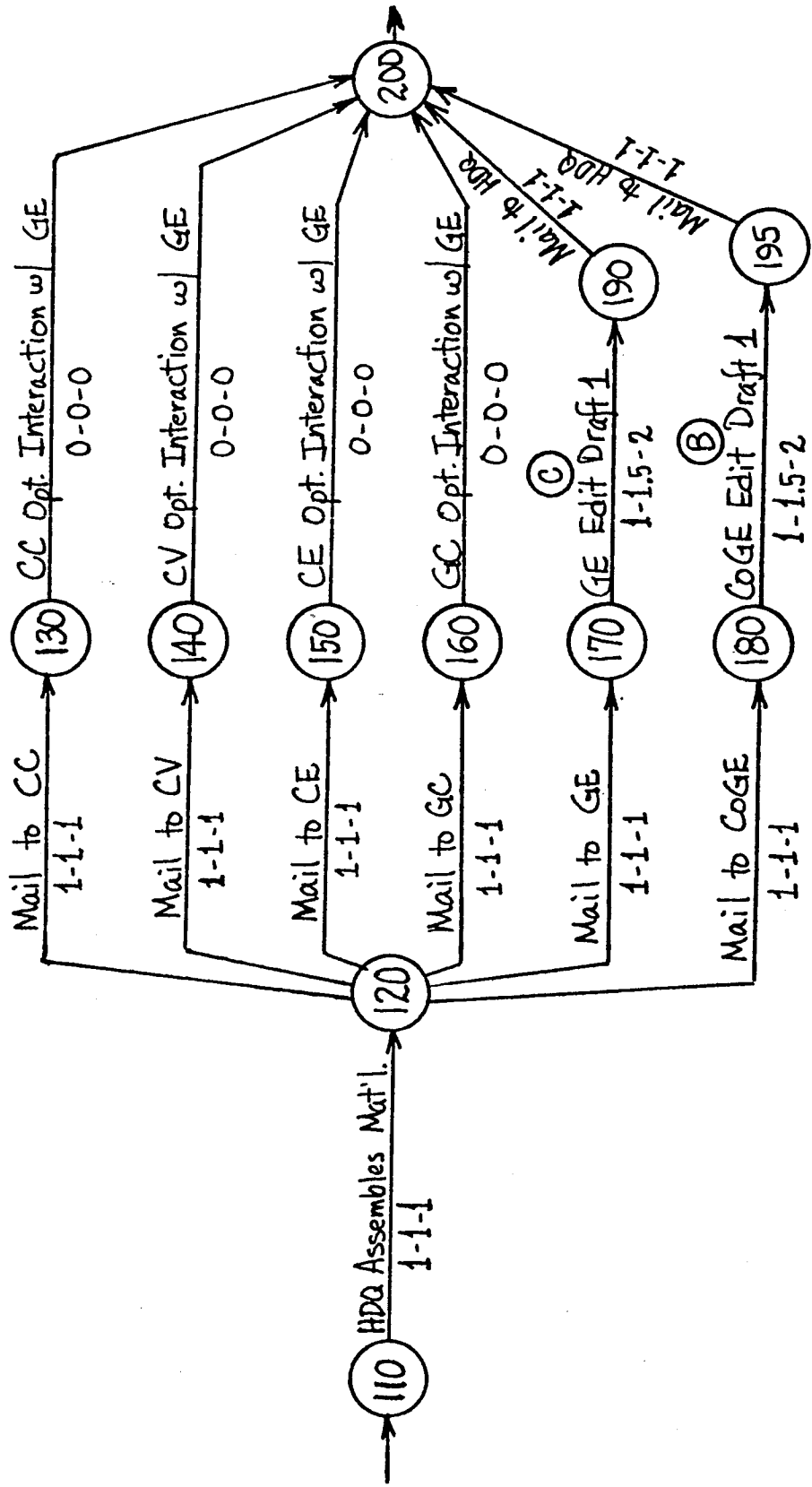
Figure 3.3. continued.
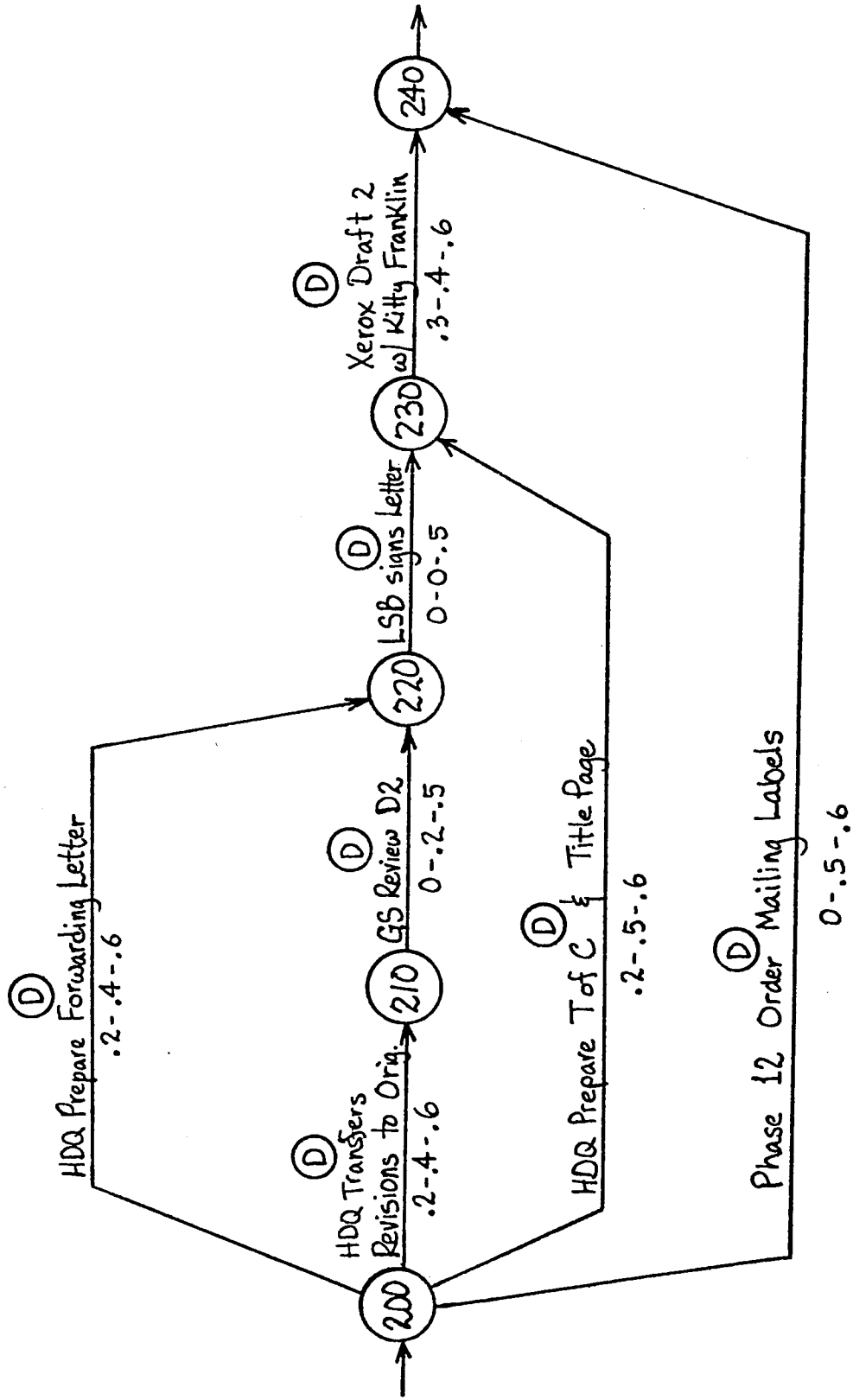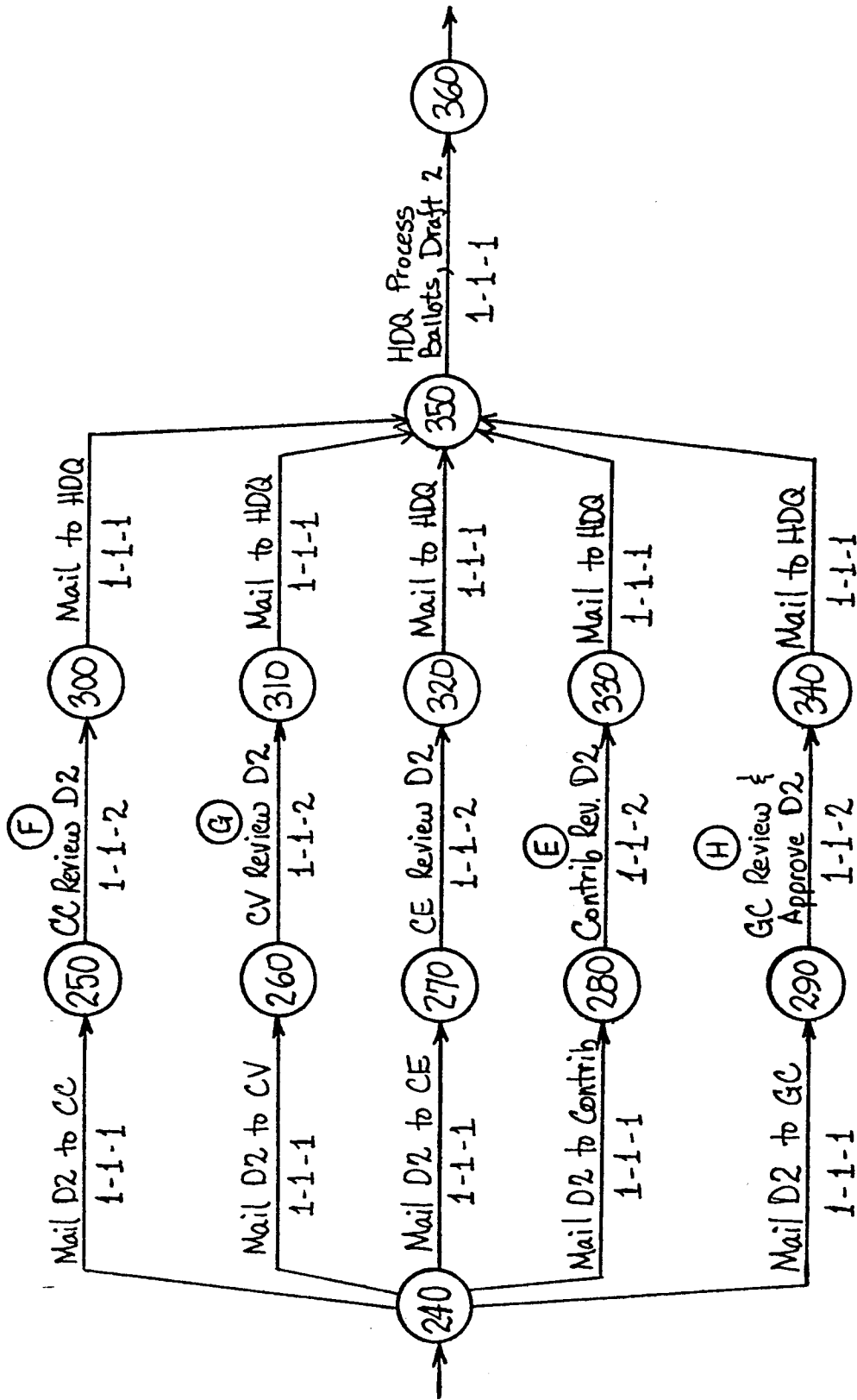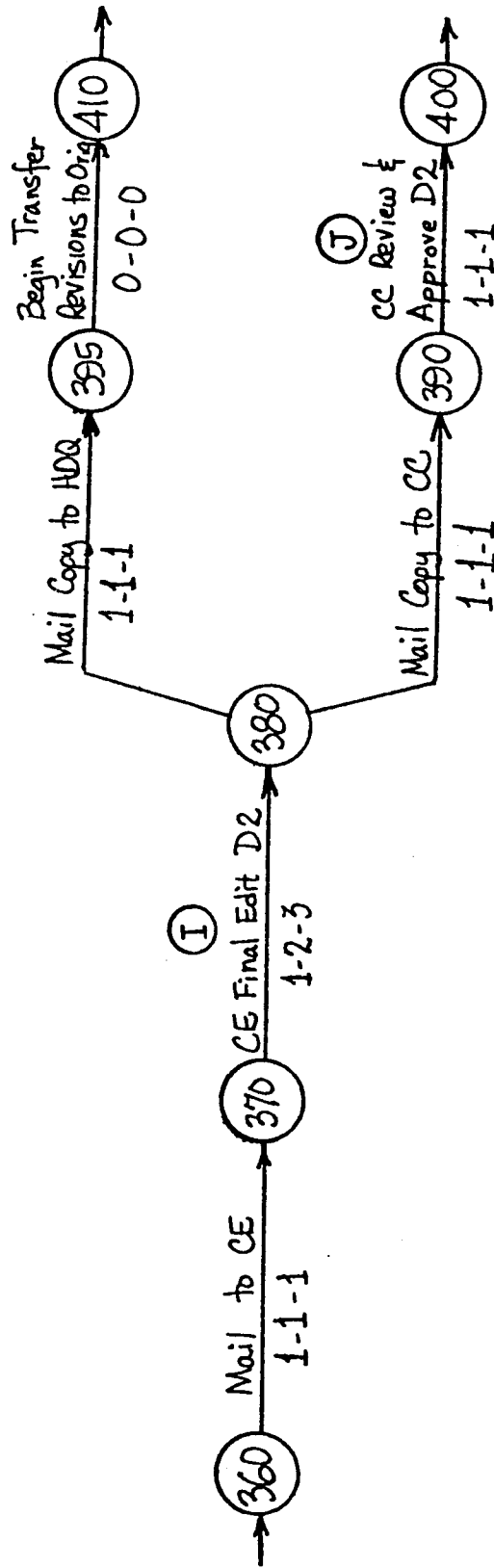
Figure 3.3. continued.

Figure 3.3. continued.

Figure 3.3. continued.

Figure 3.3. continued.

Figure 3.3. continued.

Figure 3.3. continued.

580 —HDQ Prepare Draft for Publisher— 590

Q

6-6-8
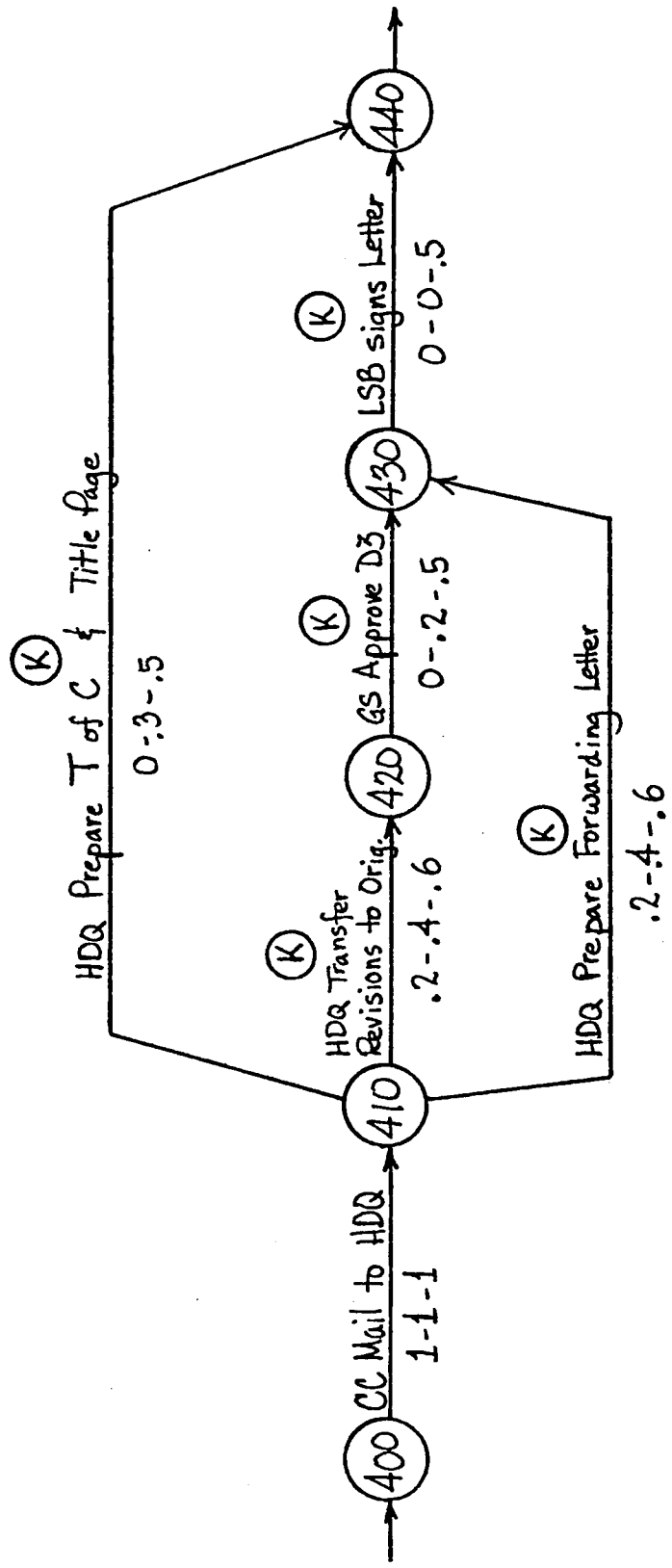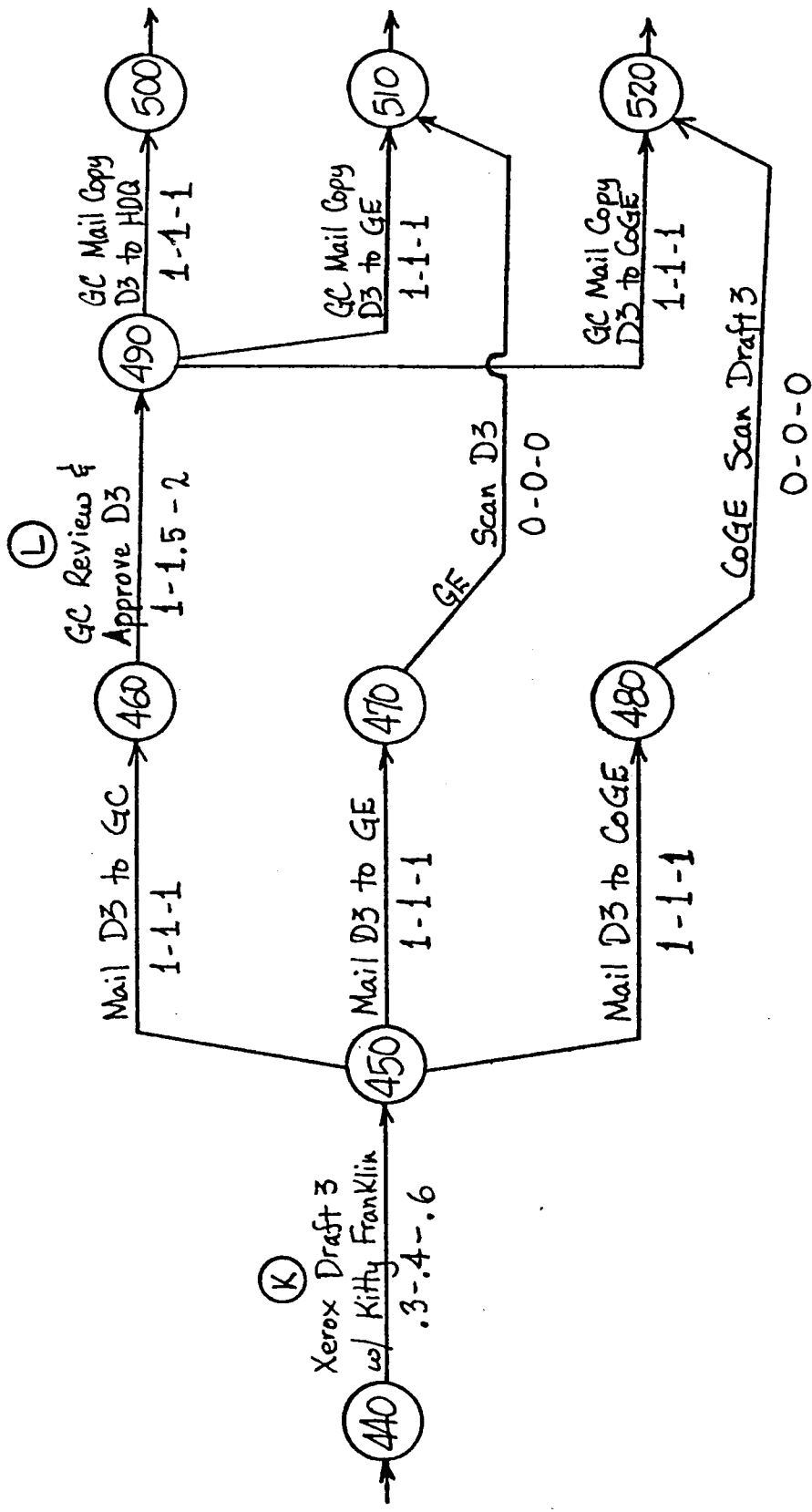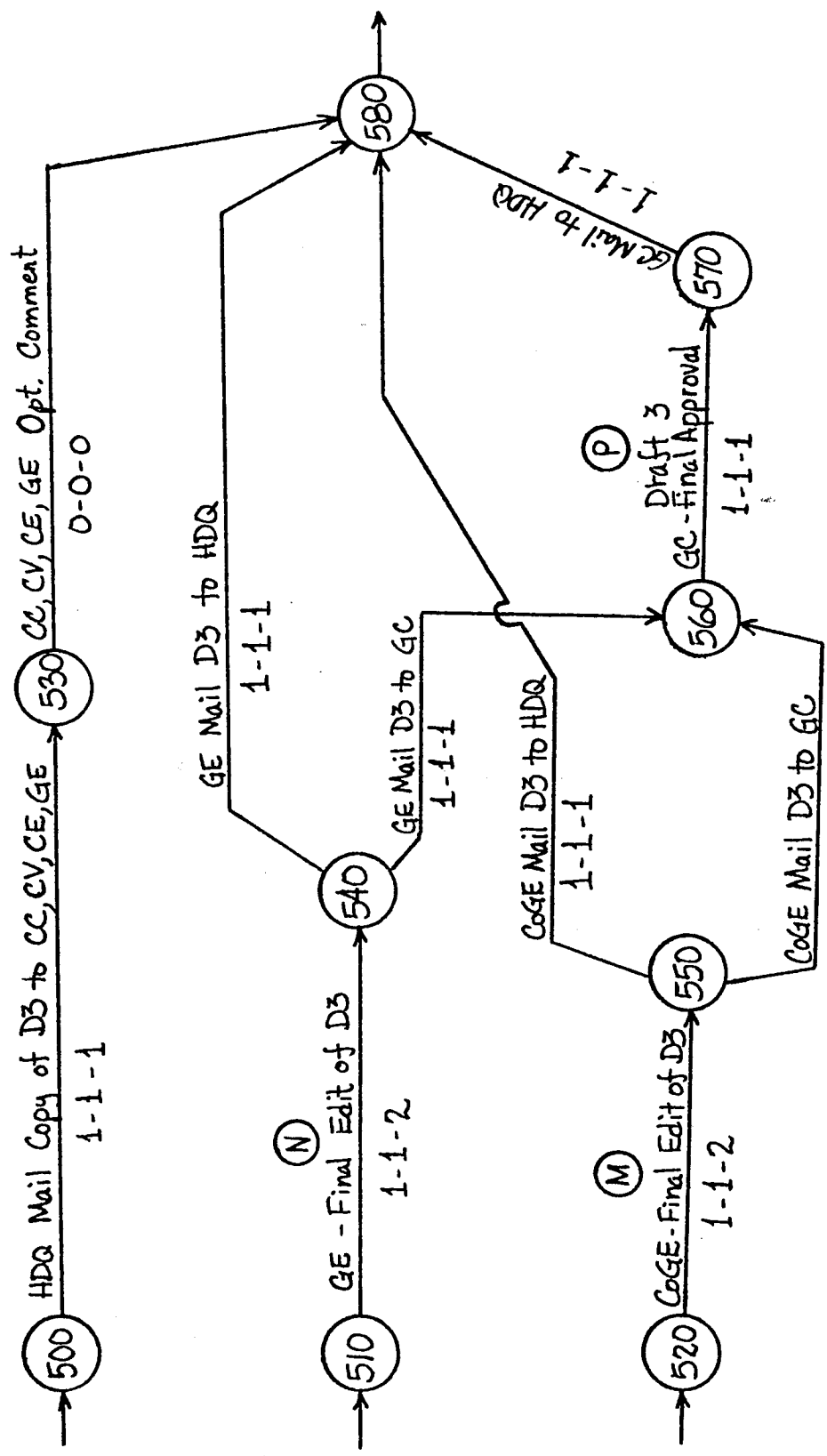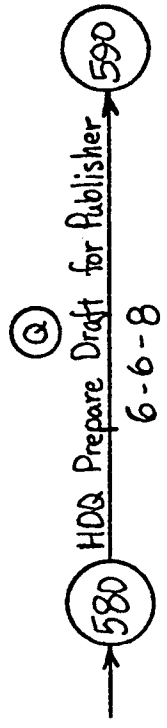
Figure 3.3. continued.

Once the network is complete and the flow of activities
and their respective time estimates are accepted by the project
management, the PERT package can be applied. Initially the net-
work was analyzed as an open ended situation, that is, the activi-
ties were allowed to freely run their course, the DATE EXPECTED
column of the activity report. (See Appendix H) From this, it
was shown that 34 weeks are needed to complete the planned acti-
vities. The activities will be completed by October 19, 1976,
if everything remains on schedule, thus easily meeting the pro-
ject's goal of completion by December 31, 1976.

The next step is to apply this general network to speci-
fic volumes of chapters. Management decided that all chapters
within a volume of the MONOGRAPH would be completed on identical
target dates. The five volumes of the MONOGRAPH which will be ,
controlled are: (1) volume PC, Planning and Environmental
Criteria; (2) volume SC, Systems and Concepts; (3) volume CL,
Criteria and Loading; (4) volume SB, Structural Design of Tall
Steel Buildings; and (5) volume CB, Structural Design of Tall
Concrete and Masonry Buildings. Volumes PC and CB will be con-
trolled by a single schedule of target dates, i.e. four sched-
ules will be used to control the five volumes.

Each of the volumes was scheduled to be complete by
its respective target date, agreed upon by the project manage-
ment and the various personnel involved with their respective

volumes. These target dates and schedule of activities are pre-
sented in Appendices H, I, J, and K. These are the dates listed
in the DATE COMP/SCHED column of the activity report. Using
these target dates, the PERT/TIME package calculates a schedule
for all the activities involved. This schedule of dates is
found in the DATE ALLOWED column of the activity report. Only
the schedule for volumes PC and CB is realistic; the other vol-
umes were behind schedule before they had even been started!
This is because the completion dates set are unrealistic as
compared to the proposed network of activities.

A more realistic control mechanism would be obtained if
the dates calculated by the PERT/TIME package were used for all
volumes and not just volumes PC and CB. If this were done, all
volumes would be completed by October 19, 1976 which is still
sooner than managements desired target date of December 31, 1976.

The output from the PERT/TIME package offers the pro-
ject management the following information:

(1) The critical path of activities, that is, those
activities which must be controlled tighter than
others since delays in these reflect delays in the
overall completion of the program of activities;
these critical activities have slack values of zero;

(2) the expected completion date of each activity; this is the date that the activity is scheduled to be completed by; and

(3) the latest allowable completion date of each activity; some of the non-critical activities have some slack which allows for slippage in their completion without affecting or delaying the overall completion of the entire program of activities and are so identified.

The expected and latest allowable completion dates can be compared with the actual completion date of an activity and used as a control mechanism to monitor the entire network of MONOGRAPH activities.

An advantage of the PERT application is that the project management can be informed in advance whether or not an expected or scheduled completion date will be met. If a target date cannot be met, the project management might consider

(1) reallocating its resources, that is, devote more effort (personnel, money) to the activities which are critical to the completion of the program; and/or

(2) redefining the scheme of activities, that is, eliminate low priority activities, combine activities, and/or shorten the time allowed for certain activities.

3.4 GANTT CONTROL

3.4.1 Procedure for Applying the Gantt Technique

Gantt chart control is applicable to those phases, as prescribed in chapter two, which operate in an environment consisting of sequential activities having activity times that are fairly deterministic. The Gantt chart will provide a time schedule for these activities. In order to apply Gantt control to a particular phase of the project, the first step is to draw a macroscopic flow diagram of the activity involved. From this, the macroscopic activities can be subdivided into their basic task elements. These tasks should then be arranged in their proper order of occurence, simultaneously and/or sequentially. The designated durations of each task or activity can then be specified. The Gantt chart now can be developed. Periodic milestones should be incorporated into the scheme of activities. The milestones will provide the project management with a basis for timing achievement of significant stages of the overall activity. (11)

To the right of the chart, across from the activities and tasks, will be the control information. This consists of the task (or activity) number, the output for report, and respective responsible personnel.

The benefits of the completed and operating Gantt chart include: (21)

(1) All tasks (or activities) are graphically displayed in one easily understood chart;

(2) Overall progress of the system of tasks at any point in time can be shown if corresponding percentages of task completion and coloring of the bar are done;

(3) Milestones can be pre-planned into the scheme of activities.

3.4.2 Applying Gantt Chart Control to the Implementation Activity

The Implementation phase consists of many sequentially related tasks and activities. Figure 2.4 presents the macroscopic view of the Implementation activity for any given city. From this, the Gantt chart, figure 3.4, was developed for the first city selected. Figure 3.5 displays the overall activity for five years of the implementation phase of the Tall Building Project. Each of the ten cities will go through the six phases of activities.

Since the activity for the Implementation phase is not planned to begin until October 1976, the control information is not yet complete. Persons responsible for the various tasks are not yet identified and required reports not specified. Both of these should be complete before the start of the activities.

The Gantt charts presented illustrate both a detailed plan for a particular city and an overall general plan for the five year duration of the Implementation Phase of the Tall Building Project. All ten cities will be selected the first year but only one will be studied through phase 2 to phase 6. All cities will follow the same flow of activities, only the timing will differ. Also, modifications can be incorporated into the system if the project management deems necessary.

DETAILED IMPLEMENTATION PLAN FOR ONE CITY & CONTROL MECHANISM

TYPICAL 2-YEAR WORK CYCLE FOR ONE CITY
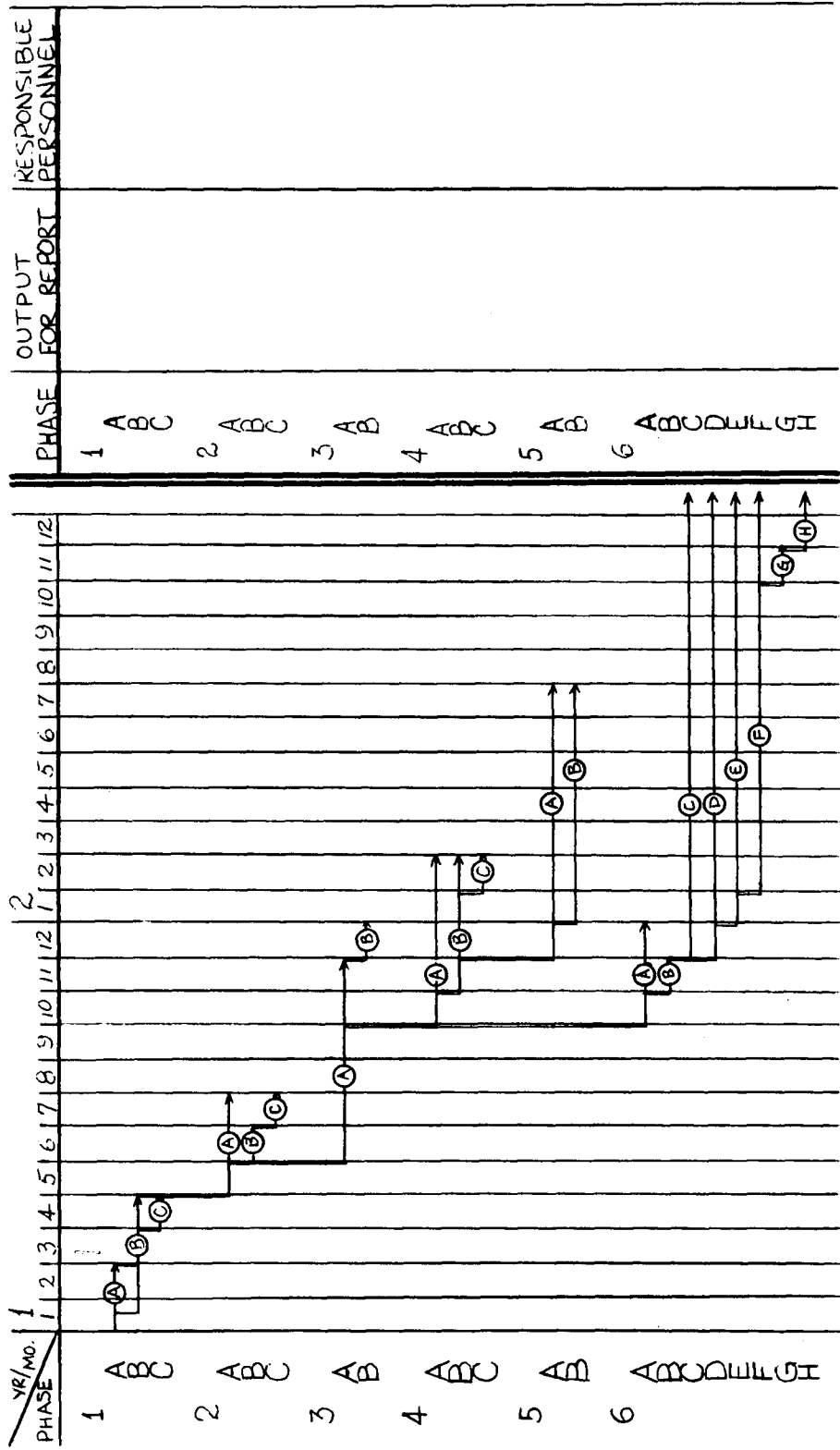
Figure 3.4

KEY FOR FIGURE 3.4 - THE IMPLEMENTATION PROGRAM

Phase 1.   Selection of Cities

        A - Identification of Cities
        B - Preliminary Contacts with Cities
        C - Decision on Selection

Phase 2.   Identify, Survey and Recruit Human & Organizational
        Resources

        A - Selection of Resources
        B - Conduct Surveys
        C - Examine and Strengthen Resource Recruitment

Phase 3.   Hold Workshops

        A - Organization
        B - Post-Workshop Follow-up

Phase 4.   Reinforce the Organizational Base

        A - Promote the Local High-Rise Committee
        B - Other Contacts
        C - Evaluate Progress

Phase 5.   Activities: Documentation, Research, Communication,

        A - Documentation and Application
        B - Information Delivery

Phase 6.   Assessment of Implementation Program

        A - Develop Plans for Making Assessment
        B - Meet with Sponsor and Advisory Committee 29
        C - Identify the flow of Information
        D - Identify the Extent to Which Information is Trans-
            ferred
        E - Identify Successes and Difficulties
        F - Recommend Changes in Work Plan
        G - Review with Sponsor and Advisory Committee 29
        H - Make Final Evaluation

FIVE-YEAR PLAN OF IMPLEMENTATION ACTIVITIES

PHASE	DESCRIPTION
1	Selection of Cities
2	Recruit Resources
3	Hold Workshops
4	Reinforce Organizational Base
5	Activities
6	Assessment
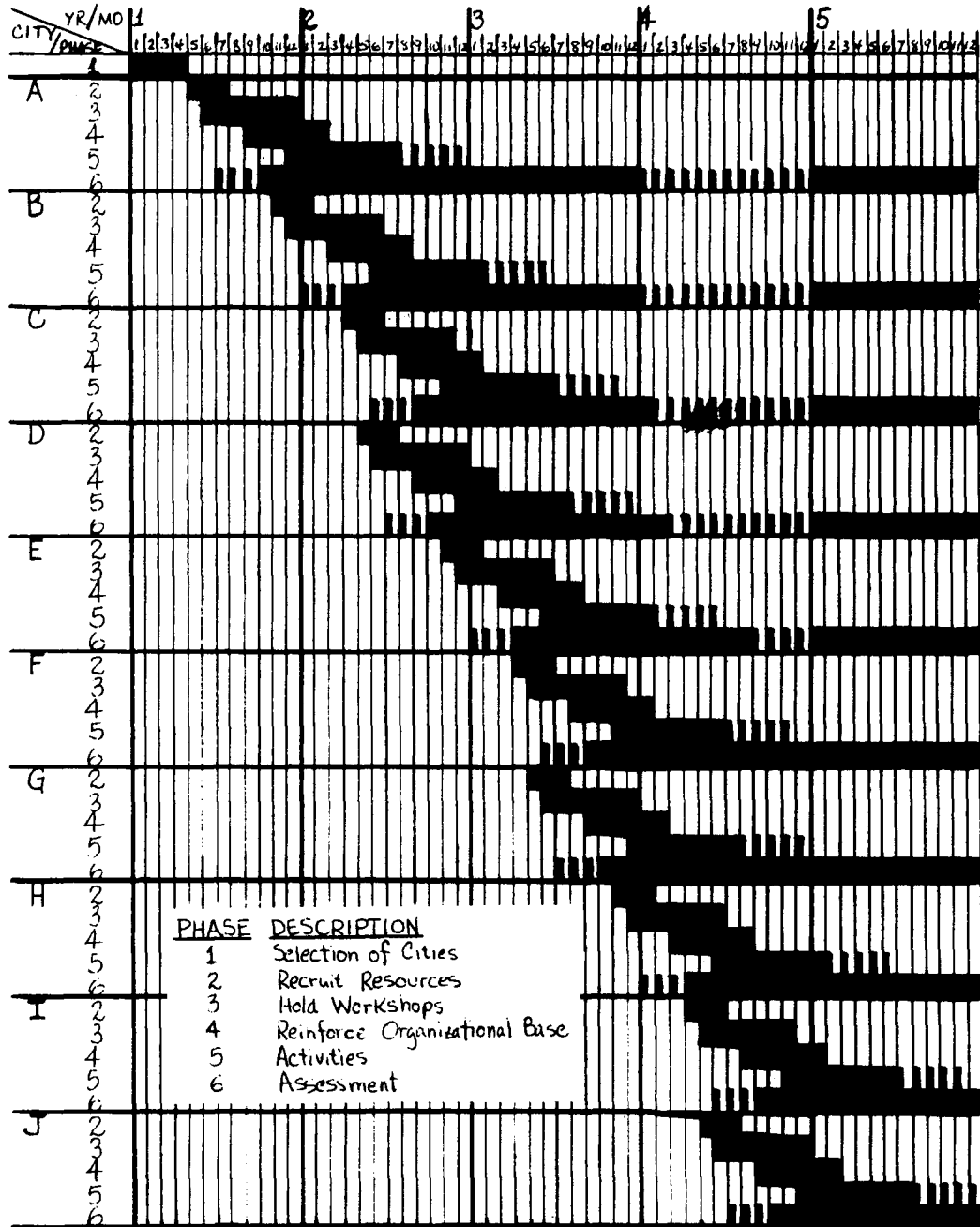
Figure 3.5

CHAPTER 4

ASSESSMENT OF THE CONTROL INFORMATION SYSTEMS

4.1 GENERAL

The objective of the thesis is to develop a management
control information system for a large international, inter-
disciplinary research project. This objective is accomplished
by use of the Tall Building project as a case study and providing
its management with a management control information system
which will assist them in their decision-making and follow-up
activities. Provided for the project management is the method-
ology, criteria and necessary environment needed for the design
and implementation of the three controlling techniques: PERT,
Gantt and procedural. In addition, each technique was applied
to a particular phase of the project: PERT to the MONOGRAPH
activity, Gantt to the Implementation activity and procedural
to the Computer Systems activity. Each system was judged
successful by the project management. The management is now
promoting the design and implementation of control information
systems for other phases of the project.

4.2 PROCEDURE CONTROL SYSTEM

The procedure control system for phase 5C, Computer
Systems, consists of a user's manual, a request order system,
and a schedule of preplanned work assignments. This package was
given to the 5C group, which is now responsible for the system's
operation, maintenance and update. Reporting from this proce-
dural control system should be on an exception basis. Project
management needs to be informed only about malfunctions in the
system's operations.

The system for phase 5C fully documents all the activ-
ity related to the phase. Prior to the system's inception, no
documentation existed other than descriptions for only two
computer programs and this contained no instructions for updating
the packages. The procedural system allows continued operation
of the 5C phase by establishing standard procedures for updating
and executing of all tasks for which the phase is responsible.
A new employee to the phase will now be able to fulfill requests
immediately rather than spending three months trying to famil-
iarize himself with the old, undocumented system of operation.
Overall, the completed procedural control system for the Com-
puter Systems phase is a very useful and vital system for the
entire project, since the 5C group performs service for all

areas of the project. A delay in fulfillment of a request for mailing labels, for example, deters mailing of documents thus delaying progress of the project.

4.3 PERT CONTROL SYSTEM

The PERT control system for phase 12, MONOGRAPH Activity, involved the incorporation of its activities into a modelled network illustrating all interrelations, and then applying PERT as a controlling mechanism. The monitoring of the system of activities and assuring that the activities remain on schedule are the responsibility of the project management and the supervisor of phase 12. Twice per week the two meet to discuss progress on the MONOGRAPH. If activities begin to fall behind schedule, it is the project management's responsibility to resolve the problem by reallocating resources and/or redefining the flow of activities.

The output report generated by the PERT package serves as the control aid for management's decision-making and follow-up action. Particular activities are scheduled to be complete by specified target dates. If the actual completion dates for activities lag behind the expected or scheduled completion dates, the system is out of control and a solution is needed from the project management.

The system designed for the MONOGRAPH activity is the first of its nature in the project. The network model forced the project management into defining all tasks involved with the MONOGRAPH and estimating realistic time durations for these tasks. Prior to this, the MONOGRAPH was controlled very loosely by a set of target dates for a few major activities with no mathematical justification. Also, these dates were always overshot and were constantly pushed ahead into the future. With the PERT model, each small task or activity is included with its estimated duration, thus providing the basis for a calculated 34 weeks needed to complete the entire scheme of activities presented in the thesis. The system also made the project management aware of inefficiencies in its previous plan of activities. Before the model was finalized, as figure 3.3, it had gone through a number of revisions and modifications to eliminate its inefficient and unnecessary steps.

The PERT control package is a useful aid to the project management's functions. New and realistic target dates can be determined and met. The entire flow of activities is illustrated by the model. Modifications can be incorporated into the model and run through the PERT package to investigate their impact on the system. Another favorable attribute of

the PERT control system is management's enthused support for
its application and results in phase 12 and eventually in other
phases of the project.

4.4 GANTT CHART CONTROL SYSTEM

The Gantt control system is not yet fully implemented
because the Implementation Activity of the Tall Building project
is not scheduled to begin until October 1976. The Gantt chart
was used initially as a planning mechanism for the activities
involved with the Implementation phase. Once the activity
begins, the chart is expanded and designed to help monitor and
control progress and needed reports of the activity.

The Gantt charts display the overall schedule of
activities for the Implementation phase and a detailed plan for
the first city in which implementation of tall building related
information will occur. The first chart aided management with
its planning of the five-year phase. Management's proposed goals
were incorporated into the Gantt chart, verifying their realistic
characteristics. With the five-year schedule of activities
complete and acceptable to the project management, the next step
is to control the activities. Management's objective is to keep
all activities on schedule in order to meet their predetermined
goals. The Gantt chart control information will aid them in

this process. The system will inform management of (1) the responsible personnel associated with each activity, (2) the report or information to be generated from each activity, and (3) the time schedule allocated for each activity. If an activity is behind schedule at any point in time, management must resolve the problem with the appropriate personnel. Progress should be regularly monitored and reviewed, and the chart can be marked up to show the progress thus providing the control aid needed by management.

4.5 SUMMARY

The three control information systems, PERT, Gantt and procedural, were designed and implemented, where possible, for three phases of the Tall Building project, MONOGRAPH, Implementation, and Computer Systems. Each was supported and judged successful by the project management.

The application of PERT gave the project management an early, more complete picture of the activities involved. Management was made aware of difficulties and problem areas. PERT's application forced project management to formulate a definite plan of action leading to the MONOGRAPH's completion. More accurate forecasts of time and costs, along with better resource allocation were obtained. Communications improved

with the use of the visual modelled network of activities.

The application of Gantt provided a graphic presentation of the overall schedule of activities. The chart was simple to employ and clearly displayed the program of activities. The Gantt chart also allowed for resource scheduling and progress reporting, which is essential for control. The disadvantages associated with Gantt Charts are its inabilities to make critical activities obvious and to illustrate change.

Applying procedure control forced both standard procedures for operations and formal documentation of all activities and software for phase 5C. Most of the support or functional phases of the project lack this kind of formal system. A continued operation will exist once once a formal procedure control system is implemented.

4.6 AREAS FOR FUTURE STUDY

Follow-up action must now occur involving the three systems prescribed in the thesis. Each system should be monitored. The system's activity and characteristics can be analyzed, and this feedback should be used in the development of future systems.

The Tall Building project can now pursue the design

and implementation of control information systems for the other

phases of the project. The methodology and necessary environ-

ment are prescribed for each control technique.

Before the design stage of a control system is attemp-

ted for a particular phase, much preliminary work must be com-

pleted. The project management must define realistic goals and

objectives for the phase. All of the activities involved in the

phase should be formalized and documented. The initiative of

developing future control information systems for the project

is the responsibility of its management.

The control techniques, PERT, Gantt and procedural

control, were presented in a general format plus an example of

application of each was given. Therefore, the results of the

thesis can be transported into other large interdisciplinary

research projects both similar and unsimilar to the Tall

Buildings project.

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APPENDIX A

Phases of the Tall Buildings Project

PHASE   TITLE

Activities of the Program

1   Membership

4   International Conferences

8   Regional Conferences

9   Technical Sessions, Workshops, and Symposia

10B   Bibliography

10F   Films

10R   Reports

10S   Slides

11   Research

12   MONOGRAPH

14   Surveys of Building Characteristics

21   Liaison

29   Implementation

40   Planning and Design Data Base

50   Special Publications

Management / Administration Operations (Support Functions)

0   Project Direction

1   Membership

APPENDIX B

Abbreviations

AIA   –   American Institute of Architects

AIP   –   American Institute of Planners

ASCE   –   American Society of Civil Engineers

CEB   –   European Committee on Concrete

CIB   –   International Commission for Building Research

ECCS   –   European Convention for Constructional Steelwork

FIP   –   International Federation of Prestressed Concrete

HUD   –   Housing and Urban Development

IABSE   –   International Association for Bridge and Structural Engineering

IFHP   –   International Federation for Housing and Planning

NAE   –   National Academy of Engineering

NBS   –   National Bureau of Standards

NTIS   –   National Technical Information Service

PERT   –   Program Evaluation and Review Technique

UIA   –   International Union of Architects

UNESCO –   United Nations Education, Scientific and Cultural Organization

APPENDIX C

Schedule 3.8

JOINT COMMITTEE "THRUSTS" IDENTIFIED

The principal thrusts of the Joint Committee (the so-called "impact areas")
are as follows:

T1 **International Information Source.** The aim of this thrust is to
create an international source of information on all aspects of
planning, design, construction, and operation of tall buildings.
The MONOGRAPH fills a key role here. The computerized biblio-
graphy is also important, as is the eventual planning and de-
sign data base. Proceedings that result from International and
Regional Conferences are other source material.

T2 **Utilization of Findings.** A "dialogue" in various forms with
decision makers is pursued to rapidly incorporate the results
of research and design experience into practice using all
available mechanisms. The conferences, symposia, workshops
and technical sessions are an important part of this thrust.

T3 **Planning and Environmental Criteria.** This thrust covers the
development of improved methodology in the field of planning
and environmental criteria. Social effects of the environment
such as family living in high-rise are particularly relevant.
Information in the MONOGRAPH is an important source. Confer-
ences identify subjects for further emphasis.

T4 **Exchange of Data Between Industrialized Countries.** This thrust
is designed to facilitate the rapid incorporation of advances
identified elsewhere. The Regional and International Conferences
have proved useful in these exchanges because they reflect
different areas of expertise in different countries. Work on
the MONOGRAPH is facilitated through these exchanges where
committee members can meet and discuss their findings.

T5 **Approaches for Developing Countries.** Unique problems exist in
developing nations, so unique solutions might be required.
Approaches can be identified that will enable them to avoid
the mistakes that have occurred inadvertently in countries
with a longer record of experience. The Regional Conferences
are important here, since they can bring professionals to-
gether from both industrialized and developing countries.

T6 **Identification and Stimulation of Needed Research.** This thrust
has been an important function from the very beginning. The
issuing of the "Research Needs" report (JC-5) and the survey of
"Current Tall Building Research" (JC-10), are key activities.
Also, the MONOGRAPH will contain indications of future needs.
Conference discussions identify areas of needed research.

APPENDIX D

DETAILED DESCRIPTIONS OF PHASES

PHASE 0

Procedure 0   Opening the Mail

Schedule	0	Future Scheduled Meetings
	2G.1	Group Secretaries
	3	Agendas
	5.5	Administrative Glossary
	6.12	Editorial Executive Group Agenda
	7.1	Master Progress Control : Proposals
	8.2	Nat/Reg Conference Progress Chart
	11J.1	Research Funded by Headquarters
	11J.2	Research Stimulated at Other Institutions
	11J.3	Potential Major Areas of J. C. - Sponsored Research
	11R.1	Master Production Control Sheet
	29.1	Implementation Components
	29.2	Implementation: Research Questions
	29.3	Utilization of Research Findings
	39.1	Research Activities
	39.2	Research Activities
	39.3	Potential Areas of Research, Tall Buildings
	39.3A	Potential Areas of Research, Tall Buildings (Lehigh)
	39.3B	Potential Areas of Research, Tall Buildings (Lehigh)
	39.3C	Potential Areas of Research, Tall Buildings (Lehigh)
	39.3S	List of Ideas and Proposals Related to Tall Buildings
	39.4	Possible Fritz Lab Research Subjects
	39.5	Sponsored Projects Related to Tall Buildings
	39.6	Faculty Participation and Future Research Areas
	39.8	Research Projects Funded by Headquarters
	39.9	Master Control on Proposals

Roster	7S-0	Project Staff and Lehigh Interested Area
	1.1	Steering Group
	1.105	Headquarters Supervisors
	6.1A	Editorial Executive Group

```
Report      M133    RSVP
            M120H   Systems H (Headquarters)
            M120J   Systems J (Joint Committee)
            M120F   Systems F (Fritz Laboratory)


PHASE 1

  Procedure 1.2     Technical/Advisory Committee Headquarters
            1.3     Distribution of Computerized Address
            1.7     IABSE
            1.8     Procedure for Filing Name Cards


  Schedule  1.1     Opportunities with Joint Committee
            1.7     National Representatives
            1.7A    Progress of Major Activities (by country)
            1.7S    Summary of National Activities
            1.8     Membership Codes
            1.8A    Checklist of Enclosures for Committee Members
            1.15    Codes for Roster 1.15
            1.16    Status of Committee Key Personnel
            1.17    National Committees on Tall Buildings:  Main
                       Objectives and Activities
            1S      Summary of Membership


  Roster    1.1     Steering Group
            1.1A    Steering Group Activities
            1.4     Lehigh Interest Group Selected
            1.4A    Lehigh Interest Areas
            1.5     Technical Committee Chairmen, Vice-Chairmen,
                       and Group Coordinators
            1.5C    ASCE Control Group
            1.6     ASCE Committee Representatives
            1.7     National Representatives/IABSE National
                       Contacts
            1.8     Lehigh Valley Group
            1.9C    Selected "Major City" Representatives
            1.13    Advisory and Staff Committees (and Scope)
            1.13A   Advisory and Staff Committees (Alphabetical
                       list)
            1.13B   Advisory Committees - Membership by Committee
            1.13C   Advisory Committee Chairmen
            1.14    National Tall Buildings Committees
            1.15    Key Participants by Country
            20      Joint Committee Members
            20.1    Times Supplement List
            20K     Key People to Joint Committee
```

PHASE 3

Procedure 3   Order in Minutes Book
         3.1   Minutes
         3.2   Master List of Meetings
         3.3   Steering Group Minutes
         3.4   Procedure for Maintaining Schedule 3.6
         3.5   Steering Group Meeting

Schedule 3.1   Action Items for Staff Members
         3.2   Historical
         3.3   Steering Group Action Items
         3.4   Record of Steering Group Activity
         3.5   Agenda -- Lehigh University Interest Area
         3.6   Progress Check by Country
         3.7   Current Meeting Papers
         3.8   Thrusts of Joint Committee
         3.9   Master Progress Control: Steering Group
         3A   Schedule Planning Sheet
         3B   Schedule for MONOGRAPH
         3C   Schedule of Activities
         3D   Master Schedule
         3D-1 Master Thrust Schedule
         3E.1 Overall Master Progress Control
         3E.2 Record of Major Phase Staff Meetings

PHASE 5

Procedure 5.0   General Procedures - List of File Numbers
         5.1   Meeting and Trip Procedures
         5.3   Meeting Plan on 369 Project
         5.4   Some Points on Organizational Philosophy
         5.4A Distribution List for J. C. Reports
         5.6   Mailing Procedures
         5.7   Ballots
         5.8   Originals
         5.9   Request for Computer Rosters and Mailing Labels
         5.11 Color Code
         5.12 Follow Up
         5.13 Committee and Group Mailing
         5.14 Administrative Glossary: Submitting New Terms
         5.16 Administrative Glossary Processing Request
         5.18 Action
         5.19 Follow Up

PHASE 7S

PHASE 7

Schedule	C7A	369 Budget & Expenditures Recap of all categories
	C7.1	369 Financial Record (Cumulative funds secured by various sponsors)
	C7.2	369 Budget & Expenditures recap of salaries and wages only
	7.1	Master Progress Control: Proposals
Roster	7P	Professional Society Sponsors
	7P.1	Financial Sponsors.
Report		Periodic Reports of Expenditures (Monthly expenditure graphs)
		Periodic Reports of Income
		University Status Reports (supplied by L.U. Accounting Office)

PHASE 8

PHASE 9

PHASE 10B

	10.5	Bibliography - Information Retrieval (Input to Computer TB-File)
	10.6	Tall Building Bibliography (Instructions for Punching Author/Title Info into LETEXT)
	10.7	Tall Building Bibliography (Procedures for Retrieval of References)
	10.8	Tall Building Bibliography (Index Terms to be attached to the TB References Manually Input to the Data Base)
Schedule	10.2	Sources of Information
	10.3	Internal Information Source
	10B.1	Bibliographic Categories

PHASE 10F

Schedule	10F.1	List of Films and Tapes (Joint Committee - Associated Productions)
	10F.2	List of Films and Tapes on Tall Buildings - related topics available from external sources

PHASE 10L

Roster	101.1	Tall Buildings Libraries - Category 1 designation
	10L.2	List of Libraries at U.S. Colleges Offering Advanced Degrees in Architecture, Civil Engineering and/or Urban-Regional Planning - Category 2 designation
	10L.3	Professional/Commercial Libraries - Category 3 designation
	10L.4	Major Libraries outside the USA

Guide Letter

	10L	Introductory Letter to University Libraries/ Dept. Chairmen
	10L.1	Letter to Category 1 Librarians for List of current holdings

Computer Program

	10L.2	List of Category 2 Libraries

PHASE 10R

Procedure	6R	Processing orders for International Conference Proceedings
	10R.1	Processing Project Reports
	10R.2	Processing Published Reports
	10R.3	Processing Orders for Regional/National Conference Proceedings and Joint Committee Publications

Schedule	10	Schedule of Reports
	10.1	Reports, Proceedings, Publications and Selected Papers
	10R.1	Available Reports and Publications
	10R.2	Project Reports (and indices)
	10R.2i	Index to 10R.2
	10R.3	Inventory of Joint Committee Reports
	10R.5	Mass Distribution of Joint Committee Publications

Guide Letter		
	10L	(Introduction to College librarians, dept. chairmen)
	10R.1	Reply to incorrect order w/enclosures
	10R.2	Cover letter for description of publications w/enclosures

Report	369.151	Project 369 Reports
	369.153	Project 369 Reports available to public and abstracts

PHASE 10S

Procedure	10S.1	Slide Indexing Routine
	10S.2	Slide Key-Coding Routine
	10S.3	Slide Index Work Sheet

Schedule	10S	Steel Buildings (Selected)
	10S.1	369 Series Index - Slide Books
	10S.2	City Slide Index
	10S.3	Slide Indexing Work Sheet
	10S.3A	Slide Index Work Sheet
	10S.4	Photo Record
	10S.5	Slide Index -- Buildings
	10S.6	Slide Key - Coding Work Sheet
	10S.7	Slide Table of Contents
	10S.8	Slide Index - Committees
	10S.9	New Slide Key Words

Report   369.127   Slide Indexes

Computer Programs

          SLIDES   sorts slides in alphabetical order according
                      to country, city, and building
          CONTENT   lists all slides with description in
                      numerical order

PHASE 11

    Procedure 11   Procedure for Handling Returned "Survey
                          of Current Research Questionnaires"

    Schedule 11J-1   Research Funded by Headquarters
              11J-2   Research Stimulated at other Institutions
              11J-3   Potential Major Areas of Joint Committee -
                          Sponsored research

    Report   JC-5   Current Questions, Problems, and Research
                          Needs
              JC-10   Current Research on Tall Buildings

PHASE 12

    Procedure 8.2   Distributing Regional Conference Proceedings
              8.3   Printing Regional Conference Proceedings
              12.2   Processing Miscellaneous Inputs
              12.3   Processing New Outlines
              12.4   Processing Response to MONOGRAPH BULLETIN 12
              12.4A   Corrections and Comments to M117
              12.6   Processing Chapters
              12.6A   Processing Chapters - Draft 1, Revised
              12.6A/S   Processing, Reviewing and Editing of Draft 1
                          (Rev.) Chapters
              12.6A/S1 Preliminary Editorial Check - Draft 1,
                          Revisions
              12.7   Processing Sections
              12.8   Processing Regional Conference Proceedings
                          Reviews
              12.9   Processing Ballots form Chapter Reviews
              12.10   Processing Regional conference "Interest"
                          Forms
              12.11   Distributing Regional Conference PROCEEDINGS,
                          Historical

	12.12	Printing Regional Conference PROCEEDINGS
	12.13	Preparing Bulleting 5 and Ballot for Regional Conference
	12.14	Regional Conference Proc. to GC's and GE's
	12.15	Public Information and Distribution of RC to Sponsors
	12R.1	Processing Inputs from Regional Conferences

Schedule
	12.2	MONOGRAPH Table of Contents
	12.2A	MONOGRAPH Table of Contents (Brochure)
	12.3A	Committee Progress Check - Draft 1
	12.3B	Committee Progress Check - Draft 1, Revised and Draft 2
	12.3G	Group Progress Check
	12.4	Input to MONOGRAPH (OBSOLETE)
	12.6	Review Regional Conference Proceedings
	12.6i	Distribution of Regional Conference Publications
	12.7	Target Dates for Proceedings and Inputs (OBSOLETE)
	12.8	Record of MONOGRAPH BULLETINS
	12.8i	Internal Record of MONOGRAPH BULLETINS
	12.10	Work Plan (OBSOLETE)
	12.12	Schedule for MONOGRAPH: First Cycle
	12.12R	Group Check Start
	12.12S	Summary of T.C. Response
	12.14	Procedures for Phase 12
	12.15	Processing a New Report
	12.16	Check List for Chapter Reviews
	12R.1	Master Production Control Sheet

Roster
	12	International Conference Reporters - Theme, SOA & Summary by committee

Guide Letter

	12A	Fowards reviews of Regional Conference Proceedings
	12B	Forwards reviews of other Regional Conference or technical session publications
	12C	Forwards complimentary copies of Proceedings to sponsoring organizations
	12D	Forwards complimentary copies of Proceedings to selected libraries
	12E	Forwards five complimentary copies of Proceedings to Dr. Gaus - NSF

	12F	Forwards reviews and comments about Chapters/Sections
	12H	Forwards New Reports, Input from Regional Conferences
	12J	Forwards Miscellaneous Input
	12K	Suggests where pertinent Input may be obtained
	12L	Forwards First Draft chapters for review w/ballot
	12M	Forwards First Draft sections for review w/ballot
Report	M61	MONOGRAPH Table of Contents
	M81	MONOGRAPH Regional Inputs and Needs
	M87A	Regional Conference Summary
	M117	MONOGRAPH: Draft 1 Report Input Control
	M__	MONOGRAPH INPUT BOOK
	M__	MONOGRAPH Production – Selected Management Control Documents

PHASE 14

Procedure	14	Photographs
	14.1	Photos (Index)
	14.2	Slide Processing Routine (SOA)
	14.3	Slide Processing Routine (Other photos)
	14.4	Filing of Project Description
	14.5	Update of the Tall Building Characteristics Data Base

Schedule	14.1	Numerical List of Project Descriptions
	14.2	Tallest Buildings in the World (50)
	14.3	Tallest Buildings in each Country
	14.4	Tallest Buildings in Major Cities
	14.5	Tallest Buildings in each Seismic Zone
	14.5A	Published Project Descriptions
	14.5B	Unpublished Project Descriptions
	14.6	Tall Building Characteristics Survey Form
	14.7	Important Dates
	14.8	Ten Tallest Buildings Outside the USA
	14.9	Statistical Tall Building Information
	14.10	Trends in Tallness (Historical Perspective)
	14.11	Buildings Using Precast Construction

Roster	1.9C	Selected "Major City" Representatives
	20S	Joint Committee Members
	22A	Major Cities and Advisors (USA)
	22B	Major Cities and Advisors (Abroad)
	24.9	Building Officials (States & Regions)

Report	369.44	Survey of Major Building Characteristics
	369.44A	Tall Building Characteristics
	Report No. 1	Tall Buildings: Major Characteristics – Vol. C, Advisory Committee 14

Computer Program

SURVY   Produces different forms (sorts) of building characteristics data in tabular arrangements

PHASE 15

Schedule 15.1   Systems Planning: Progress Control Chart

Systems H Book

PHASE 20

Procedure	20.1	Process Control Sheet for THE TIMES
	20.2	Process Control Sheet for news release for Regional Conference
	20.3	Process Control Sheet for general press statement
	20.4	Distribution of Brochure

Schedule	20	FACT SHEET of general information on the Joint Committee
	20.1	Press Kit Inventory
	20.1A	Process Control Sheet for Public Information Activities in Connection with National/ Regional Conferences
	20.2	Subject Index – THE TIMES
	20.3	Index of Quotes (Subject) THE TIMES
	20.3A	Index of Quotes (Author) THE TIMES
	20.4	1975 Mailing Dates for THE TIMES (and "EXTRAS")

Roster	20	Joint Committee Members
	20.1	THE TIMES supplement list
	20.2	Interested candidates
	20.3	Major newspapers and magazines
	20.4	Selected magazines
	20.5	Listing of technical journals and foreign correspondents
	20.6	News releases for regional/national conferences
	20.7	THE TIMES extra mailing list
	20B	Public information: selected editors
	20B.1	Public information: contact members
	20C	Business publications (classification groupings)
	20K	Key people to the Joint Committee
	20S	Combined rosters 20 and 20.1

Guide Letter

	20	Cover letter for 50 copies of THE TIMES to Sam Connor
	20.1	Cover letter for press statement
	20.2	Illustration/photo reprint request letter
	20.3	Letter to conference organizers for publicity plans

PHASE 21

Procedure	21.1	Liaison

Schedule	21.1	Liaison
	21A	Liaison
	21S	Summary of Liaison

Roster	21	Liaison Representatives (Suggested)
	21A	Liaison Representative (Accepted)
	21B	Non-governmental Liaison Organizations
	21S	Summary of Liaison
	21.1	Engineering Societies (Overseas)
	21.2C	ASCE (Chicago)

PHASE 29

Schedule	29.1	Implementation Components
	29.2	Implementation: Research Questions
	29.5	Utilization of Research Findings

PHASE 39

APPENDIX E

IMPLEMENTATION COMPONENTS

(A list of possible ways in which the work of the Joint Committee
and its findings can find their way into actual practice)

1. High-Rise Committees. Formed in the major cities, usually on an ad hoc
   basis; representation of engineers, architects, planners, city officials
   such as building commissioners, material interests; exchange information,
   stimulate research, promote utilization. Evaluation.

2. Specialized Documents. Preparation of abstracts of MONOGRAPH and other
   Proceedings of conferences in own region that will provide material di-
   rectly oriented to the various decision-maker categories (developers,
   investors, building officials, city planners).

3. National Tall Building Committees. These can be established by a country
   to carry out this implementation phase. In many cases there are exisiting
   "editorial committees" that can act in this role. Keep contact with the
   Joint Committee.

4. Identify Data Base. In some cases this has already started with the es-
   tablishment of "tall building libraries". Can be expanded to interact
   with regional computerized tape networks.

5. Professional Societies. In their usual role they can arrange lectures
   and conferences on topics of local and current interest. Stimulate con-
   tact and exchanges and interaction with and among the professions.

6. Organized Citizens Groups. In many regions there are established groups
   that can exercise considerable influence. Ways should be found to work
   with them. They are a key "decision-maker". Education. Provide access
   to information.

7. Visiting Specialists. Groups may want to take advantage of contacts with
   the Joint Committee by inviting specialists from other parts of the world
   to visit and lecture. By the same token, a given country can arrange to
   support its people to attend conferences in other parts of the world.

8. Stimulate Instructional Programs. New or expanded instructional programs
   are sometimes useful. They can act to arouse student interest.

9. The Media. Ways should be found to work with radio, tv and press to faci-
   litate the reporting of factual information and progress.

10. Promote Development of Urban Plans. Flexibility. Consider high-rise - trans-
    portation - urban services. Provides a focus for items 1, 3. Impact plans.

11. Workshops/Symposia. Identify problems. Organize sessions to feature those
    problems with preprints. Follow up actions (see items 1 & 3).

APPENDIX F

PROCEDURAL CONTROL

DATA PROCESSING SYSTEMS

PHASE 5C

TALL BUILDING PROJECT

TALL BUILDING PROJECT

DATA PROCESSING SYSTEMS

PHASE 5C

1. GENERAL INTRODUCTION

The 5C group is responsible for creating new software, maintaining existing software, and fulfilling requests for computerized documents. These routine procedure executions are fully presented in the following sections of the 5C documentation.

The group receives all requests for computerized documents by a request form (See Enclosure 1) and records this in its log of requests (See Enclosure 2). Priorities are for execution are generally determined by the 5C group or the requestor, depending on backlog and urgency of the need.

2. THE MEMBERSHIP (D369) DATA BASE SYSTEM

2.1 MEMBERSHIP DATA BASE

2.1.1 General Description

The system consists of three basic elements:

(1) The data base file "ROSTERS" which is an UPDATE (See (2)) program library. It is stored on magnetic tape and contains, among other things, a file of names of all members of the Joint Committee (source deck name D369) together with information about their status with the committees (See secion on Roster File).

File "ROSTERS" also contains the source listing of a COBOL program (source deck name BEEDLET) which is used to operate on the D369 data. The binary version of this program is on permanent file "ROSTGEN" and is described under (3).

(2) The (CDC) UPDATE system is the second basic element. UPDATE is the data base management system employed by the phase. It is described completely in the CDC manuals, but information pertinent to the project system is sifted out here. In brief, it is a program which stores files of card images in an efficient format and allows changes to be made to the files by referencing their line number in an UPDATE

directive.   See the section on UPDATE for more detailed information.

(3)   The third basic element is on file "ROSTGEN" and is a binary COBOL program.   It prints roster reports, mailing labels and sorted information needed for the project.   It uses the other two elements to do this.

The three elements use each other as follows.   The UPDATE program reads file "ROSTERS" which contains a version of the data base on UPDATE deck "D369".   It also reads corrections to the data base on cards (which are supplied by the membership phase).   These corrections are in the form of UPDATE directives. From this, it creates a card image file containing the latest version of the data base, on local file "SAM".   The COBOL program ROSTGEN is then executed.   It reads SAM, which now contains complete instructions for ROSTGEN in it.   ROSTGEN performs the sorts and prints the information asked for.

2.1.2   Roster File Contents

The roster file is the membership data base for the project.   It contains a list of everyone's name and address and lists of rosters containing names only of people involved with their particular rosters.   A roster is a collection of members who all have something in common.   For example, Roster 1.1 is

a list of "Joint Committee Steering Group" members. The exact

format of the file (in its proper order) is:

PARTS   EXAMPLE

A   nnnnnn   } a 6-digit control number instruc-
ting ROSTGEN what to do

B   369

C   } a blank line

D   QQROSSC   1.1JOINT COMMITTEE   STEERING GROUP

         •
         •   } a list of all roster titles in
         •   data base

E   ENDCOMM   } indicates end of roster title list

F   QQROSSC   369JOINT COMMITTEE   MAILING ADDRESS

G   MR. J. H. ANLEY   ANLEY   MR. J H
         DEPT. OF CIVIL ENGR.   UNIVERSITY OF AMERICA
         UNIVERSITY OF AMERICA   13,15E
         HOMETOWN, STATE 12345   USA   HOMETOWN   STATE

         •
         •   the names and addresses (4-lines each) of all
         •   } members and affiliates of the project in
         •   alphabetical order
         •

H   ENDADDRESS   } indicates end of addresses

I   QQROSSC   1.1 JOINT COMMITTEE   STEERING GROUP

         •
         •   list of all names belonging to roster 1.1
         •   } (name is exact image of 1st line of 4-line
         •   address)
         •

         QQROSSC 2.1

         •
         •   } etc.
         •

J   ENDROSTER   } indicates end of roster titles with
                  members

PARTS   EXAMPLE (Cont.)

K   ALBANIA   ALBANIA (AL) ⎤
          AUSTRIA   AUSTRIA (A)   ⎥
                                   ⎥ list of all countries
                                   ⎬ and abbreviations
                                   ⎥ (to 13 chars.)
                                   ⎥
          YUGOSLAVIA YUGOSLAVIA (YU) ⎦

L   ENDCOUNTRY   ⎫ indicates end of membership data
                          ⎬ base
                          ⎭

All of the above 12 parts (A through L) of the mem-

bership data base must be present for correct output. Some of

the parts are altered to instruct the program ROSTGEN in what

to do. (See BEEDLET program description).

Every roster title appears twice. Once in part D, and

again as the first card in a roster list, in part I. In part G

everybody's name on the Joint Committee appears, together with

his mailing address (at left), his city, country (last line at

right), his organization if any (2nd line at right), and com-

mittee codes (3rd line at right) which indicate to which sub-

committees he belongs. Thus, there must be four lines to each

member of the Joint Committee in part G. The first card of

the four is called the name card. It has his mailing name at

left and last name first at the right. A duplicate of the card

should appear in part I for every roster to which the member

belongs. To delete a member from a roster his name is removed

from that roster list in part I.

Some of the rosters are broken down into committees. This is indicated by following the QQROSS card in part D by a series of QQCOM cards with the names of the committees. In part I the committee name cards also appear in the same order, after the QQROSS card bearing the name of the roster. The QQCOM cards in part I are separated by the names of the people in each committee. CHAIRMEN and VICECHAIRMEN of committees are indicated. The format for a roster of committees in part I is then: (an example)

```
QQROSTC   2.1   JOINT COMMITTEE   TECH. COMM. ROSTERS
QQCOM  1
QQTIT CHAIRMAN
MR JOHN DOE                         DOE          MR. J
QQTIT VICECHAIRMAN
MR JOHN SMITH                       SMITH        MR. J
MR BILL ADAMS                       ADAMS        MR. B
    •              ⎤  names of members belonging to
    •              ⎦  committee 1 of Roster 2.1
    •
QQCOM  2
    •
    •
    •
```

Everybody in the roster should be listed under some committee.

The input format for data to the system is described next. All changes are made to the file by using the UPDATE system.

I. Address File

Card 1

Column	Type	Description
1-32	Alphanumeric	First line of address (left justified)
33-40		Blank
41-56	Alphabetic	Last name (left justified)
57-64	Alphanumeric	Title (left justified)
65-68	Alphabetic	Initials
69-80		Blank

Card 2

Column	Type	Description
1-32	Alphanumeric	Second line of address (left justified)
33-40		Blank
41-73		Organization (left justified)
74-80		Blank .

Card 3

Column	Type	Description
1-32	Alphanumeric	Third line of address (left justified)
33-43		Blank
44-71	Alphanumeric	Roster Cards (left justified; free format separated by commas)
72-80		Blank

Card 4

Column	Type	Description
1-27	Alphanumeric	Fourth line of address (left justified)
28-32	Alphanumeric	Zip code
33-40		Blank
41-52	Alphanumeric	Country (left justified)
53-65	Alphanumeric	City (left justified)
66-78	Alphanumeric	State (left justified)
79-80		Blank

II. Title Cards

Column	Type	Description
1-5	Alphabetic	QQROS or QQCOM
6-7	Alphanumeric	SC
8-13	Alphanumeric	Roster/Committee member
14-45	Alphanumeric	First line of Roster or Committee title
46-75	Alphanumeric	Second line of Roster or Committee title

2.1.3   UPDATE System

The UPDATE utility program is used to make changes to the data base.   Each line of the data base has an UPDATE line number which can be found at the right of every line in the data base listing.   It consists of the letters D369 followed by an integer.   "D369" is the deck name under which the roster file has been stored.   UPDATE allows the storage of more than one deck or file of information on the same SCOPE file.   To distinguish between these different decks, they are given a user specified deck name, of 1 to 7 characters.   The deck name for the roster file is D369.   The deck name for the source listing of the COBOL program which prints roster reports (ROSTGEN) is BEEDLET.   Both these decks and others reside together on a magnetic tape.

To make changes to a deck, UPDATE reads cards containing UPDATE directives, as follows:

UPDATE Directive	Meaning
*I D369.37	Insert cards after line 37 on deck D369. All subsequent cards will be treated as information to be placed on D369 between lines 37 and 38, until UPDATE encounters a card containing a '*' in column 1.

UPDATE Directive	Meaning (Cont.)
*D D369.65	Delete line 65 and replace with the following card(s) until next UPDATE directive is encountered.
*D D369.65,75	Delete lines 65 through 75 inclusive from deck D369 and replace with the following card(s) until next UPDATE directive is encountered.
*CY D369,D369.15,32	Copy lines 15 through 32 from the deck D369 to another place in D369 deck. This card must follow an Insert or Delete card. The lines 15 through 32 will be copied to the line specified in the *I of *D immediately before.
*C D369	Compile deck D369. This means to take the old version of the deck, make all corrections, then write the deck in card image form on the compile file (see below).
*S D369	Resequence deck D369 after corrections have put line numbers out of sequence.

UPDATE is called into execution by the card:

UPDATE (Q, D, P=ROSTERS, C=SAM, N=NEWROS, L=A12)

where ROSTERS is the old program library and SAM is the compile file on which corrected decks will be written by the *C card. L=A12 is a print option, which should always be included for Tall Buildings purposes, Q means do a quick update (not to be used for a new creation of data base file), D means write 80 column lines instead of 72, and N=NEWROS is used to create a new program library.

After calling UPDATE, the compiled file should be on file "SAM". ROSTGEN will read file SAM to generate its output.

2.1.4 ROSTGEN - Report Generator

ROSTGEN is a file containing a binary program. This is the program which, using the results of UPDATE, generates mailing labels, roster reports, and geographical, organizational and alphabetical sorts of the membership data as specified by the user. All instructions to ROSTGEN are on file SAM which was created by the UPDATE run. File SAM is just a card image file of all the information in the membership data base (see ROSTER File Contents section) with some changes as follows:

Part A - To specify type of output desired, the first line of SAM (part A of roster file) should be a six-digit number. The first three digits specify the type of output desired, and the last three specify number of copies desired. The codes for the different types of output are listed below:

CONTROL CODE   OUTPUT

100	Geographical Sort
101	Roster report, Geographical Sort with addresses
200	Organizational List
300	Alphabetical Sort

CONTROL CODE	OUTPUT (Cont.)
310	Alphabetical, Geographical Sorts
321	Alphabetical, Geographical, Organizational Sorts
420	Roster report, Mailing Labels (Note: a "1" in col. 55 produces a fifth address line of committee affiliations)
500	Roster report, Mailing labels, and Alphabetical, Geographical, Organizational Sorts
600	Roster report
700	Roster report, Alphabetical, Geographical, Organizational Sorts
710	Roster report, Geographical Sort
712	Roster report, Geographical, Organizational Sorts
713	Roster report, Alphabetical, Geographical Sorts
720	Roster report, Organizational Sort
723	Roster report, Alphabetical, Organizational Sorts
730	Roster report, Alphabetical Sort

The 700 and higher control cards limit the data base for alphabetical, geographical and organizational sorts to the rosters listed, where as the 100 to 321 control cards, excluding 101, use the entire address file. Various options are available through the use of this control card besides output options. These along with their input formats will be discussed next.

Control Card for Output Options

I. Format

Column	Type	Description
1-3	Numeric	3-digit output option code
4-6	Numeric	Number of copies desired of output (right justified)
7		Blank (no longer used)
8		Blank (no longer used)
9-50		Blank
51-55	Numeric	Option to produce fifth line on mailing labels
56-60		Blank
61-66	Alphanumeric	Title for Geographical Listing
67-72	Alphanumeric	Title for Alphabetical Listing
73-78	Alphanumeric	Title for Organizational Listing
79-80		Blank

II. Description

The option to produce a fifth line on the address mailing labels (col. 51-55) is a recent modification to the BEEDLET program. The fifth line consists of the roster codes associated with a given individual for on the right hand side (col. 44-71) of the third line (or data card) of the individual's address in the data base.

The titles for the geographical (col. 61-66), alpha-
betical (col. 67-72), and organizational (col. 73-78) listings
are referred to in the program as GEOG-NO, ALPH-NO, and ORG-NO,
respectively. These three fields allow a -G, -A, and -C suffix
to the various sorted outputs. For example, when the bimonthly
20S roster is produced, it will consist of Roster 20S, which is
a roster report listing only the names of the members of the
roster, Roster 20A, which is an alphabetical sort with addresses
of the members, Roster 20G, which is a geographical sort, and
Roster 20C, which is a sort by organization. These three fields
are only used when any of their respective sorting options are
asked for.

Parts B and C – These parts of the roster file are never changed.

Part D – In part D of the roster file, all title cards except those for which output is desired, should be deleted, during the UPDATE run. For each roster title card, ROSTGEN will perform the action specified by part A. However, if part A specifies mailing labels, and more than one roster title is left in, mailing labels will be merged into one alphabetical sequence, and anyone who's name appears on both rosters, will get only one copy of his address label (duplicates are eliminated). Also, if a roster has subcommittees, all committees for which output is desired should have their title cards included.

Parts E, F, G, and H – These parts of the roster file are never changed.

Part I – All roster titles and lists of names, for which output is desired, should be left in part I. Rosters not desired may be deleted for efficiency of execution.

Part J – ENDROSTER must be included.

Part K – This part is needed for output requiring geographical sorts, otherwise may be deleted.

Part L – This part must be included.

2.2 OBTAINING FILES FROM MAGNETIC TAPE STORAGE

The Tall Building Project has three magnetic tapes:
LSB1, LSB2 and LSB3. Each one is updated in sequence upon new
membership data base creation runs. For example, if LSB1 is
the tape containing the most up-to-date data, LSB3 would be
most recent and LSB2 third. A new creation run would involve
reading from LSB1, updating, and then writing onto LSB2.

The control cards needed to obtain the files from
tape are as follows:

```
SUBMISSION CARD
GDLSB,*Name,B5402,T60,P1,MT1.
ACCOUNT(R=HIBLDG)
PAGES(199,N)
LABEL(BUILDUP,L=BEEDLETAPE,E=20,R,VSN=LSB1)
REWIND(BUILDUP)
COPYBF(BUILDUP,ROSTERS)
REWIND(ROSTERS)
RETURN(BUILDUP)
CATALOG(ROSTERS,ID=TWB,PW=WIPEOUT)
```

This will catalog the files for the day. The files contained
on ROSTERS are (1) BEEDLET, (2) INDEX, (3) SCED-2-1, (4)
SCED-2-2, (5) LUCREST, (6) LIAISON, (7) D369, (8) FERS,
(9) FERSADD, (10) PERS, (11) FRITZ, and (12) NUPAY. Once the
catalog is completed successfully, any one of the above files
can be updated and/or used by attaching ROSTERS in subsequent
runs. See examples in section 2.3.

2.3 EXAMPLES OF BASIC METHODS OF D369 REPORT GENERATION

2.3.1 Mailing Label Request Run

This job will produce mailing labels for everyone in roster 20K (numbers are hypothetical):

```
SUBMISSION CARD (Special Forms - GDLSB Mailing Labels)
GDLSB,*Name,B5402,T100,P1.
ACCOUNT(R=HIBLDG)
PAGES(199,N)
ATTACH(ROSTERS,ID=TWB,PW=WIPEOUT)
ATTACH(ROSTGEN,ID=TWB,PW=WIPEOUT)
UPDATE(Q,D,P=ROSTERS,C=SAM,L=A12)
DISPOSE(OUTPUT,PR)        ⎧ This prints all output from the
                          ⎨  UPDATE and clears the output
                          ⎩  file for mailing labels.
RFL(70000)
ROSTGEN.                  ⎧
DISPOSE(OUTPUT,PR=CSF)    ⎨  This sends output file to
                          ⎪  special forms queue to be
                          ⎩  printed on mailing label paper.
7-8-9
*ID  12JAN76
*D D369.2
420003        ⎰420 means mailing labels; 003 means 3 copies.
*D 5,94          { delete all title cards up to Roster 20K
*D 96,129        { delete all title cards after Roster 20K
  :     }        insert all address corrections/updates
*D 10856,16799     delete all rosters up to 20K
  :     ⎱       insert all corrections/updates to
  .     ⎰       Roster 20K
*D 17257,18250   { delete all rosters after 20K
*C D369          { write D369 onto SAM
E-O-F
```

2.3.2 Example for Executing Bimonthly "20S" Roster Run

The bimonthly "20S" is needed in thirteen copies.

Thus 4-part carbon paper is used for the output. To make sure

that the output is correct (which consists of a roster report, and a geographical, organizational, and alphabetical sort of rosters 20 and 20.1 combined, called "20S") an update run is made with output file SAM being cataloged. Once SAM is checked and approved by the 5C group, it is then copied to output the desired number of items.

I. Creation of "20S" on SAM

```
GDLSB,*Name,B5402,T150,P1.
ACCOUNT(R=HIBLDG)
PAGE(199,N)
ATTACH(ROSTERS,ID=TWB,PW=WIPEOUT)
ATTACH(ROSTGEN,ID=TWB,PW=WIPEOUT)
UPDATE(Q,D,P=ROSTERS,C=SAM,L=A12)
DISPOSE(OUTPUT,PR)
RFL(70000)
ROSTGEN.
REWIND(OUTPUT)
COPYBF(OUTPUT,ROS20S)
REWIND(ROS20S)
CATALOG(ROS20S,ID=TWB)
7-8-9
*ID 12JAN76
*D D369.2
700001          { code 700 - Geog., Org., Alph. sort
*D 5,88
QQROSSC   20S   JOINT COMMITTEE MEMBERS
*D 91,129
    :        }  address corrections
*D 10856,14139 { delete all rosters up to Roster
                 20.1 plus Roster 20.1 title card
QQROSSC   20S   JOINT COMMITTEE MEMBERS
    :        }  Roster 20 corrections
*D 15546      {  delete Roster 20.1 title card
    :        }  Roster 20.1 corrections
*D 16562,18250
*C D369
E-O-F
```

II. After successfully completing run I, SAM can now

be printed to output:

                    SUBMISSION CARD (Special Forms - GDLSB 4-part
                              paper)
                    GDLSB,*Name,B5402,T10,P1.
                    ACCOUNT(R=HIBLDG)
                    PAGES(1000,N)
                    ATTACH(ROS20S,ID=TWB)
                    PMNOTE. PLS MNT GDLSB 4-PART PAPER.
                    MULTCOP(ROS20S,OUTPUT,3)
                    PMNOTE. PLS REMNT REGULAR PAPER.
                    DISPOSE(OUTPUT,PR=CSF)
                    E-O-F

2.4 MULTIPLE SETS OF D369 REPORT GENERATION

2.4.1 Deck 3

Purpose:

        Deck 3 reads the D369 deck from the UPDATE library

file ROSTERS and puts it on file SAM. Unnecessary portions are

deleted — these include:

        (1) All of the list of roster and committee names

             at the beginning of the data base, except the

             "ENDCOMM" card and the first three cards in the

             file which must be kept; and

        (2) All rosters which will not be used in subsequent

             runs.

The cataloged program, "ADDPROG" is then attached and executed.

It reads SAM and creates the files TAPE2, TAPE3, and TAPE10

as output. These files are then cataloged for later use by

"DOPROG" (See Deck 4) to produce mailing labels and roster

reports.

Usage:

The SCOPE cards shown must be followed by a series

of UPDATE directive cards which delete unwanted portions of

the D369 data base (see (1), (2) above). The file "NEWADD"

which is cataloged by this job is quite large and thus not kept

on permanent file longer than two days.

Deck Set-up:

```
        GDLSB,*Name,B5402,T150,P1.
        ACCOUNT(R=HIBLDG)
        PAGES(20,N)
        ATTACH(ROSTERS,ID=TWB)
        ATTACH(ROSTGEN,ADDPROG,ID=TWB)
        UPDATE(Q,D,P=ROSTERS,C=SAM,L=A12)
        REWIND(SAM)
        REWIND(TAPE2,TAPE3,TAPE10)
        ROSTGEN.
        REWIND(TAPE2,TAPE3,TAPE10)
        COPYCR(TAPE2,JUNK)
        COPYCR(TAPE3,TAPE2)
        COPYCR(TAPE10,TAPE2)
        REWIND(TAPE2)
        CATALOG(TAPE2,NEWADD,ID=TWB,CN=WIPEOUT,RP=__)
        DSPACE.
        7-8-9
        *ID 12JAN76
        *D D369.5,129          { deletes all Roster title cards
          •
          •                    } updates directives
          •
        *C D369
        E-O-F
```

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2.4.2 Deck 4

Purpose:

Deck 4 is used for obtaining multiple sets of mailing
labels and roster reports (that is, various numbers of different
label requests can be made in one run). Deck 4 attaches and
reads the file "NEWADD" which was created by "ADDPROG" in
Deck 3. It also attaches and executes "DOPROG", which was
created by Deck 2. (See section 2.5.2) The program's output
is then disposed to the special forms queue if labels are re-
quested. Initially, control cards are set up for one execution
to generate one set of labels or reports; then a "REPEAT,$\underline{X}$,5"
statement which causes an additional X number of label or re-
port executions within the same run.

Usage:

A 7-8-9 card followed by control cards must be in-
cluded after the SCOPE cards. These control cards direct the
program to which rosters or committees are requested and number
of copies of each. For each separate mailing label or report
set desired, the following control cards are used:

```
    nnnxxx              ⎧where nnn is the control for type
                        ⎨of output and xxx is number of copies
                        ⎩requested.
    369
    (blank card)
    (One or more Roster or Committee title cards)
    ENDCOMM
    7-8-9
```

All of these control cards are required for each output desired.

The sets of control cards are then separated by 7-8-9 cards.

2.4.3 Execution Example

Deck Set-up:

```
    SUBMISSION CARD                      ⎧(GDLSB Mailing Labels, if
    GDLSB,*Name,B5402,T150,P1.           ⎨desired, and "Ignore all
    ACCOUNT(R=HIBLDG)                    ⎩'Remove mail labels' requests"
    PAGES(199,N)
    ATTACH(A,NEWADD,ID=TWB)
    ATTACH(PROG,DOPROG,ID=TWB,CY=02)
    REWIND(A)
    REWIND(TAPE2,TAPE3,SAM)
    COPYCR(A,TAPE2)
    COPYCR(A,TAPE3)
    COPYCR(A,SAM)
    REWIND(TAPE2,TAPE3,SAM)
    COPYCR(INPUT,CARDZ)
    REWIND(CARDZ)
    RFL(70000)
    PROG.
    REPEAT,X,5.                           ⎧where X=one less than num-
    REWIND(CARDZ,TAPE2,TAPE3,SAM)⎤        ⎪ber of sets desired; 5=the
    COPYCR(INPUT,CARDZ)          ⎪        ⎨next five cards to be
    REWIND(CARDZ)               ⎪        ⎩repeated
    RFL(70000)                  ⎬
    COBCODE.                    ⎭         } Repeated cards
    DISPOSE(OUTPUT,PR=CSF)
    EXIT(S)
    DISPOSE(OUTPUT,PR=CSF)
    PMNOTE.  MOUNT MAIL LABELS.
    7-8-9/1/5
    420003          ⎤
    369             ⎪  This is one set of control cards which
    (blank card)    ⎬  produces 3 copies of mailing labels
    QQROSSC 20 ...  ⎪  for Roster 20
    ENDCOMM         ⎭
    7-8-9/1/5
```

(Continued)

```
420001
369                        ⎤
(blank card)               ⎬  Produces 1 copy of mailing labels
QQROSSC 20.1 ...           ⎥  for Roster 20.1
ENDCOMM                    ⎦
7-8-9/1/5
    •                      ⎤
    •                      ⎬  Additional sets of control cards
    •                      ⎦  for desired output
E-O-F
```

2.5   CHANGING THE MULTIPLE SET REPORT GENERATION PROGRAM

2.5.1   Deck 1

Purpose:

Deck 1 reads the COBOL program BEEDLET from the

UPDATE library file ROSTERS, makes necessary changes, and then

compiles the program. The binary, PROG, is cataloged as

ADDPROG. The purpose of ADDPROG during later executions is to

read the D369 data base from file SAM and store the ADDRESS-FILE

(TAPE2), the COMM-ROSTER-FILE (TAPE3) and the country names in

ROSTER-RPT-FILE (TAPE10).

Usage:

The input does not change, and this deck may always

be submitted as is. It is only necessary to run this deck if

the ADDPROG file is lost or if changes are desired in this part

of the COBOL program.

<u>Deck Set-up</u>:

```
GDLSB,B5402,*Name,T100,P1.
ACCOUNT(R=HIBLDG)
PAGES(50,N)
ATTACH(ROSTERS,ID=TWB)
REWIND(ROSTERS)
UPDATE(Q,P=ROSTERS,C=GCD,L=A12)
REWIND(GCD)
RFL(70000)
COBOL(I=GCD,B=PROG,LXR)
CATALOG(PROG,ADDPROG,ID=TWB,RP=999,PW=WIPEOUT)
DSPACE.
7-8-9
*ID 12JAN76
    •
    •          }  UPDATE Directives
    •
*C BEEDLET
E-0-F
```

2.5.2   Deck 2

Purpose:

Deck 2 reads the COBOL program BEEDLET from the UPDATE
library file ROSTERS, makes changes, and compiles it.   The
binary, PROG, is cataloged as DOPROG.   The purpose of DOPROG
during later execution is to read the files created by ADDPROG
(Deck 1) and to produce roster reports or mailing labels.
DOPROG's usage was described under DECK 3 documentation.

Usage:

This deck may always be run as is, and does not have
to be run unless the file DOPROG is lost or changes are desired
to the COBOL program.

<u>Deck Set-up:</u>

```
GDLSB,B5402,*Name,T100,P1.
ACCOUNT(R=HIBLDG)
PAGES(50,N)
ATTACH(ROSTERS,ID=TWB)
UPDATE(Q,P=ROSTERS,C=GCD,L=A12)
REWIND(GCD)
RFL(70000)
COBOL(I=GCD,B=PROG,LXR)
CATALOG(PROG,DOPROG,ID=TWB,RP=999,PW=WIPEOUT)
DSPACE.
7-8-9
*ID 12JAN76
     •
     ◦           }    UPDATE Directives
     •
*C BEEDLET
E-O-F
```

2.6 CREATION OF A NEW D369 DATA BASE

The creation of a new membership data base is made every three months. Figure 5C-1 shows the schematic procedure for this creation run. Jobs A through E are to be run on the same day to save the cost of holding permanent files over night. Since the project has three magnetic tapes, LSB1, LSB2, LSB3, with respective sequential edition numbers, the examples presented will show the updating of tape LSB1, E=18 to tape LSB2, E=19. All parameters are underlined that are edition-dependent and must be changed in each three-month execution (i.e. LSB2).

FLOW DIAGRAM:

General Procedure for the Creation of

a New Membership Data Base

START

CURRENT DATA BASE

ACCUMULATED CORRECTIONS

JOB A

A

NEW DATA BASE (Update)

COPY OF NEW D. B. LISTING

COMPILED LISTING OF NEW D. B.

CHECK LISTING

LAST LSB TAPE

JOB B

NEW LSB TAPE

A

JOB C

JOB D

JOB E

LSB TAPE LISTING

COPY OF NEW D. B. LISTING

PERMANENT FILE ACCOUNT

STOP
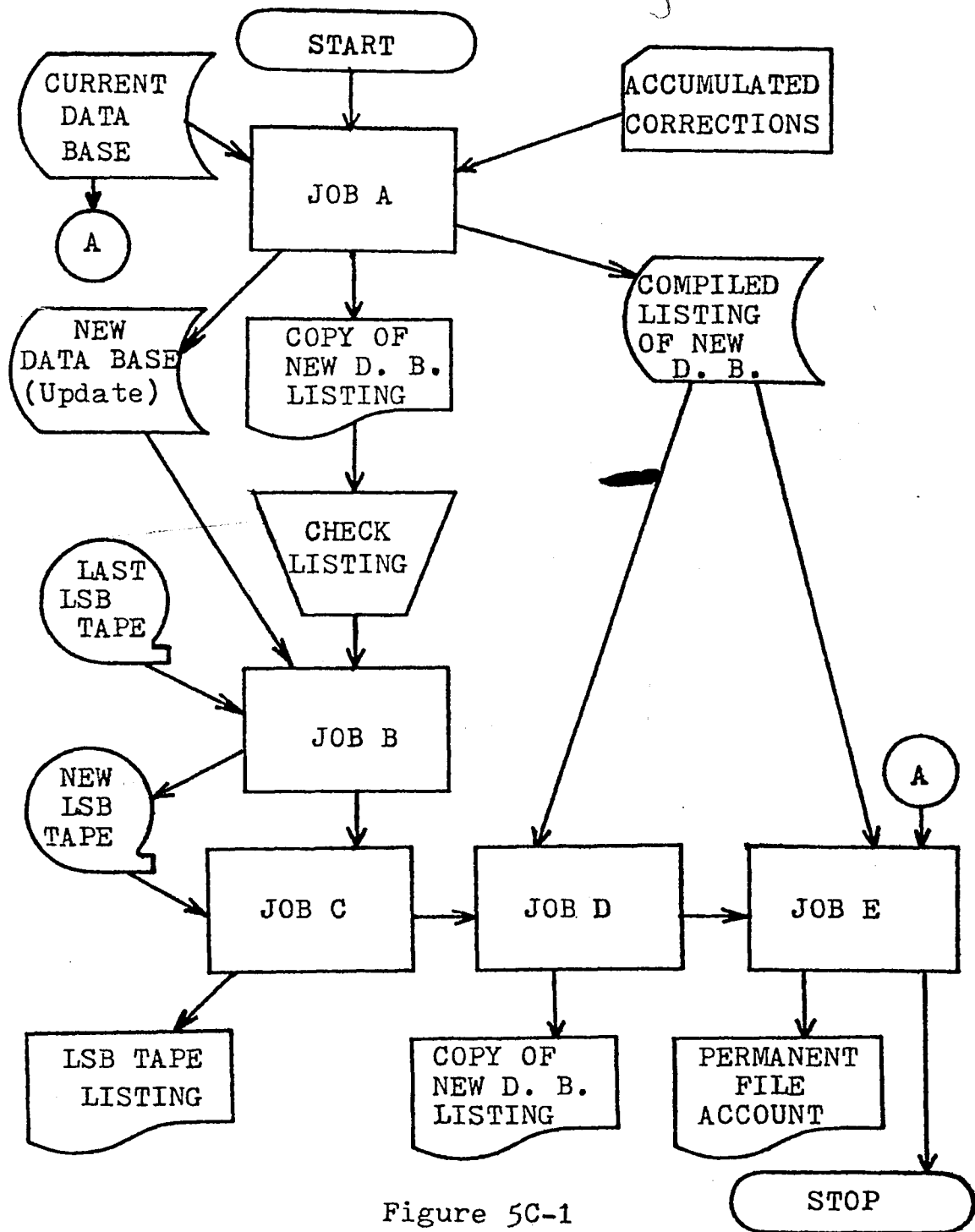
Figure 5C-1

2.6.1 Job A

Purpose:

Actual creation of new membership data base.

<u>Deck Set-up:</u>

```
GDLSB,B5402,*Name,T100,P1.
ACCOUNT(R=HIBLDG)
PAGES(1000,N)
ATTACH(ROSTERS,ID=TWB)
UPDATE(P=ROSTERS,N=NEWROS,C=SAM,D,L=A12)
CATALOG(NEWROS,ROSTERS,ID=TWB,CY=2,PW=WIPEOUT,RP=2)
CATALOG(SAM,ID=TEMP)
COPYSBF(SAM)
DSPACE.
7-8-9
*ID 12JAN76
*D D369.2
    •
    •          }  all corrections
    •
*S D369
*C D369
E-O-F
```

2.6.2 Job B

Purpose:

To make a new tape creation.

<u>Deck Set-up:</u>

```
SUBMISSION CARD (See below)
GDLSB,B5402,*Name,T60,MT2,P1.
ACCOUNT(R=HIBLDG)
LABEL(OLD,VSN=LSB1,L=BEEDLETAPE,R,E=17,NORING)
LABEL(NEW,VSN=LSB2,L=BEEDLETAPE,W,E=18,RING)
ATTACH(ROSTERS,ID=TWB,CY=2)
UPDATE(P=ROSTERS,N=NEW,B)
```

(Continued)

Deck Set-up (Continued)

```
REWIND(OLD,NEW)
COPYBF(OLD,JUNK)
COPYBF(NEW,JUNK)
COPY(OLD,NEW)
ITEMIZE(NEW)
RETURN(OLD,NEW)
E-O-F
```

SUBMISSION CARD:

REQUEST/LABEL Cards

Local File Name	VSN	Write Ring In?		Tape Held?		Save Tape?	
OLD	LSB1	YES	(NO)	(YES)	NO	(YES)	NO
NEW	LSB2	(YES)	NO	(YES)	NO	(YES)	NO
		YES	NO	YES	NO	YES	NO

SPECIAL INSTRUCTIONS

etc.

2.6.3   Job C

Purpose:

        To get a hard copy of the LSB_ tape.

Deck Set-up:

```
SUBMISSION CARD (See below)
GDLSB,B5402,*Name,T30,MT1,P1.
ACCOUNT(R=HIBLDG)
PAGES(2000,N)
LABEL(NEW,VSN=LSB2,L=BEEDLETAPE,R,E=18,NORING)
REWIND(NEW)
UPDATE(P=NEW,F,L=1)
REWIND(NEW)
ITEMIZE(NEW)
COPYSBF(COMPILE)
E-O-F
```

SUBMISSION CARD:

REQUEST/LABEL Cards

Local File Name	VSN	Write Ring In?		Tape Held?		Save Tape?	
NEW	LSB2	YES	(NO)	(YES)	NO	(YES)	NO
		YES	NO	YES	NO	YES	NO
		YES	NO	YES	NO	YES	NO

SPECIAL INSTRUCTIONS

etc.

2.6.4   Job D

Purpose: To get a copy of the data base listing.

Deck Set-up:

```
GDLSB,B5402,*Name,T20,P1.
ACCOUNT(R=HIBLDG)
PAGES(1000,N)
ATTACH(SAM,ID=TEMP)
COPYSCF(SAM)
E-O-F
```

2.6.5 Job E

Purpose: To clean up permanent file space.

Deck Set-up:

```
GDLSB,B5402,*Name,T10,P1.
ACCOUNT(R=HIBLDG)
PAGES(10,N)
DSPACE.
PURGE(ROSTERS,ID=TWB,PW=WIPEOUT)
PURGE(ROSTERS,ID=TWB,PW=WIPEOUT,CY=2)
PURGE(SAM,ID=TEMP)
DSPACE.
E-O-F
```

3. ADMINISTRATIVE GLOSSARY (SCHEDULE 5.5)

3.1 GENERAL

The purpose of the Administrative Glossary program is to provide project personnel with administrative terms and definitions.

The binary of the COBOL source program and its date subroutine is stored on the permanent file ADMINISTRATIVEGLOSSARY (ID=TWB). The data file is manually maintained on punched cards. To obtain an updated listing of Schedule 5.5 the card file must be manually updated to reflect corrections or additions to the file of defined terms, then run using the deck set-up shown in 'Obtaining Administrative Glossary'.

3.2 UPDATING ADMINISTRATIVE GLOSSARY PACKAGE

File Description

The punched card file for this system contains two types of cards organized in ascending alphabetical order of term cards:

(1) Term cards – containing the term to be defined, the abbreviation of that term (if any), and the number of definition cards to follow;

(2) Definition cards — containing the definition for the preceding term, a few characters of the title for confirmation, and the number of that card in the sequence of definition cards.

Each term card may have up to nine lines (or cards) of definition following it.

Data fields

Term Card:

Column	Type	Description
1-60	alphanumeric	Term to be defined on following cards.
70-79	alphabetic	Abbreviation of term (if any).
80	numeric	Number of definition cards to follow. For 1-line abbreviations, a "0" (zero) should be punched here and the term will appear only in the List of Abbreviations.

Definition Card:

Column	Type	Description
1-9	alphabetic	Confirmation field — first nine characters of term that is being defined exactly how it appears on the term card.
10	numeric	Sequence number of this line of definition.
11-80	alphanumeric	One line of defintion of the term.

3.3 OBTAINING ADMINISTRATIVE GLOSSARY OUTPUT (SCHEDULE 5.5)

Deck Set-up:

```
GLOSS,B5402,*Name,T60.
ACCOUNT(R=HIBLDG)
PAGES(N,199)
UOASTAT.
ATTACH(FILE,ADMINISTRATIVEGLOSSARY,ID=TWB)
RFL(100000)
FILE.
REWIND(SAM)
MULTCOP(SAM,OUTPUT,1)*
7-8-9
  •
  •         } deck of term and definition cards
  •
E-O-F
```

*Note: Number of copies of this schedule is dictated by the

number placed on MULTCOP card.

3.4 MODIFYING THE ADMINISTRATIVE GLOSSARY PACKAGE

Any tested modifications of the COBOL program should

be compiled and the binary stored using the following control

cards:

```
GLOSS,B5402,*Name,T60.
ACCOUNT(R=HIBLDG)
COBOL.
COBOL(SUB)
REWIND(LGO)
CATALOG(LGO,ADMINISTRATIVEGLOSSARY,ID=TWB,PW=WIPEOUT,
          RP=999)
DSPACE.
7-8-9
  •
  •         } Source deck of COBOL program
  •
E-O-F
```

After the new binary is tested, the old version of the binary

may be removed from permanent file using the PURGE command

(the cycle being one less than the cycle on which the new

version resides).

Deck set-up:

```
GLOSS,B5402,*Name,T10.
ACCOUNT(R=HIBLDG)
PURGE(ADMINISTRATIVEGLOSSARY,ID=TWB,PW=WIPEOUT,CY=___)
E-O-F
```

4. DESCRIPTION SYSTEM (SCHEDULES 14.1, 14.5, 22.2)

4.1 GENERAL

The purpose of the description system is to provide indices and sorted content listings of two files of news articles called project descriptions and city descriptions on demand.

The binary program of the FORTRAN source program is stored on the permanent file DESCRIPTIONS (ID=TWB). There are two data files; the first, a project data file with one card for each project description containing project numbers, project names and locations. This file is manually maintained on punched cards in increasing project number order. The second data file contains city description data. Each card represents an article title and contains the article title, the city, the country, and the city abbreviation. This file is also maintained on punched cards in ascending alphabetical order of city abbreviations.

4.2 UPDATING THE DATA FILE

I. Project Description File Description

This file contains only one type of card punched in the following format and maintained with the file in ascending

numerical order by project number. The data input format is
as follows (all left justified):

Column	Type	Description
1-5	Alphanumeric	Project number
11-25	Alphabetic	Name of country
26-40	Alphabetic	Name of city
41-70	Alphanumeric	Name of project

Note: A potential exists for the creation of duplicate files
for the same building (or project). Thus, outputs and source
files should be consulted for all buildings within the same
city to be sure that a new building is indeed being added.

II. City Description File Description

This file also contains one type of card punched in
the following format and maintained within the file in ascending
alphabetical order by city abbreviation, (all left justified):

Column	Type	Description
1-3	Alphabetic	City abbreviation
11-25	Alphabetic	Name of country
26-40	Alphabetic	Name of city
41-70	Alphanumeric	Subject of article

4.3 OBTAINING SCHEDULES 14.1, 14.5, AND/OR 22.2

This system produces any combination of four reports from any run.

Report Number	Report Contents
1	Schedule 14.5 only
2	Schedule 14.1 only
3	Schedule 22.2 only
4	Schedules 14.1 and 14.5

Each report desired is obtained by entering the report number on a direction card in column 1 and the number of copies desired of any report right justified in columns 3 and 4. Any number of direction cards may be used.

Deck Set-up:

```
PRDES,B5402,T30,*Name.
ACCOUNT(R=HIBLDG)
PAGES(199,N)
UOASTAT.
ATTACH(LGO,DESCRIPTIONS,ID=TWB)
COPYCR(INPUT,DIRECT)
COPYCR(INPUT,TEMP)
COPYCR(INPUT,CITY)
RFL(100000)
LDSET(LIB=RUN2P3/SYSMISC)
LGO.
7-8-9
1  03      (3 copies of Sch. 14.5)        ⎱ file of direction
4          (1 copy of Sch. 14.1 and 14.5) ⎰ cards
7-8-9
   •
   •        ⎱ file of project descriptions cards
   •        ⎰
7-8-9
   •
   •        ⎱ file of city description cards
   •        ⎰
E-O-F
```

4.4 MODIFYING THE DESCRIPTION PACKAGE

The source program written in FORTRAN is located in the program library with the 5C group. Any modifications should be fully tested before replacing the presently working binary. The control cards to recompile and catalog a new object program are shown below:

```
PRDES,B5402,*Name.
ACCOUNT(R=HIBLDG)
RUN(S)
ATTACH(SORL,SORT64,ID=TDENNIS,CY=01)
COPYBR(SORL,LGO,4)
REWIND,LGO.
CATALOG(LGO,DESCRIPTIONS,ID=TWB,PW=WIPEOUT,RP=999)
DSPACE.
7-8-9
   •
   •      }  source deck
   •
E-O-F
```

After successfully testing the new binary, the cycle (XX) containing the latest version may be purged using this purge command:

```
PURGE(DESCRIPTIONS,ID=TWB,PW=WIPEOUT,CY=XX)
```

5.   M117 PROGRAM

5.1   GENERAL

The purpose of the M117 program is to provide the
MONOGRAPH Draft 1 Report of Input Control document on demand.
The entire report is generally referred to as "M117".

The object program is written in FORTRAN and is
stored with the 5C group. The data file is also stored with
the program on cards. The package is commanded by a main pro-
gram which calls options specified by subroutines. Presently,
only one option is needed by the project: M117, a listing by
chapter. Additional options can easily be programmed into the
package by just complying with the subroutine option format.

5.2   UPDATING THE DATA FILE

The data file consists of two types of cards. The
first, of which there is only one, is the command card specify-
ing options to program, and the second type which consists of
the data for the report.

I.   Command Card

Column	Type	Description
1-5	Integer	1 specifies M117 output
6-10	Integer	blank (available for future options)

II. Report Data Card

Column	Type	Description
1-3	Alphanumeric	Chapter number (right justified)
4-6	Alphanumeric	Area (Subdivision) of chapter (right justified)
7-34	Alphanumeric	Title of chapter/area (left justified)
35-49	Alphabetic	Name of reporter/editor for chapter/area (left justified)
50-52	Alphabetic	Country affiliation of reporter/editor (left justified)
53-60	Alphanumeric	Codes (one code per column)

All the report data cards relating to common chapters must on each card have the chapter number punched in columns 1 thru 3. This is the field on which the program distinguishes both like and new chapters in the report. Continuation of the title information in the title field (col. 7-34) is permissible on a subsequent data card with the continuation beginning in column 10 and the card containing the chapter number in columns 1-3. Blank cards will be read and interpreted as a blank line in the report.

5.3 OBTAINING THE M117 REPORT

The report is obtained by following the set-up given below:

Deck Set-up:

```
GM117,*Name,B5402,T30.
ACCOUNT(R=HIBLDG)
PAGES(199,N)
FTN.
LGO(,,SAM)
REWIND(SAM)
MULTCOP(SAM,OUTPUT,n)
7-8-9
  •
  •    } M117 Program
  •
7-8-9
  •
  •    } M117 Data
  •
E-0-F
```

5.4 MODIFYING THE M117 PROGRAM

The source program is written in FORTRAN and any modifications made should be checked and approved before permanently modifying the program. One possible change will be to increase the dimension of the ICHART variable. Presently it is dimensioned to 1300, but if the data should increase beyond this number, an increase to this variable is necessary.

6. POPULATION PACKAGE

6.1 GENERAL

The purpose of the population program is to provide Schedules 22.3 and 22.4 which are listings of the Population of Major Cities and the World's Largest Urban Areas, respectively.

The package consists of a FORTRAN program and two data files. The program and its data are stored on cards and maintained by the 5C group. The main program reads each data file and prints a two-column listing of the country, city and its population.

6.2 UPDATING THE DATA FILES

Updating will occur directly to the data cards. Because of the nature of the data, updates will be at most once a year since the data is based on almanac census. The input fields for both data files, major cities and urban areas, are exactly the same.

Input format:

Column	Type	Description
1-20	Alphanumeric	Country name (left justified)
21-37	Alphanumeric	City name (left justified)
41-50	Alphanumeric	Population (right justified)

6.3 OBTAINING SCHEDULES 22.3 and 22.4

Both schedules can be obtained by executing the following deck.

Deck Set-up:

```
GDLSB,*Name,B5402,T30.
ACCOUNT(R=HIBLDG)
PAGES(199,N)
COPYCR(INPUT,STCITY)
COPYCR(INPUT,STURB)
REWIND(STCITY,STURB)
FTN.
LGO.
REWIND(TOM)
MULTCOP(TOM,OUTPUT,n)
7-8-9
  •
  •        }  Major City Data
  •
7-8-9
  •
  •        }  Urban Area Data
  •
E-O-F
```

7. SCHEDULE 2-1 AND 2-2 PACKAGE

7.1 GENERAL

The purpose of the Schedule 2-1 and Schedule 2-2 programs are to provide their respective schedules, Scope Index (Alphabetically) and Subject Index (Committee).

The package consists of two programs and two data files accessed by both programs. The Schedule 2-1 program is written in COBOL and the Schedule 2-2 program consists of a FORTRAN section and a COBOL section. The FORTRAN section separates the committee symbols, which are separated by commas on the data cards, into individual committee entries for the COBOL section of the program. Both source programs are stored on the project's LSB tapes. The data is kept on cards with the 5C group.

7.2 UPDATING THE SCHEDULE 2-1 AND 2-2 PACKAGE

The punched data card file is arranged in ascending alphabetic order according to subjects. Updates are manually made to the box of cards.

Input Format: (Same for both data files)

Column	Type	Description
1-60	Alphanumeric	Subject (left justified)
61-68	Blank	
69-80	Alphanumeric	Committees (right justified, free format, separated by commas)

7.3 OBTAINING SCHEDULES 2.1, 2.2, 2.1B, AND 2.2B

Deck Set-up: Schedule 2.1 (Using Sch. 2-1 & 2-2 data file)

```
GD21,*Name,B5402,T60,P1.
ACCOUNT(R=HIBLDG)
PAGES(199,N)
ATTACH(ROSTERS,ID=TWB)
UPDATE(Q,P=ROSTERS,C=NUPROG)
COPYCR(INPUT,COMPILE)
REWIND(COMPILE,SORTED)
SORTMRG.
COBOL(I=NUPROG,L=JUNK)
DISPOSE(OUTPUT,PR)
LGO.
REWIND(COPIER)
MULTCOP(COPIER,OUTPUT,n)        (for n copies)
7-8-9
*ID   TOM
*D   SCED-2-1.2,23
*D   SCED-2-1.83
                          VALUE IS '12MAR76'.     (Today's date)
*C  SCED-2-1
7-8-9
  •
  •              Data Card File
  •
7-8-9
      SORT(1,1,100,1,1,1)
      KEY(A,C,1,60)
      FILE(COMPILE,S,D,R,N)
      FILE(SORTED,O,D,R,N)
      RECORD(I,R,100)
      RECORD(O,R,100)
      END
7-8-9
E-O-F
```

Deck Set-up: Schedule 2.2   (Using Sch. 2-1 & 2-2 data file)

```
    GD22,*Name,B5402,T60,P1.
    ACCOUNT(R=HIBLDG)
    PAGES(199,N)
    ATTACH(ROSTERS,ID=TWB)
    UPDATE(Q,P=ROSTERS,C=NUPROG)
    COPYCR(INPUT,COMPIL)
    REWIND(COMPIL)
    REWIND(NUPROG)
    FTN(I=NUPROG)
    LGO.
    REWIND(LGO)
    REWIND(INDIV,OUTPUT1)
    SORTMRG(I=NUPROG)
    REWIND(LGO)
    COBOL(I=NUPROG,L=JUNK)
    DISPOSE(OUTPUT,PR)
    LGO.
    REWIND(COPIER)
    MULTCOP(COPIER,OUTPUT,n)        (for n copies)
    7-8-9
    *ID   TOM
    *D   SCED-2-2.2,30
    *D   SCED-2-2.162
                          VALUE IS '12MAR76'.    (Today's date)
    *C   SCED-2-2
    7-8-9
```

```
    •
    •      }  Data Card File
    •
    7-8-9
    E-O-F
```

Deck Set-up: Schedule 2.1B   (Using Sch. 2-1B & 2-2B data file)

```
    GC21B,*Name,B5402,T60,P1.
    ACCOUNT(R=HIBLDG)
    •
    •
    •     }  Same control cards as Schedule 2.1
    •
    •
    MUTCOP(COPIER,OUTPUT,n)
    7-8-9
```

(Continued)

Deck Set-up: Schedule 2.1B   (Continued)

```
*ID  TOM
*D   SCED-2-1.2,23
*D   SCED-2-1.74,76
                 03   COLUMN NUMBER IS 20
                      SIZE IS 39 ALPHANUMERIC DISPLAY
                          CHARACTERS
                      VALUE IS 'BIBLIOGRAPHY SCOPE INDEX
                          (ALPHABETICAL)'.
*D   SCED-2-1.78,79
                      SIZE IS 43 CHARACTERS
                      VALUE IS 'SCHEDULE 2.1B'.
*D   SCED-2-1.83
                      VALUE IS '12MAR76'.    (Today's date)
*D   SCED-2-1.84,86
                 03   COLUMN NUMBER IS 20
                      SIZE IS 39 ALPHANUMERIC DISPLAY
                          CHARACTERS
                      VALUE IS '-----------------------------
                          --------------'.
*C   SCED-2-1
7-8-9
  •
  •      }      Data Card File
  •
7-8-9
  •
  •      }      Sort cards same as Schedule 2.1
  •
E-O-F
```

Deck Set-up: Schedule 2.2B   (Using Sch. 2-1B & 2-2B data file)

```
GD22B,*Name,B5402,T60,P1.
ACCOUNT(R=HIBLDG)
  •
  •
  •      }      Same control cards as Schedule 2.2
  •
MULTCOP(COPIER,OUTPUT,n)
7-8-9
```

(Continued)

Deck Set-up: Schedule 2.2B (Continued)

```
*ID  TOM
*D   SCED-2-2.2,30
*D   SCED-2-2.157,158
                         SIZE IS 13 ALPHANUMERIC CHARACTERS
                         VALUE IS 'SCHEDULE 2.2B'.
*D   SCED-2-2.162
                         VALUE IS '12MAR76'.   (Today's date)
*D   SCED-2-2.163,165
                     03  COLUMN NUMBER IS 21
                         SIZE IS 38 ALPHANUMERIC CHARACTERS
                         VALUE IS 'BIBLIOGRAPHY SUBJECT INDEX
                            (COMMITTEE)'.
*D   SCED-2-2.173,175
                     03  COLUMN NUMBER IS 21
                         SIZE IS 38 ALPHANUMERIC CHARACTERS
                         VALUE IS '----------------------------
                            -----------'.
*C   SCED-2-2
7-8-9
  •         ⎤
  •         ⎬   Data Card File
  •         ⎭
7-8-9
E-O-F
```

7.4 MODIFYING THE SCHEDULE 2-1 AND 2-2 PACKAGE

All changes to the source programs can be made by
UPDATE directives. After all changes and modifications have
been debugged and approved, they can be permanently incorpora-
ted into the package again by the use of UPDATE directives at
the time of a new LSB tape creation.

8. CUMULATIVE PERSONNEL PACKAGE

8.1 GENERAL

The PERSONNEL program provides rosters 7S-C1 and 7S-C2 which are the 'Personnel Record of the Tall Building Project' (alphabetical order) and a list of personnel arranged according to starting date, respectively.

The purpose of this COBOL program is to produce two outputs. The first is a list of all personnel associated with the project, past and present, with the respective position on the project and starting and ending years of the term of association. The other output is the same data, but sorted according to the starting year of association with the project. The program and its data file are stored on cards and are located with the 5C group.

The ARRNG-ALPH SECTION of the PERSONNEL program reads the input data from the input file (I-CARDS) and moves the data fields from the input-file to the output-file (TERM-SAVE-FILE) to be used as the input-file for the sorting operation. ALPH-RPT prepares the output in the desired output form as described in the working storage section.

The SRT SECTION describes two sort operation methods. The first sorting is done to the names of the project personnel in ascending order. The second sorting operation is done on the starting year of the project personnel in ascending order.

8.2   UPDATING THE PERSONNEL PACKAGE DATA FILE

The PERSONNEL program has one data file to be accessed by the program for its two types of output.

Input Data Card Format

Column	Type	Description
1-14	Alphabetic	Last name of person (left justified)
15	Alphabetic	First initial of person
17	Alphabetic	Second initial of person
19-20	Numeric	Starting year of project association
22-23	Numeric	Ending year of project association
25-26	Alphabetic	Position of person
27-80		Blank

8.3   OBTAINING ROSTERS 7S-C1 AND 7S-C2

The program is set-up to produce both rosters, 7S-C1 and 7S-C2, during each execution. The number of copies desired can be requested by specifying the number, n, on the MULTCOP card.

<u>Deck Set-up</u>:

```
GDLSB,B5402,*Name,T30,CM100000.
ACCOUNT(R=HIBLDG)
PAGES(199,N)
COPYCR(INPUT,GEORGE)
REWIND(GEORGE)
COBOL(LXRM)
COBOL(SUB)
RFL(100000)
LGO.
REWIND(SAM)
MULTCOP(SAM,OUTPUT,n)
7-8-9
  •
  •     } Data cards of personnel
  •
7-8-9
  •
  •     } COBOL main program
  •
7-8-9
  •
  •     } COBOL sub-program
  •
E-O-F
```

NO. _____

FL 503
25 MAY 75

369 COMPUTER REQUEST WORK ORDER

TO: _____   DATE: _____

REQUESTOR: _____

      RM: _____

      EXT: _____

REQUEST: _____

_____

FORMAT*: _____

NO. SETS, COPIES: _____

PURPOSE: _____

PRIORITY: _____

NEEDED BY: _____

ADDITIONAL COMMENTS, INSTRUCTIONS: _____

_____

_____

* FORMAT: Type of output requested, e.g. mailing labels; alphabetical lists; geographical lists; organizational lists; standard formats like M117, etc.

PAGE____

369 COMPUTER REQUEST LOG

NO.	DATE OF REQUEST	REQUESTOR	PURPOSE	PRIORITY	WHAT IS NEEDED (ROSTER, COMM, ETC)	FORMAT	# SETS, COPIES	DATE NEEDED	DATE COMPLETED	DELIVERED

MONOGRAPH FLOW DIAGRAM — DRAFTS 1,2,3 & 4

PERT/TIME
ACTIVITY REPORT

PERT ANALYSIS OF MONOGRAPH
1ST SORT KEY   PREDECESSOR EVENT NO.
2ND SORT KEY   SUCCESSOR EVENT NO.
3RD SORT KEY   EXPECTED DATE (TE)
4TH SORT KEY   LATEST ALLOWED DATE

REPORTING ORGN.
VOL. DG + CB

CONTRACT NO.

TERM- APR - DEC 76
REPORT DATE- 4/ 1/76
RELEASE DATE- 4/ 1/76

EVENT PRED.	SUCC.	ACTIVITY DESCRIPTION	PROB.	ACTIV. TIME	DATE EXPECTED	DATE ALLOWED	DATE COMP/SCHED	SLACK	REMAINING TIME	ORG.	ACCOUNT NO.
I 10	20	HDQ PRINT DRAFT 1 (REV)		1.1	4/ 1/76	4/ 1/76		-3.6	0.0		
20	30	HDQ MAIL DRAFT 1 (REV) TO CC		1.0	4/ 7/76	4/ 1/76		-1.1	1.0		
20	40	HDQ MAIL DRAFT 1 (REV) TO CV		1.0	4/ 7/76	4/ 1/76		-1.1	1.0		
20	50	HDQ MAIL DRAFT 1 (REV) TO CE		1.0	4/ 7/76	4/ 1/76		-1.1	1.0		
20	60	HDQ MAIL D1 (REV) TO CONTRIB		1.0	4/ 7/76	4/ 7/76		-0.1	1.0		
20	70	HDQ MAIL DRAFT 1 (REV) TO CC		1.0	4/ 7/76	4/ 7/75		-3.6	1.0		
20	80	HDQ MAIL DRAFT 1 (REV) TO GE		1.0	4/ 7/76	4/ 7/75		-0.1	1.0		
20	90	HDQ MAIL D1 TO CO GE		1.0	4/ 7/76	4/ 7/76		-0.1	1.0		
30	110	CC OPT COMMENT + MATL TO HDQ		0.0	4/ 7/76	4/ 1/76		-1.1	1.0		
40	110	CV OPT COMMENT + MAIL TO HDQ		0.0	4/ 7/76	4/ 1/76		-1.1	1.0		
50	110	CE OPT COMMENT + MAIL TO HDQ		0.0	4/ 7/76	4/ 1/76		-1.1	1.0		
60	90	CONTRIB OPT REVIEW D1 (REV)		0.0	4/ 7/76	4/ 7/76		-0.1	1.0		
70	100	GC REVIEW DRAFT 1 (REV) (A)		1.5	4/15/76	4/ 7/76	P 4/15/76	-3.6	2.5		
80	120	GE OPT REVIEW DRAFT 1 (REV)		0.0	4/ 7/76	4/ 7/76		-0.1	1.0		
90	120	CO GE OPT REVIEW D1 (REV)		0.0	4/ 7/76	4/ 7/76		-0.1	1.0		
100	110	GC MAIL DRAFT 1 (REV) TO HDQ		1.0	4/22/76	4/ 1/76		-3.6	3.5		
110	120	HDQ ASSEMBLES D1 (REV) CORR.		1.0	4/28/76	4/ 7/76		-3.5	4.5		
120	130	HDQ MAIL DRAFT 1 (REV) TO CC		1.0	5/ 4/76	5/ 3/76		-0.2	5.5		
120	140	HDQ MAIL DRAFT 1 (REV) TO CV		1.0	5/ 4/76	5/ 3/76		-0.2	5.5		
120	150	HDQ MAIL DRAFT 1 (REV) TO CE		1.0	5/ 4/76	5/ 3/76		-0.2	5.5		
120	160	HDQ MAIL DRAFT 1 (REV) TO GC		1.0	5/ 4/76	5/ 3/76		-0.2	5.5		
120	170	HDQ MAIL DRAFT 1 (REV) TO GE		1.0	5/ 4/76	4/13/76		-3.6	5.5		
130	180	HDQ MAIL D1 (REV) TO CO GE		1.0	5/ 4/76	4/13/76		-3.6	5.5		
130	200	CO OPT INTERACTION WITH GE		0.0	5/ 4/76	5/ 3/76		-0.2	5.5		
140	200	CV OPT INTERACTION WITH GF		0.0	5/ 4/76	5/ 3/76		-0.2	5.5		
150	200	CE OPT INTERACTION WITH GF		0.0	5/ 4/76	5/ 3/76		-0.2	5.5		
160	200	GC OPT INTERACTION WITH GE		0.0	5/ 4/76	5/ 3/76		-0.2	5.5		
170	190	GE EDIT DRAFT 1 (C)		1.5	5/12/76	4/21/76	E 4/21/76	-3.6	7.0		
180	195	CO GF EDIT DRAFT 1 (B)		1.5	5/12/76	4/21/76	R 4/21/76	-3.6	7.0		
190	200	GF MAIL DRAFT 1 TO HDQ		1.0	5/18/76	5/ 3/76		-2.7	8.0		
195	200	CO GF MAIL DRAFT 1 TO HDQ		0.4	5/18/76	5/ 3/75		-2.7	8.4		
200	210	HDQ TRANSFER REV TO CFIG (C)		0.4	5/20/76	5/ 6/76		-2.7	8.4		
200	220	HDQ - FORWARDING LETTER (C)		0.4	5/20/76	5/ 6/76		-2.5	8.4		
200	240	HDQ PREPARE T.OF C.+ T.P.(C)		0.4	5/21/76	5/ 6/76		-2.2	8.5		
210	230	PH 12 ORDER MAIL LABELS (C)		0.2	5/21/76	5/ 8/76		-2.7	8.6		
220	240	GS REVISE DRAFT 2		0.0	5/21/76	5/ 6/76		-2.7	8.6		
230	240	LSB SIGNS FOR. LETTER (C)		0.4	5/24/76	5/ 8/76		-2.7	9.0		
240	250	XEROX L2 W/ K FRANKLIN (C)		1.0	5/29/76	5/14/76	O 5/12/76	-2.7	10.0		
240	260	HDQ MAIL DRAFT 2 TO CC		1.0	5/29/76	5/14/76		-2.7	10.0		
240	270	HDQ MAIL DRAFT 2 TO CE		1.0	5/29/76	5/14/76			10.0		

PERT/TIME
ACTIVITY REPORT

PERT ANALYSIS OF MONOGRAPH   VOL. PC + CB   TERM-- APR - DEC'76

EVENT PRED.	SUCC.	ACTIVITY DESCRIPTION	PROB.	ACTIV. TIME	DATE EXPECTED	DATE ALLOWED	DATE COMP/SCHED	SLACK	REMAINING TIME	ORG.	ACCOUNT NO.
240	280	HDQ MAIL DRAFT 2 TO CONTRIB (F)		1.0	5/29/76	5/14/76		-2.7	10.0		
240	290	HDQ MAIL DRAFT 2 TO GC (G)		1.0	5/29/76	5/14/76		-2.7	10.0		
250	300	CC REVIEW DRAFT 2		1.1	6/ 5/76	5/20/76		-2.7	11.1		
260	310	CV REVIEW DRAFT 2		1.1	6/ 5/76	5/20/76		-2.7	11.1		
270	320	CE REVIEW DRAFT 2		1.1	6/ 5/76	5/20/76		-2.7	11.1		
280	330	CONTRIB REVIEW DRAFT 3 (E)		1.1	6/ 5/76	5/20/76		-2.7	11.1		
290	340	GC REVIEW + APPROVE D2 (H)		1.1	6/ 5/76	5/20/76		-2.7	11.1		
300	350	CC MAIL DRAFT 2 TO HDQ		1.0	6/11/76	5/26/76		-2.7	12.1		
310	350	CV MAIL DRAFT 2 TO HDQ		1.0	6/11/76	5/26/76		-2.7	12.1		
320	350	CE MAIL DRAFT 2 TO HDQ		1.0	6/11/76	5/26/76		-2.7	12.1		
330	350	CONTRIBUTORS MAIL D2 TO HDQ		1.0	6/11/76	5/26/76		-2.7	12.1		
340	350	GC MAIL DRAFT 2 TO HDQ		1.0	6/11/76	5/26/76		-2.7	12.1		
350	360	HDQ PROCESS BALLOTS, DRAFT 2		1.0	6/17/76	6/ 1/76		-2.7	13.1		
360	370	HDQ MAIL DRAFT 2 REV. TO CE (I)		2.0	6/23/76	6/ 7/76		-2.7	14.1		
370	380	CE FINAL EDIT DRAFT 2		2.0	7/ 5/76	6/18/76	P 6/19/76	-2.7	16.1		
380	390	CE MAIL DRAFT 2 TO CC		1.0	7/10/76	6/24/76		-2.7	17.1		
390	395	CE MAIL COPY DRAFT 2 TO HDQ (J)		1.0	7/10/76	7/ 2/76		-0.4	17.1		
400	410	CC REVIEW + APPROVE D2 (J)		1.0	7/16/76	6/30/76	R 6/30/76	-2.7	18.1		
400	410	HDQ BEGIN TRANS REV TO ORIG		0.0	7/10/76	7/ 8/76		-0.4	17.1		
410	420	CC MAIL DRAFT 2 TO HDQ		1.0	7/22/76	7/ 8/76		-2.4	19.1		
410	430	HDQ TRANSFER REV TO ORIG (K)		0.4	7/24/76	7/10/76		-2.2	19.5		
420	430	HDQ - FORWARDING LETTER (K)		0.4	7/24/76	7/12/76		-2.1	19.5		
430	440	HDQ PREFACE T. OF C.+T.F.(K)		0.3	7/23/76	7/12/76		-2.4	19.4		
430	440	GS APPROVES DRAFT 3 (K)		0.2	7/26/76	7/12/76		-2.4	19.7		
440	450	LSB SIGNS FOR. LETTER (K)		0.4	7/26/76	7/12/76	R 7/15/76	-2.4	19.7		
450	460	XEROX D3 W/ K FRANKLIN (K)		1.1	7/28/76	7/14/76		-2.4	20.1		
460	470	HDQ MAIL DRAFT 3 TO GC		1.1	8/ 3/76	7/20/76		-2.2	21.2		
470	480	HDQ MAIL DRAFT 3 TO GF		1.1	8/ 7/76	8/ 4/76		-2.2	21.2		
480	490	HJQ MAIL DRAFT 3 TO CC GE		1.5	8/12/76	8/ 4/76		0.1	22.7		
490	500	GC REVIEW + APPROVE D3 (L)		0.0	8/ 3/76	9/ 4/76		-2.4	21.2		
500	510	GE SCAN DRAFT 3		0.0	8/ 3/76	9/ 4/76		0.1	21.2		
510	520	CO GE SCAN DRAFT 3		1.0	8/18/76	8/10/76		3.1	23.7		
500	510	GC MAIL COPY DRAFT 3 TO HDQ		1.0	8/18/76	8/10/76		-2.4	23.7		
510	520	GC MAIL COPY DRAFT 3 TO GF		1.0	8/18/76	9/11/76		-2.4	23.7		
520	530	GC MAIL COPY DRAFT 3 TO COGE		1.0	8/24/76	9/11/76		3.1	24.7		
500	540	HDO MAIL COPY D3-CC,CV,CE,GF		1.1	8/24/76	8/10/76	F 8/14/76	-2.4	24.8		
510	550	GE - FINAL EDIT (N)		1.1	8/24/76	8/10/76	F 8/14/76	-2.4	24.8		
520	580	CO - FINAL EDIT (M)		0.0	8/24/76	9/11/76		3.1	24.7		
530	560	CC,CV,CE,GC OPT COMMENT		1.0	8/30/76	8/16/76		-2.4	25.8		
540	580	GF MAIL DRAFT 3 TO GC		1.0	8/30/76	8/16/76		2.0	25.8		
560	580	GF MAIL DRAFT 3 TO HDQ		1.0	8/30/76	9/11/76		-2.4	25.8		
560	580	CO GE MAIL DRAFT 3 TO GC		1.0	8/30/76	8/16/76		2.0	25.8		
570	580	CO GF MAIL DRAFT 3 TO HDQ		1.0	9/ 4/76	8/21/76	R 8/21/76	-2.4	26.8		
580	590	GC - FINAL APPROVAL (P)		1.0	9/11/76	9/11/76		0.0	27.8		
580	590	GC MAIL FINAL DRAFT 3 TO HDQ		1.0	9/11/76	9/11/76		0.0	27.8		
580	590	HDQ PREPARE FOR PUBLISHER (Q)		6.3	10/19/76	10/19/76		0.0	34.1		

PERT ANALYSIS OF MONOGRAPH
1ST SORT KEY   PREDECESSOR EVENT NO.
2ND SORT KEY   SUCCESSOR EVENT NO.
3RD SORT KEY   EXPECTED DATE (TE)
4TH SORT KEY   LATEST ALLOWED DATE
EVENT

PERT/TIME
ACTIVITY REPORT
VOL. SC

TERM- APP - DEC 76
REPORT DATE- 4/ 1/76
RELEASE DATE- 4/ 1/76

PRED.	SUCC.	ACTIVITY DESCRIPTION	PROB.	ACTIV. TIME	DATE EXPECTED	DATE ALLOWED	DATE COMP/SCHED	SLACK	REMAINING TIME	ORG.	ACCOUNT NO.
I 10	20	HDQ PRINT DRAFT 1 (REV)		1.1	4/ 1/76			-10.2	0.0		
20	30	HDQ MAIL DRAFT 1 (REV) TO CC		1.0	4/ 7/76			-7.7	1.0		
20	40	HDQ MAIL DRAFT 1 (REV) TO CV		1.0	4/ 7/76			-7.7	1.0		
20	50	HDQ MAIL DRAFT 1 (REV) TO CE		1.0	4/ 7/76			-7.7	1.0		
20	60	HDQ MAIL D1 (REV) TO CONTRIB		1.0	4/ 7/76			-6.7	1.0		
20	70	HDQ MAIL DRAFT 1 (REV) TO GC		1.0	4/ 7/76			-10.2	1.0		
20	80	HDQ MAIL DRAFT 1 (REV) TO GE		1.0	4/ 7/76			-6.7	1.0		
20	90	HDQ MAIL D1 TO CO GE		1.0	4/ 7/76			-6.7	1.0		
30	110	CC OPT COMMENT + MAIL TO HDQ		0.0	4/ 7/76			-7.7	1.0		
40	110	CV OPT COMMENT + MAIL TO HDQ		0.0	4/ 7/76			-7.7	1.0		
50	110	CE OPT COMMENT + MAIL TO HDQ		0.0	4/ 7/76			-7.7	1.0		
60	90	CONTRIB OPT REVIEW D1 (REV)		0.0	4/ 7/76			-6.7	1.0		
70	100	GC REVIEW DRAFT 1 (REV) (A)		1.5	4/16/76			-10.2	2.5		
80	120	GF OPT REVIEW DRAFT 1 (REV)		0.0	4/ 7/76			-6.7	1.0		
90	120	CO GF OPT REVIEW D1 (REV)		0.0	4/ 7/76			-6.7	1.0		
100	110	GC MAIL DRAFT 1 (REV) TO HDQ		1.0	4/22/76			-10.2	3.5		
110	120	HDQ ASSEMBLES D1 (REV) CORR.		1.0	4/28/76			-10.2	4.5		
120	130	CO MAIL DRAFT 1 (REV) TO CC		1.0	5/ 4/76			-7.7	5.5		
120	140	HDQ MAIL DRAFT 1 (REV) TO CV		1.0	5/ 4/76			-7.7	5.5		
120	150	HDQ MAIL DRAFT 1 (REV) TO CE		1.0	5/ 4/76			-7.7	5.5		
120	160	HDQ MAIL DRAFT 1 (REV) TO GC		1.0	5/ 4/76			-7.7	5.5		
120	170	HDQ MAIL DRAFT 1 (REV) TO GF		1.0	5/ 4/76			-10.2	5.5		
120	180	HDQ MAIL D1 (REV) TO CO GF		1.0	5/ 4/76			-10.2	5.5		
130	200	CC OPT INTERACTION WITH GF		0.0	5/ 4/76			-7.7	5.5		
140	200	CV OPT INTERACTION WITH GE		0.0	5/ 4/76			-7.7	5.5		
150	200	CE OPT INTERACTION WITH GF		0.0	5/ 4/76			-7.7	5.5		
160	200	GC OPT INTERACTION WITH GF		0.0	5/ 4/76			-7.7	5.5		
170	180	GF EDIT DRAFT 1 (C)		1.5	5/12/76			-10.2	7.0		
180	195	CO GF EDIT DRAFT 1 (B)		1.5	5/12/76			-10.2	7.0		
195	200	GE MAIL DRAFT 1 TO HDQ		1.0	5/18/76			-10.2	8.0		
200	210	CO GE MAIL DRAFT 1 TO HDQ		1.0	5/20/76			-10.2	8.0		
200	210	HDQ TRANSFER REV TO ORIG (D)		0.4	5/20/76			-10.0	8.4		
200	220	HDQ - FORWARDING LETTER (D)		0.4	5/20/76			-10.0	8.4		
200	230	HDQ PREPARE T. OF C.+ T.P. (D)		0.4	5/21/76			-10.0	8.4		
200	240	PH 12 ORDER MAIL LABELS (D)		0.5	5/21/76			-9.7	8.5		
210	220	GS REVISE DRAFT 2 (D)		0.2	5/21/76			-10.2	8.6		
220	230	LSB SIGNS FOR. LETTER (D)		0.0	5/21/76			-10.2	8.6		
230	240	XEROX D2 W/ K FRANKLIN (D)		0.4	5/24/76		R 4/ 7/76	-10.2	9.0		
240	250	HDQ MAIL DRAFT 2 TO CC		1.0	5/29/76			-10.2	10.0		
250	260	HDQ MAIL DRAFT 2 TO CV		1.0	5/29/76			-10.2	10.0		
260	270	HDQ MAIL DRAFT 2 TO CF		1.0	5/29/76			-10.2	10.0		

PERT/TIME
ACTIVITY REPORT

PERT ANALYSIS OF MONOGRAPH   VOL. SC

TERM- APR - DEC 76

EVENT PRED.	SUCC.	ACTIVITY DESCRIPTION	PROB.	ACTIV. TIME	DATE EXPECTED	DATE ALLOWED	DATE COMP/SCHED	SLACK	REMAINING TIME	ORG.	ACCOUNT N
240	280	HDQ MAIL DRAFT 2 TO CONTRIB (F)		1.0	5/29/76	4/ 7/76		-10.2	10.0		
240	290	HDQ MAIL DRAFT 2 TO GC (G)		1.0	5/29/76	4/ 7/76		-10.2	10.0		
250	300	CC REVIEW DRAFT 2 (E)		1.1	6/ 5/76	4/ 7/76		-10.2	11.1		
260	310	CV REVIEW DRAFT 2 (G)		1.1	6/ 5/76	4/ 7/76		-10.2	11.1		
270	320	CE REVIEW DRAFT 2		1.1	6/ 5/76	4/ 7/76		-10.2	11.1		
280	330	CONTRIB REVIEW DRAFT 3 (E)		1.1	6/ 5/76	4/ 7/76		-10.2	11.1		
290	340	GC REVIEW + APPROVE D2 (H)		1.1	6/11/76	4/13/76		-10.2	12.1		
300	350	CC MAIL DRAFT 2 TO HRQ		1.0	6/11/76	4/13/76		-10.2	12.1		
310	350	CV MAIL DRAFT 2 TO HDC		1.0	6/11/76	4/13/76		-10.2	12.1		
320	350	CE MAIL DRAFT 2 TO HDQ		1.0	6/11/76	4/13/76		-10.2	12.1		
330	350	CONTRIBUTORS MAIL D2 TO HDQ		1.0	6/11/76	4/13/76		-10.2	12.1		
340	355	GC MAIL DRAFT 2 TO HDQ		1.0	6/11/76	4/13/76		-10.2	12.1		
350	360	HDQ PROCESS BALLOTS, DRAFT 2		1.0	6/17/76	4/19/76		-10.2	13.1		
360	370	HDQ MAIL DRAFT 2 REV. TO CE		1.0	6/23/76	4/24/76		-10.2	14.1		
370	380	CE FINAL EDIT DRAFT 2 (I)		2.0	7/ 5/76	5/ 6/76		-10.2	16.1		
380	390	CE MAIL DRAFT 2 TO CC		1.0	7/10/76	5/12/76		-10.2	17.1		
390	395	CC MAIL COPY DRAFT 2 TO HDQ		1.0	7/10/76	5/24/76		-8.2	17.1		
395	400	CC REVIEW + APPROVE D2 (J)		1.0	7/16/76	5/18/76		-10.2	18.1		
400	410	HDQ BEGIN TRANS DEV TO ORIG		0.0	7/10/76	5/24/76		-8.2	17.1		
410	410	CC MAIL DRAFT 2 TO HDQ		1.0	7/22/76	5/24/76		-10.2	19.1		
420	430	HDQ TRANSFER DEV TO ORIG (K)		0.4	7/24/76	5/26/76		-10.2	19.5		
430	440	HDQ - FORWARDING LETTER (K)		0.4	7/24/76	5/27/76		-10.0	19.5		
410	440	HDQ PREPARE T.OF C.+ T.P. (K)		0.3	7/23/76	5/27/76		-9.9	19.4		
420	430	GS APPROVES DRAFT 3 (K)		0.2	7/26/76	5/27/76		-10.2	19.7		
430	440	LSB SIGNS FOR. LETTER (K)		0.0	7/26/76	5/27/76		-10.2	19.7		
440	450	XEROX D3 W/ K FRANKLIN (K)		0.4	7/28/76	5/29/76	R 6/ 7/76	-10.2	20.1		
450	460	HDQ MAIL DRAFT 3 TO GC		1.1	8/ 3/76	6/ 4/76		-10.2	21.2		
460	470	HDQ MAIL DRAFT 3 TO GF		1.1	8/ 3/76	6/19/76		-7.7	21.2		
450	470	HDQ MAIL DRAFT 3 TO CC GE		1.1	8/ 3/76	6/19/76		-7.7	21.2		
460	480	GC REVIEW + APPROVE D3 (L)		1.5	8/12/76	6/14/76		-10.2	22.7		
470	490	GE SCAN DRAFT 3		0.0	8/ 3/76	6/19/76		-7.7	21.2		
480	490	CC GF SCAN DRAFT 3		0.0	8/ 3/76	6/19/76		-7.7	21.2		
490	500	GC MAIL COPY DRAFT 3 TO HDQ		1.0	8/18/76	6/19/76		-10.2	23.7		
510	520	GC MAIL COPY DRAFT 3 TO GE		1.0	8/18/76	6/19/76		-10.2	23.7		
520	530	GC MAIL COPY DRAFT 3 TO COGE		1.0	8/18/76	6/19/76		-10.2	23.7		
530	540	HDQ MAIL COPY D3-CC,CV,CE,GE		1.0	8/24/76	9/11/76		3.1	24.7		
540	550	GE - FINAL EDIT (N)		1.1	8/24/76	6/25/76		-10.2	24.8		
550	560	CC GE - FINAL EDIT (M)		1.1	8/24/76	6/25/76		-10.2	24.8		
560	560	CC,CV,CE,GC OPT COMMENT		0.0	8/24/76	9/11/76		3.1	24.7		
540	550	GF MAIL DRAFT 3 TO GC		1.0	8/30/76	7/ 1/76		-10.2	25.8		
560	560	GF MAIL DRAFT 3 TO HDQ		1.0	8/30/76	9/11/76		2.0	25.8		
550	540	CC GE MAIL DRAFT 3 TO GC		1.0	8/30/76	7/ 1/76		-10.2	25.8		
550	570	CC GE MAIL DRAFT 3 TO HDQ		1.0	8/30/76	9/11/76		2.0	25.8		
560	580	GC - FINAL APPROVAL (P)		1.0	9/ 4/76	7/ 7/76	R 7/ 7/76	-10.2	26.8		
570	580	GC MAIL FINAL DRAFT 3 TO HDQ		1.0	9/11/76	9/11/76		0.0	27.8		
580	590	HDQ PREPARE FOR PUBLISHER(Q)		6.3	10/19/76	10/19/76		0.0	34.1		

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APPENDIX J

PERT/TIME
ACTIVITY REPORT
REPORTING ORGN.
VOL. CL
CONTRACT NO.

TERM- APR - DEC 76
REPORT DATE- 4/ 1/76
RELEASE DATE- 4/ 1/76

PERT ANALYSIS OF MONOGRAPH
1ST SORT KEY   PREDECESSOR EVENT NO.
2ND SORT KEY   SUCCESSOR EVENT NO.
3RD SORT KEY   EXPECTED DATE (TE)
4TH SORT KEY   LATEST ALLOWED DATE

EVENT PRED.	SUCC.	ACTIVITY DESCRIPTION	PROG.	ACTIV. TIME	DATE EXPECTED	DATE ALLOWED	DATE COMP/SCHED	SLACK	REMAINING TIME	ORG.	ACCOUNT NO.
10	20	HDQ PRINT DRAFT 1 (REV)		1.1	4/ 1/76			-13.0	0.0		
20	30	HDQ MAIL DRAFT 1 (REV) TO CC		1.0	4/ 7/76			-10.5	1.0		
20	40	HDQ MAIL DRAFT 1 (REV) TO CV		1.0	4/ 7/76			-10.5	1.0		
20	50	HDQ MAIL DRAFT 1 (REV) TO CE		1.0	4/ 7/76			-10.5	1.0		
20	60	HDQ MAIL D1 (REV) TO CONTRIB		1.0	4/ 7/76			-9.5	1.0		
20	70	HDQ MAIL DRAFT 1 (REV) TO GO		1.0	4/ 7/76			-13.0	1.0		
20	80	HDQ MAIL DRAFT 1 (REV) TO GE		1.0	4/ 7/76			-9.5	1.0		
30	90	HDQ MAIL D1 TO CO GE		1.0	4/ 7/76			-9.5	1.0		
40	110	CC CPT COMMENT + MAIL TO HDQ		0.0	4/ 7/76			-10.5	1.0		
40	110	CV CPT COMMENT + MAIL TO HDQ		0.0	4/ 7/76			-10.5	1.0		
50	110	CE CPT COMMENT + MAIL TO HDQ		0.0	4/ 7/76			-10.5	1.0		
60	90	CONTRIB CPT REVIEW D1 (REV)		0.0	4/ 7/76			-9.5	2.5		
70	100	GO REVIEW DRAFT 1 (REV) (A)		1.5	4/15/76			-13.0	1.0		
80	120	GE CPT REVIEW DRAFT 1 (REV)		0.0	4/ 7/76			-9.5	1.0		
90	100	CO GE CPT REVIEW DRAFT D1 (REV)		0.0	4/ 7/76			-9.5	1.0		
100	110	GO MAIL DRAFT 1 (REV) TO HDQ		1.0	4/22/76			-13.0	3.5		
110	120	HDQ ASSEMBLES D1 (REV) COGR.		1.0	4/28/76			-13.0	4.5		
120	130	HDQ MAIL DRAFT 1 (REV) TO CC		1.0	5/ 4/76			-10.5	5.5		
120	140	HDQ MAIL DRAFT 1 (REV) TO CV		1.0	5/ 4/76			-10.5	5.5		
120	150	HDQ MAIL DRAFT 1 (REV) TO CE		1.0	5/ 4/76			-10.5	5.5		
120	160	HDQ MAIL DRAFT 1 (REV) TO GO		1.0	5/ 4/76			-13.0	5.5		
120	170	HDQ MAIL DRAFT 1 (REV) TO GE		1.0	5/ 4/76			-13.0	5.5		
130	180	HDQ MAIL D1 (REV) TO CO GE		0.0	5/ 4/76			-10.5	5.5		
140	200	CC CPT INTERACTION WITH GF		0.0	5/ 4/76			-10.5	5.5		
150	200	CV CPT INTERACTION WITH GF		0.0	5/ 4/76			-10.5	5.5		
160	200	CE CPT INTERACTION WITH GE		0.0	5/ 4/76			-10.5	5.5		
170	190	GE CPT DRAFT 1		1.5	5/12/76			-13.0	7.0		
185	195	CO GE EDIT DRAFT 1 (A)		1.5	5/12/76			-13.0	7.0		
190	200	GE MAIL DRAFT 1 TO HDQ		1.0	5/18/76			-13.0	8.0		
200	210	HDQ TRANSFER REV. TO ORIG (D)		0.4	5/20/76			-13.0	8.4		
205	220	HDQ - FORWARDING LETTER (D)		0.4	5/20/76			-12.8	8.4		
205	230	HDQ PREPARE T.OF C.+ T.P. (D)		0.4	5/20/76			-12.8	8.4		
210	220	PH 12 ORDER MAIL LABELS (D)		0.5	5/21/76			-12.5	8.5		
220	230	GS REVISE DRAFT 2		0.2	5/21/76			-12.5	8.5		
230	240	LSB SIGNS FOR LETTER (D)		0.2	5/21/76			-13.0	8.6		
240	250	XEROX D2 W/K FRANKLIN (D)		0.2	5/24/76			-13.0	9.0		
250	260	HDQ MAIL DRAFT 2 TO CC		1.0	5/29/75			-13.0	10.0		
260	270	HDQ MAIL DRAFT 2 TO CV		1.0	5/29/76			-13.0	10.0		
260	270	HDQ MAIL DRAFT 2 TO CE		1.0	5/29/76			-13.0	10.0		

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PERT ANALYSIS OF MONOGRAPH   VOL. CL   TERM- APR - DEC 76

EVENT PRED.	SUCC.	ACTIVITY DESCRIPTION	PROB.	ACTIV. TIME	DATE EXPECTED	DATE ALLOWED	DATE COMP/SCHED	SLACK	REMAINING TIME	ORG.	ACCOUNT NO.
240	290	HDQ MAIL DRAFT 2 TO CONTRIB		1.0	5/29/76			-13.0	10.0		
240	290	HDQ MAIL DRAFT 2 TO GC		1.0	5/29/76			-13.0	10.0		
250	300	GC REVIEW DRAFT 2 (F)		1.1	6/ 5/76			-13.0	11.1		
260	310	CV REVIEW DRAFT 2 (G)		1.1	6/ 5/76			-13.0	11.1		
270	320	CF REVIEW DRAFT 2		1.1	6/ 5/76			-13.0	11.1		
280	330	CONTRIB REVIEW DRAFT 2 (F)		1.1	6/ 5/76			-13.0	11.1		
290	340	GC REVIEW + APPROVE D2 (H)		1.1	6/ 5/76			-13.0	11.1		
300	350	GC MAIL DRAFT 2 TO HDQ		1.0	6/11/76			-13.0	12.1		
310	350	CV MAIL DRAFT 2 TO HDQ		1.0	6/11/76			-13.0	12.1		
320	350	CF MAIL DRAFT 2 TO HDQ		1.0	6/11/76			-13.0	12.1		
330	350	CONTRIBUTORS MAIL D2 TO HDQ		1.0	6/11/76			-13.0	12.1		
340	350	GC MAIL DRAFT 2 TO HDQ		1.0	6/11/76			-13.0	12.1		
350	360	HDQ PROCESS BALLOTS, DRAFT 2		1.0	6/17/76	4/ 2/76		-13.0	13.1		
360	370	HDQ MAIL DRAFT 2 REV. TO CF		1.0	6/23/76	4/ 8/76		-13.0	14.1		
370	380	CF FINAL EDIT DRAFT 2 (I)		2.0	7/ 5/76	4/20/76		-13.0	16.1		
380	390	CF MAIL DRAFT 2 TO CC		1.0	7/10/76	4/26/76		-13.0	17.1		
390	395	CF MAIL COPY DRAFT 2 TO HDQ		1.0	7/10/76	5/ 7/76		-11.0	17.1		
395	400	CC REVIEW + APPROVE D2 (J)		0.0	7/16/76	5/ 1/76		-13.0	18.1		
400	410	HDQ BEGIN TRANS REV TO ORIG		1.0	7/10/76	5/ 7/76		-11.0	17.1		
410	420	CC MAIL DRAFT 2 TO HDQ		1.0	7/22/76	5/ 7/76		-13.0	19.1		
410	420	HDQ TRANSFER REV TO ORIG (K)		0.4	7/24/76	5/10/76		-13.0	19.5		
410	430	HDQ - FORWARDING LETTER (K)		0.4	7/24/76	5/11/76		-12.8	19.5		
430	440	HDQ PREPARE T.OF C.+ T.F. (K)		0.5	7/23/76	5/11/76		-12.7	19.4		
430	440	GS APPROVES DRAFT 3 (K)		0.2	7/26/76	5/11/76		-13.0	19.7		
440	450	LSB SIGNS FOR. LETTER (K)		0.5	7/26/76	5/11/76		-13.0	19.7		
450	460	XEROX D3 W/ K FRANKLIN (K)		0.4	7/28/76	5/13/76	R 5/21/76	-13.0	20.1		
450	470	HDQ MAIL DRAFT 3 TO GC		1.1	8/ 3/76	5/19/76		-13.0	21.2		
450	480	HDQ MAIL DRAFT 3 TO GF		1.1	8/ 3/76	6/ 3/76		-10.5	21.2		
460	490	HDQ MAIL DRAFT 3 TO CC GE		1.1	8/ 3/76	6/ 3/76		-10.5	21.2		
470	510	GC REVIEW + APPROVE D3 (L)		1.5	8/12/76	5/28/76		-13.0	22.7		
480	520	GE SCAN DRAFT 3		0.0	8/ 3/76	5/ 3/76		-10.5	21.2		
490	510	CO GE SCAN DRAFT 3		0.0	8/ 3/76	6/ 3/76		-10.5	21.2		
490	520	GC MAIL COPY DRAFT 3 TO HDQ		1.0	8/18/76	9/ 4/76		3.1	23.7		
500	530	GF MAIL COPY DRAFT 3 TO GF		1.0	8/18/76	6/ 3/76		-13.0	23.7		
510	540	GC MAIL COPY DRAFT 3 TO COGE		1.0	8/18/76	6/ 3/76		-13.0	23.7		
520	550	HDQ MAIL COPY D3-CC,CV,CF,GE		1.0	8/24/76	9/11/76		3.1	24.7		
530	560	GF - FINAL EDIT (N)		1.1	8/24/76	6/ 9/76		-13.0	24.8		
540	560	CO GF - FINAL EDIT		1.1	8/24/76	6/ 9/76		-13.0	24.8		
540	560	GC,CV,CF,GC OPT COMMENT (M)		0.0	8/24/76	9/11/76		3.1	24.7		
550	580	GF MAIL DRAFT 3 TO GC		1.0	8/30/76	6/15/76		-13.0	25.9		
560	590	GF MAIL DRAFT 3 TO HDQ		1.0	8/30/76	9/11/76		2.0	25.9		
560	580	CO GF MAIL DRAFT 3 TO GC		1.0	8/30/76	6/15/76		-13.0	25.8		
560	590	CO GF MAIL DRAFT 3 TO HDQ		1.0	8/30/76	9/11/76		2.0	25.8		
570	580	GC - FINAL APPROVAL (P)		1.0	9/ 4/76	6/21/76	R 6/21/76	-13.0	26.9		
570	580	GC MAIL FINAL DRAFT 3 TO HDQ		1.0	9/11/76	9/11/76		0.0	27.8		
580	590	HDQ PREPARE FOR PUBLISHER (Q)		6.3	10/19/76	10/19/76		0.0	34.1		

APPENDIX K

PERT/TIME
ACTIVITY REPORT

PERT ANALYSIS OF MONOGRAPH   VOL. S3
1ST SORT KEY   PREDECESSOR EVENT NO.
2ND SORT KEY   SUCCESSOR EVENT NO.
3RD SORT KEY   EXPECTED DATE (TE)
4TH SORT KEY   LATEST ALLOWED DATE

EVENT PRED.	SUCC.	ACTIVITY DESCRIPTION	PROB.	ACTIV. TIME	DATE EXPECTED	DATE ALLOWED	DATE COMP/SCHED	SLACK	REMAINING TIME	ORG.	ACCOUNT NO.
10	20	HDQ PRINT DRAFT 1 (REV)		1.1	4/ 1/76			-4.8	0.0		
20	30	HDQ MAIL DRAFT 1 (REV) TO CC		1.0	4/ 7/76			-2.3	1.0		
20	40	HDQ MAIL DRAFT 1 (REV) TO CV		1.0	4/ 7/76			-2.3	1.0		
20	50	HDQ MAIL DRAFT 1 (REV) TO CE		1.0	4/ 7/76			-2.3	1.0		
20	60	HDQ MAIL D1 (REV) TO CONTRIB		1.0	4/ 7/76			-1.3	1.0		
20	70	HDQ MAIL DRAFT 1 (RFV) TO GC		1.0	4/ 7/76			-4.8	1.0		
20	80	HDQ MAIL DRAFT 1 (REV) TO GF		1.0	4/ 7/76			-1.3	1.0		
20	90	HDQ MAIL C1 TO CO GF		1.0	4/ 7/76			-1.3	1.0		
30	110	CC CPT COMMENT + MAIL TO HDQ		0.0	4/ 7/76			-1.3	1.0		
40	110	CV OPT COMMENT + MAIL TO HDQ		0.0	4/ 7/76			-2.3	1.0		
50	110	CE OPT COMMENT + MAIL TO HDQ (REV)		0.0	4/ 7/76			-2.3	1.0		
60	90	CONTRIB OPT REVIEW D1 (REV)		0.0	4/ 7/76			-1.3	1.0		
70	100	GC REVIEW DRAFT 1 (REV) (4)		1.5	4/16/76			-4.8	2.5		
80	120	GE OPT REVIEW DRAFT 1 (REV)		0.0	4/ 7/76			-1.3	1.0		
90	120	CO GE OPT REVIEW D1 (REV)		0.0	4/ 7/76			-1.3	1.0		
100	110	GC MAIL DRAFT 1 (REV) TO HDQ		1.0	4/22/76			-4.8	3.5		
110	120	HDQ ASSEMBLES D1 (REV) CORR.		1.0	4/28/76			-4.8	4.5		
120	130	HDQ MAIL DRAFT 1 (REV) TO CC		1.0	5/ 4/76	4/20/76		-2.3	5.5		
120	140	HDQ MAIL DRAFT 1 (REV) TO CV		1.0	5/ 4/76	4/20/76		-2.3	5.5		
120	150	HDQ MAIL DRAFT 1 (RFV) TO CE		1.0	5/ 4/76	4/20/76		-2.3	5.5		
120	160	HDQ MAIL DRAFT 1 (REV) TO GC		1.0	5/ 4/76	4/20/76		-2.3	5.5		
120	170	HDQ MAIL DRAFT 1 (REV) TO GF		1.0	5/ 4/76	4/ 6/76		-4.8	5.5		
120	180	HDQ MAIL D1 (REV) TO CO GF		1.0	5/ 4/76	4/20/76		-2.3	5.5		
130	200	CC CPT INTERACTION WITH GE		0.0	5/ 4/76	4/20/76		-2.3	5.5		
140	200	CV OPT INTERACTION WITH GE		0.0	5/ 4/76	4/20/76		-2.3	5.5		
150	200	CE OPT INTERACTION WITH GF		0.0	5/ 4/76	4/20/76		-2.3	5.5		
160	190	GC OPT INTERACTION WITH GF		0.0	5/12/76	4/14/76		-4.8	7.0		
170	195	GE EDIT DRAFT 1		1.5	5/12/76	4/14/76		-4.8	7.0		
180	200	CO GF EDIT DRAFT 1		1.0	5/16/76	4/20/76		-4.8	8.0		
195	205	GF MAIL DRAFT 1 TO HDQ		0.4	5/18/76	4/22/76		-4.8	8.0		
205	206	HDQ TRANSFER REV TO ORIG (C)		0.4	5/20/76	4/23/76		-4.6	8.4		
206	230	HDQ - FORWARDING LETTER (C)		0.4	5/20/76	4/23/76		-4.6	8.4		
200	210	HDQ PREPARE T. OF C. + T.P. (D)		0.5	5/21/76	4/26/76		-4.3	8.5		
210	220	DH 12 ORDER MAIL LABELS (C)		0.2	5/21/76	4/23/76		-4.8	8.6		
220	230	GS REVISE DRAFT 2		0.4	5/21/76	4/23/76		-4.8	8.6		
230	240	LS3 SIGNS FOR. LETTER (C)		0.4	5/24/76	4/26/76		-4.8	9.0		
240	250	XEROX D2 W/ K FRANKLIN (C)		1.0	5/29/76	5/ 1/76		-4.8	10.0		
240	260	HDQ MAIL DRAFT 2 TO CC		1.0	5/29/76	5/ 1/76		-4.8	10.0		
240	270	HDQ MAIL DRAFT 2 TO CV		1.0	5/29/76	5/ 1/76		-4.8	10.0		

EVENT PREC.	SUCC.	ACTIVITY DESCRIPTION	PROJ.	ACTIV. TIME	DATE EXPECTED	DATE ALLOWED	DATE COMP/SCHED	SLACK	REMAINING TIME	ORG.	ACCOUNT NO.
240	290	HDQ MAIL DRAFT 2 TO CONTRIB		1.0	5/29/76	5/ 1/76		-.8	10.0		
240	290	HDQ MAIL DRAFT 2 TO GC		1.0	5/29/76	5/ 1/75		-.8	10.0		
250	300	CC REVIEW DRAFT 2 (F)		1.1	6/ 5/76	5/ 8/76		-.8	11.1		
260	310	CV REVIEW DRAFT 2 (G)		1.1	6/ 5/76	5/ 8/76		-.8	11.1		
270	320	CF REVIEW DRAFT 2		1.1	6/ 5/76	5/ 8/76		-.8	11.1		
280	330	CONTRIB REVIEW DRAFT 3 (F)		1.1	6/ 5/76	5/ 8/76		-.8	11.1		
290	340	GC REVIEW + APPROVE D2 (H)		1.0	6/ 5/76	5/ 8/76		-.8	11.1		
300	350	CC MAIL DRAFT 2 TO HDQ		1.0	6/11/76	5/14/76		-.8	12.1		
310	350	CV MAIL DRAFT 2 TO HDQ		1.0	6/11/76	5/14/75		-.8	12.1		
320	350	CF MAIL DRAFT 2 TO HDQ		1.0	6/11/76	5/14/76		-.8	12.1		
330	350	CONTRIBUTORS MAIL D2 TO HDQ		1.0	6/11/76	5/14/76		-.8	12.1		
340	350	GC MAIL DRAFT 2 TO HDQ		1.0	6/11/76	5/14/76		-.8	12.1		
350	360	HDQ PROCESS BALLOTS, DRAFT 2		1.1	6/17/76	5/20/76		-.8	13.1		
360	370	HDQ MAIL DRAFT 2 REV. TO CF		1.1	6/23/76	5/26/76		-.8	14.1		
370	380	CF FINAL EDIT DRAFT 2 (I)		2.0	7/ 5/76	6/ 1/76		-.8	16.1		
380	390	CE MAIL DRAFT 2 TO CC		1.0	7/10/76	6/12/76		-.8	17.1		
390	395	CE MAIL COPY DRAFT 2 TO HDQ		1.0	7/10/76	6/24/76		-2.8	17.1		
395	400	CC REVIEW + APPROVE D2 (J)		1.0	7/16/76	6/18/76		-.8	18.1		
400	410	HDQ BEGIN TRANS REV TO ORIG		0.0	7/10/76	6/24/76		-2.8	17.1		
410	420	CC MAIL DRAFT 2 TO HDQ		1.0	7/22/76	6/24/76		-.8	19.1		
410	420	HDQ TRANSFER REV TO ORIG (K)		0.4	7/24/76	6/26/76		-.8	19.5		
410	430	HDQ - FORWARDING LETTER (K)		0.4	7/24/76	6/28/76		-.6	19.5		
420	430	HDQ PREPARE T.OF C.+ T.P.(K)		0.7	7/23/76	6/28/76		-.5	19.4		
430	440	GS APPROVES DRAFT 3 (K)		0.2	7/26/76	6/28/76		-.8	19.7		
440	450	LSB SIGNS FOR. LETTER (K)		0.0	7/26/76	6/28/76		-.8	19.7		
450	460	XEROX D3 W/ K FRANKLIN (K)		0.4	7/28/76	6/30/76		-.8	20.1		
450	470	HDQ MAIL DRAFT 3 TO GC		1.1	8/ 3/76	7/ 6/76		-.8	21.2		
450	480	HDQ MAIL DRAFT 3 TO GF		1.1	8/ 3/76	7/21/76		-2.3	21.2		
460	490	HDQ MAIL DRAFT 3 TO CO GF		1.1	8/ 3/76	7/21/76		-2.3	21.2		
470	510	GC REVIEW + APPROVE D3 (L)		1.5	8/12/76	7/15/76		-.8	22.7		
480	510	GE SCAN DRAFT 3		0.0	8/ 3/76	7/21/76		-2.3	21.2		
490	520	GF MAIL COPY DRAFT 3		0.0	8/ 3/76	7/21/76		-2.3	21.2		
490	510	GF MAIL COPY DRAFT 3 TO HDQ		1.0	8/18/76	9/ 4/76		3.1	23.7		
500	520	GC MAIL COPY DRAFT 3 TO GF		1.0	8/18/76	7/21/76		-.8	23.7		
500	530	GC MAIL COPY DRAFT R TO CODE		1.0	8/18/76	7/21/76		-.8	23.7		
510	540	HDQ MAIL COPY D3-CC,CV,CE,GF		1.0	8/24/76	9/11/76		3.1	24.7		
520	550	GF - FINAL EDIT (N)		1.1	8/24/76	7/27/76		-.8	24.8		
520	550	CO GF - FINAL EDIT (M)		1.1	8/24/76	7/27/76		-.8	24.8		
530	560	CC,CV,CF,GC OPT COMMENT		0.0	8/24/76	9/11/76		3.1	24.7		
540	560	GE MAIL DRAFT 3 TO GC		1.0	8/30/76	8/ 2/76		-.8	25.8		
540	560	GE MAIL DRAFT 3 TO HDQ		1.0	8/30/76	9/11/76		2.0	25.8		
550	560	CO GE MAIL DRAFT 3 TO GC		1.0	8/30/76	8/ 2/76		-.8	25.8		
550	560	CO GE MAIL DRAFT R TO HDQ		1.0	8/30/76	9/11/76		2.0	25.8		
560	570	GC - FINAL APPROVAL (P)		1.0	9/ 4/76	8/ 7/76		-.8	26.8		
570	580	GC MAIL FINAL DRAFT 3 TO HDQ		1.0	9/11/76	9/11/76		0.0	27.3		
580	590	HDQ PREPARE FOR PUBLISHER(Q)		6.3	10/19/76	10/19/76		0.0	34.1		

VITA

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He graduated from Louis E. Dieruff High School in 1970, and then attended Lehigh University. He received the degree of Bachelor of Science in Industrial Engineering in June 1974.

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