IBM

Application Program

1130 Project Control System (1130-CP-05X)

User's Manual

The 1130 Project Control System serves as the data
processing element of a system that helps management carry
out its functions of planning and supervising projects, within
a broader environment of operations and procedures.
Although designed primarily for those areas of government
and industry concerned with construction, repair, or mainte-
nance, the system will meet the critical path requirements
of a broad range of users, irrespective of industry. It will
process data from networks planned in either precedence-
diagramming or arrow-diagramming methods. The system
consists of a set of routines stored on disk. The sequence of
processing and system outputs is controlled by the system
control card, the type of input data to be processed, and the
output report requests submitted at run time. Output reports
include status listings, bar charts, and basic resource and
cost summarization reports. Updating capability is provided
for network restructuring as well as progress reporting for
in-process work items.

Kristofer Sweger

PREFACE

This manual is intended for the individual who wants to use the 1130 Project Control System to plan, schedule, and control project-type work. It contains discussions of:

- ° Systems features

- ° Input preparation

- ° Output reports

- ° Program messages

The manual assumes the user is familiar with the critical path technique and precedence networks.

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Chapter 2: Preparation of Input

Chapter 3: 1130 PCS Output

INTRODUCTION

The 1130 Project Control System (hereafter referred to as "1130 PCS" or simply "the system") is designed to compute schedule dates and produce reports for a project for which a critical path network has been established.

A critical path network is essentially a pictorial representation of a project that shows:

- Each item of work that is to be performed during the course of the project

- The point in time during the project at which each item is to be performed

- The dependencies that exist between the various items of work

The capabilities provided by 1130 PCS are listed below.

- The time required to perform a "work item" can be expressed in seven different "time units".

- Seven different days can be designated as the "starting day" of the "work week" associated with each work item.

- The work week of each work item can consist of from one to seven days.

- Any one of three distinct "calendars" can be used for each work item.

- Two "actual dates" can be specified for each work item.

- Three types of "scheduled" dates can be specified for each work item.

- Two "early" and two "late" dates can be computed for each work item.

- Two types of "duration" can be specified for each work item.

- Two types of "percent complete" can be specified for each work item.

- Two kinds of "float" can be computed for each work item.

- Three different kinds of "codes" can be specified that the system is to associate with each work item.

o   Three kinds of "cost" can be specified for each work item.

o   An "IJ/PERT/CPM", or "precedence" network can be accepted
    for processing.

o   An "IJ/PERT/CPM" network can be converted in a "precedence"
    network.

o   Three different "relationships" can be specified between
    any two work items.

o   "Loops" are detected and identified.

o   A "time delay" can be specified that becomes an intrinsic
    part of the relationship between two work items.

o   All network calculations are based primarily on three "cal-
    culation dates".

o   The specification of 240 "milestones" is possible.

o   Thirteen different types of "output reports" can be produced
    on request.

o   Four different kinds of "system runs" can be specified.

Note: All preceding terms enclosed in quotation marks are discussed
at length in "Chapter 1: Background Information".

CHAPTER 1:   BACKGROUND INFORMATION

The terms used to explain 1130 PCS, and the concepts on which its design is based are discussed in detail in this chapter. This discussion deals with four major topics: work items, the critical path network, output reports, and system runs.

WORK ITEMS

A work item is any distinct unit of work that must be performed during the course of a project for which a critical path network has been formed. This network may be diagrammed as shown in Figure 1.

1.   In a precedence network, work items are represented by nodes or boxes.

2.   In an IJ/PERT/CPM network, work items are represented by the lines that connect the nodes or circles on the diagram.

Another commonly used term for work item is "activity".

The total number of work items that may be included in a network that is to be processed by 1130 PCS is 2000.

Work items have nine major properties: description, time frame, work dates, duration, precent complete, float, codes, cost, and milestones. Each of these properties is discussed in detail in the paragraphs that follow.

Description

The description of a work item is from 1 to 44 alphameric characters that describe the item in such a way that it cannot be confused with any other work item in the network.

One description may be specified for each work item in the network (see "Work Item Card Form" in Chapter 2).

If the description of a work item is specified, 1130 PCS reproduces that description in certain program messages and on output reports that involve the affected work item. (See "Program Messages" and "Output Reports".)

If a description is not specified for a work item, 1130 PCS makes no assumptions.

Time Frame

The time frame of a work item is the frame of reference -- in relation to various aspects of time -- within which the user specifies that 1130 PCS is to work with the item.

The aspects of work item's time frame that must be specified are the time units, starting day, and work week.

Each of these aspects is described in the material that follows.

Time Unit

The time unit of a work item is the unit of measurement in which the amount of time required to perform the item is expressed.

1130 PCS makes provision for seven different time units:

Time Unit	Explanation
Days	A normal work day, that is, eight hours of work
Hours	One hour of work
Half-days	Half a normal work day, that is, four hours of work
One-shift days	A work day made up of one normal work shift, that is, eight hours of work
Two-shift days	A work day made up of two shifts, that is, 16 hours of work
Three-shift days	A work day made up of three shifts, that is, 24 hours of work
Weeks	A normal work week (see "Work Week") made up of from one to seven days, that is, from eight to 56 hours of work

1130 PCS converts all time units to tenths of days and performs all program calculations in tenths of days.

The user may specify different time units for every work item in the network (see "Work Item Card Form", Chapter 2).

If no time unit is specified, 1130 PCS assumes the applicable unit is days.

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Starting Day

The starting day of a work item is the day of the week on which the work week associated with the item is to begin (see "Work Week" below).

1130 PCS makes provision for seven starting days:

Starting Day	Explanation
1	Monday
2	Tuesday
3	Wednesday
4	Thursday
5	Friday
6	Saturday
7	Sunday

The user may specify different starting days for every work item in the network (see "Work Item Card Form", Chapter 2).

If no starting day is specified, 1130 PCS assumes the work week begins on Monday.

Work Week

The work week of a work item is the number of days that are to be worked from one starting day to the next.

Note: The starting day is considered the first day of the work week.

1130 PCS permits the specification of seven work weeks:

Work Week	Explanation
1	One day in the work week
2	Two days in the work week
3	Three days in the work week
4	Four days in the work week
5	Five days in the work week
6	Six days in the work week
7	Seven days in the work week

The user may specify different work weeks for every work item in the network (see "Work Item Card Form", Chapter 2).

If no work week is specified, 1130 PCS assumes a work week consisting of five days.

Work Dates

The work dates of a work item are the dates on which work on the item is to start and is to be completed.

There are three different categories of dates that are or can be associated with every work item: the early and late dates, actual dates, and scheduled dates.

Early and Late Dates

The early and late dates of a work item consist of the early start, early completion, late start, and late completion dates.

The early start and early completion dates for a work item are, respectively, the earliest date on which the item can be started and the earliest date by which the item can be completed.

The late start and late completion dates for a work item are, respectively, the latest date on which the work item can be started and the latest date by which it can be completed if the project is to hold to its overall schedule.

Early start, early completion, late start, and late completion dates are calculated by 1130 PCS based on the logic of the network, actual dates, scheduled dates, durations, and time delays. (Time delays are discussed in this chapter under "Critical Path Network".)

In computing early start, early completion, late start, and late completion dates, 1130 PCS takes into account the user-specified starting day, work week, and calendar for the relevant work item. (Calendars are discussed under "Critical Path Network".)

1130 PCS expresses all early and late start and completion times as a decimal number carried out to tenths of a day. For example, if 1130 PCS calculates the earliest time a work item can start as the 21st day of the project, it expresses the early start date as 21.0.

While calculating early and late start, and early and late completion, 1130 PCS subtracts one-tenth of a day from early and late completion and adds one-tenth of a day to early and late start. It does this to ensure that these dates reflect the true schedule situation. For example, if early completion is to take place on Friday of a five-day work week with a starting day of Monday, the system will show early completion on the following Monday if the subject adjustment is not made.

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1130 PCS, in calculating early and late start and completion dates, also uses certain calculation dates that the user must supply. These dates and how to supply them are discussed in the section of this chapter entitled "Critical Path Network", under the heading "Calculation Dates".

1130 PCS calculates early and late start and completion dates during the network generation run, and recalculates them during update and maintenance runs whenever changes in actual dates, scheduled dates, durations, and time delays warrant this recalculation. (The network generation, update, and maintenance runs are discussed in this chapter under "System Runs".)

The user may obtain the calculated early and late start and completion dates through output reports (see "Output Reports", Chapter 3).

Actual Dates

The actual dates of a work item consist of the actual start and actual completion dates.

The actual start and actual completion dates for a work item are, respectively, the actual date on which work on the item was started and the actual date on which work on the item was completed.

The user may specify only one actual start date and/or one actual completion date for a work item during an update or a maintenance run (see "Progress Reporting Card Form", Chapter 2).

If an actual date is specified for the start of a work item, the actual date overrides the scheduled start date -- if any -- specified for the item, and becomes the early and the late start dates 1130 PCS would otherwise have calculated for the item.

If an actual date is specified for the completion of a work item, the actual date overrides the scheduled completion date -- if any -- specified for the item, and becomes the early and the late completion dates 1130 PCS would otherwise have calculated for the item.

If no actual start or completion dates are specified, 1130 PCS relies on the relevant scheduled dates specified for the work item, or on the early and late start and completion dates it calculates for the work item.

Scheduled Dates

The scheduled dates of a work item may be one of three different types:

Type	Explanation
I	These dates have no effect on 1130 PCS. They are maintained on the 1130 PCS master file (see "Master File" in this chapter) for use in any routines the user may add to the system.
II	This represents the earliest date desired for 1130 PCS to schedule the start or completion of the work item.
III	This represents the specific date desired for 1130 PCS to schedule the start or completion of the item, regardless of the early or late start or completion dates the system computes.

The user may specify different types of scheduled dates for every work item in he network (see "Schedule Card Form", Chapter 2).

The user may specify one scheduled start and/or one scheduled completion date for a work item for either the network generation or a maintenance run.

If the user does not specify any scheduled dates, and has not specified actual dates for a work item, 1130 PCS uses the early and late start and completion dates it then calculates for the work item.

If the user specifies Type I scheduled start and/or completion dates, and has not specified actual start and/or completion dates, 1130 PCS uses the early and/or late start and completion dates it then calculates for the item.

If the user specifies Type II scheduled start and/or completion dates, and has not specified actual dates, the scheduled dates become the early and/or late start and completion dates calculated by 1130 PCS, unless the calculated dates are later dates. If the calculated dates are later, they are used.

If the user specifies Type III scheduled start and/or completion dates, they become the early and/or late start and completion dates 1130 PCS would otherwise have calculated.

Duration

The duration of a work item is the number of work days needed to complete work on the item.

1130 PCS allows the user to specify two kinds of duration:

Duration	Explanation
Estimated	The amount of time estimated to perform a work item
Remaining	The amount of time specified -- in a maintenance run -- that will elapse before completion of an item that is being performed at the time of the run

Both estimated and remaining duration are specified as decimal numbers carried out to tenths.

Estimated duration for a work item is specified using the work item card (see "Work Item Card Form", Chapter 2).

Remaining duration for a work item is specified using the progress reporting card (see "Progress Reporting Card Form", Chapter 2).

If estimated duration is not specified, 1130 PCS assumes a duration of zero days for the item.

If remaining duration is not specified, 1130 PCS calculates it for the item.

If an actual completion date for an item is specified, 1130 PCS automatically calculates a remaining duration of zero for the item.

Percent Complete

The percent complete of a work item is the percentage of the work that has been performed on an item that is being processed at the time of the run. 1130 PCS makes provision for two different types of percent complete:

Percent Complete	Explanation
This period	A five-digit number that represents the percentage of the total work that has been performed on an item up to the end of the current reporting period
To date	A five-digit number that represents the percentage of the total work that has been performed on the item since the last reporting period

Percent complete is specified on the progress reporting card (see "Progress Reporting Card Form", Chapter 2).

The user may specify originally, or change, the percent complete for a work item by including the above card in an update or maintenance run (see "System Runs" in this chapter).

Once the user has specified percent complete, 1130 PCS maintains it unitl it is respecified.

If percent complete for a work item is never specified, 1130 PCS calculates both types.

If an actual completion date for an item has been specified, 1130 PCS automatically sets percent complete this period and percent complete to date at 100%.

Float

The float of a work item is the number of days between the early and late start, or between the early and late completion of the item.

Float permits the user to see how much leeway he has between these dates.

There are two kinds of float: start and completion.

Each kind of float is calculated by 1130 PCS and expressed as a decimal number carried out to tenths of a day.

Start Float

The start float of a work item is the amount of time between late start and early start; that is, start float equals late start minus early start.

If an actual start date or a Type III scheduled start date is specified, 1130 PCS equates the start float of the subject item to zero.

Completion Float

The completion float of a work item is the amount of time between early completion and late completion; that is, completion float equals late completion minus early completion.

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If an actual completion date or a Type III scheduled completion date is specified, 1130 PCS calculates the completion float of the relevant item to be zero.

The user may obtain the various kinds of float for an item through output reports (see "Output Reports" in Chapter 3).

Codes

Codes are provided primarily so that the user can identify individual work items, and can indicate what work items he wants included in the various output reports the system can provide (see "Output Reports").

1130 PCS makes provision for three different types of codes that can be associated with work items: work item identification codes, organization codes, and resource codes.

Work Item Identification Codes

A work item identification code is any group of from one to ten alphameric characters that can be specified for 1130 PCS to associate with a particular work item.

For IJ/PERT/CPM networks, this code represents the IJ event codes.

An event code is any group of four alphameric characters that the user specifies 1130 PCS is to associate with a particular event.

The two event codes that must be specified are the predecessor event code and the successor event code.

The predecessor event code is the event code for the beginning node of an activity.

The successor event code is the event code for the ending node of an activity.

The user must specify (see "Work Item Card Form", Chapter 2) a work item identification for every work item in the network. Otherwise, 1130 PCS cannot process the network.

If the value of a work item identification code is greater than the value of the identification codes of all the work items preceding it in the network, the speed with which 1130 PCS processes the network is increased.

Once the user has specified a work item identification code for a particular work item, he may replace it with a revised work item identification code.

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The <u>revised work item identification code</u> of a work item is the work item code with which 1130 PCS is requested to replace the currently specified identification code for that item.

The user may specify (see "Work Item Card Form," Chapter 2) a revised work item identification code for a work item during a network generation or update run (see "System Runs" in this chapter).

Organization Codes

An organization code is any group of four alphameric characters (for example, A12B) that the user specifies for 1130 PCS to associate with a particular work item.

1130 PCS allows four such codes to be specified for each work item in the network.

For example, if an output report is desired that deals only with the work items that are (1) the responsibility of department X, and (2) have to do with the production of finished product Y, the procedure is as follows:

    °   Create an organization code (for example, X1Y1) that identifies all work items which are the responsibility of department X and have to do with the manufacture of finished product Y.

    °   Enter this organization code in the same organization code level (that is, organization code level 1, or code level 2, etc.) on the schedule card completed for each of the affected items.

The user can then specify on an output request card (see "Output Request Card", Chapter 3) that he wants an output report that includes only those work items that have (1) the organization code X1Y1 assigned to them, and (2) the organization code X1Y1 entered in the same organization code level of the schedule card dealing with each one of the relevant items.

The user may specify (1) different organization codes, (2) the same organization codes, or (3) a mixture of the same and different codes, for every work item in the network.

If no organization codes are specified, 1130 PCS makes no assumptions concerning them.

Resource Codes

A resource code is a four-digit number (for example, 1356) that identifies a resource. (See "Resources" under the discussion of "Critical Path Network" in this chapter.)

The user may specify up to four different resource codes for each work item in the network. (See "Resource Description Card Form", Chapter 2.)

The user may specify different resource codes for every work item in the network, as long as he does not exceed 100 different resources for the whole network.

If no resource codes are specified for an item, 1130 PCS makes no assumptions concerning them.

An additional feature of resource codes is the resource elements that can be associated with the resource code assigned to a specific work item.

Resource Element. A resource element is the number of whole units of the resource required to perform the relevant work item.

The user may specify one resource element for each resource code specified for a work item (see "Resource Card Form," Chapter 2).

A resource element may be specified as the number of units of the resource required to perform the relevant work item (1) for the period of one time unit, or (2) for the duration of the item.

If a resource element is not specified for a particular resource code, 1130 PCS makes no assumptions.

Note: Every resource element has a resource code flag (implied if this field is left blank).

A resource code flag is a flag that indicates to 1130 PCS whether the resource element is (1) The number of units of the resource required to perform the work item for the period of one day, or (2) The number of units of the resource required to perform the total work item.

The user indicates a resource code flag for every resource element (see "Resource Card Form", Chapter 2).

Cost

Costs may be assigned to each work item in the network, as specified by the user.

1130 PCS permits the specification of three different categories of costs: total estimated cost, actual cost this period, and actual cost to date.

Total Estimated Cost

Total estimated cost is a seven-digit number that represents the estimated number of whole dollars it will cost to perform the work item.

The user may specify the total estimated cost for a work item using the resource card (see "Resource Card Form", Chapter 2) and include this card in the network generation run (see "System Runs" in this chapter).

The user may change the total estimated cost of an item by respecifying this cost in an update run.

If the total estimated cost is not specified in the network generation run, it may be specified in any later update run.

Once this cost has been specified, 1130 PCS maintains it until it is specified.

Actual Cost This Period

Actual cost this period is a seven-digit number that represents the number of whole dollars spent in performing a work item during the current reporting period.

The user may specify actual cost this period for a work item using the progress reporting card (see "Progress Reporting Card Form", Chapter 2).

The user may change the actual cost this period for an item by respecifying this cost in an update or a maintenance run.

If the user does not specify actual cost this period in the network generation run, he may specify it in an update or a maintenance run.

Once this cost has been specified, 1130 PCS maintains it until it is specified.

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Actual Cost to Date

Actual cost to date is a seven-digit number that represents the number of whole dollars spent in performing a work item since work on the item was started.

All remarks concerning the specification of this cost are the same as those set forth under "Actual Cost This Period".

Milestones

The milestone of a work item is the start or the completion of the item, whichever is of major interest or importance to the project. Up to 240 milestones may be specified (see "Milestone Card Forms", Chapter 2).

Once the user has specified milestones for a network, he may obtain a report that shows the dates 1130 PCS calculates for each (see "output Reports", Chapter 3).

Milestone Description

A milestone description is from 1 to 44 alphameric characters that describe a milestone in such a way that it cannot be confused with any other milestone specified in the network.

Resource Descriptions

Every resource may have a resource description associated with it.

A resource description is from 1 to 15 alphameric characters that describe the resource in such a way that it cannot be mistaken for any other resource used in the network.

The user may specify a description for every resource in the network (see "Resource Description Card Form", Chapter 3).

1130 PCS reproduces this description in output reports concerning the resource.

CRITICAL PATH NETWORK

The critical path network 1130 PCS is to process may be either a precedence network or an IJ/PERT/CPM network.

Conversion

1130 PCS is designed to process precedence networks. However, if the network is an IJ/PERT/CPM network, the system automatically converts it to a precedence network every time the system is run (see "System Runs" in this chapter).

1130 PCS performs this conversion by:

° Treating every activity -- including dummy activities -- in the network as a work item (see "Work Items")

° Establishing a completion-to-start relationship (see "relationships" below) between all activities terminating in a node and all activities emanating from the same node

Figure 1 shows an IJ/PERT/CPM network and the equivalent precedence network generated by 1130 PCS.

Properties

A critical path network can be said to have nine major properties: an identification code, relationships, loops, time delays, base work items, calculation dates, calendars, resources, and resource groups.

Network Identification Code

The network identification code is a unique group of four numeric digits that the user specifies 1130 PCS is to associate with his network.

The user must specify an identification code (see "Network Title Card Form", Chapter 2) for the network. If otherwise, 1130 PCS cannot process the network.

Network Title. The network may also have a title.

The network title is from 1 to 44 alphameric characters that describe the network in such a way that it cannot be confused with any other network.

The user may specify the title of his network in the network title card.

Relationships

The relationships that exist in a network are the dependencies that exist between the various work items contained in the network.

The IJ Network

The Equivalent Precedence Network
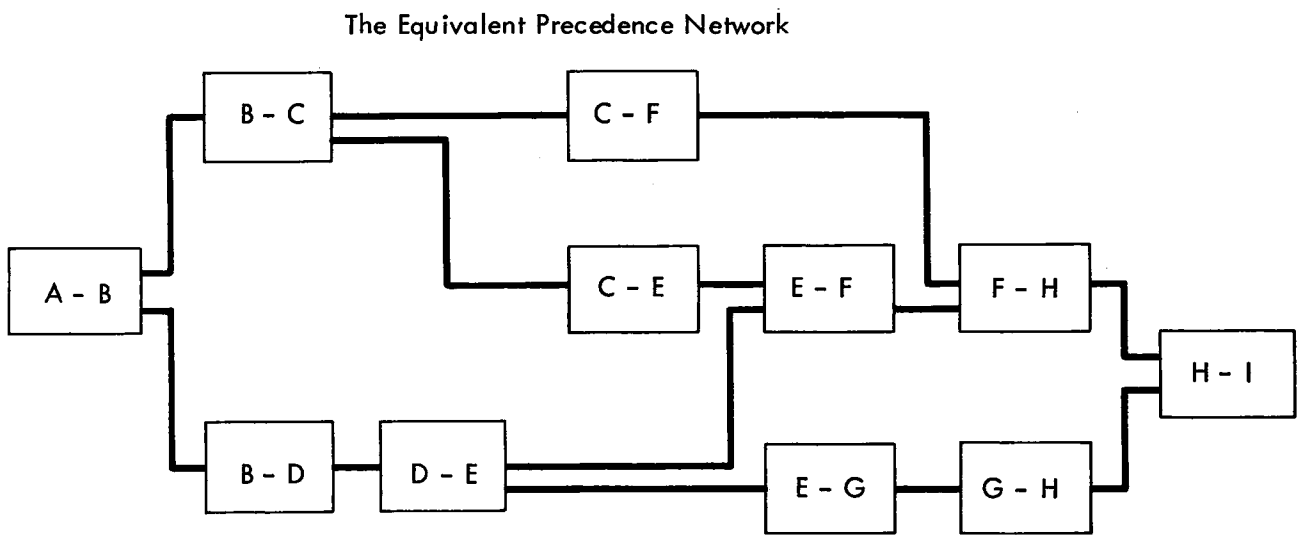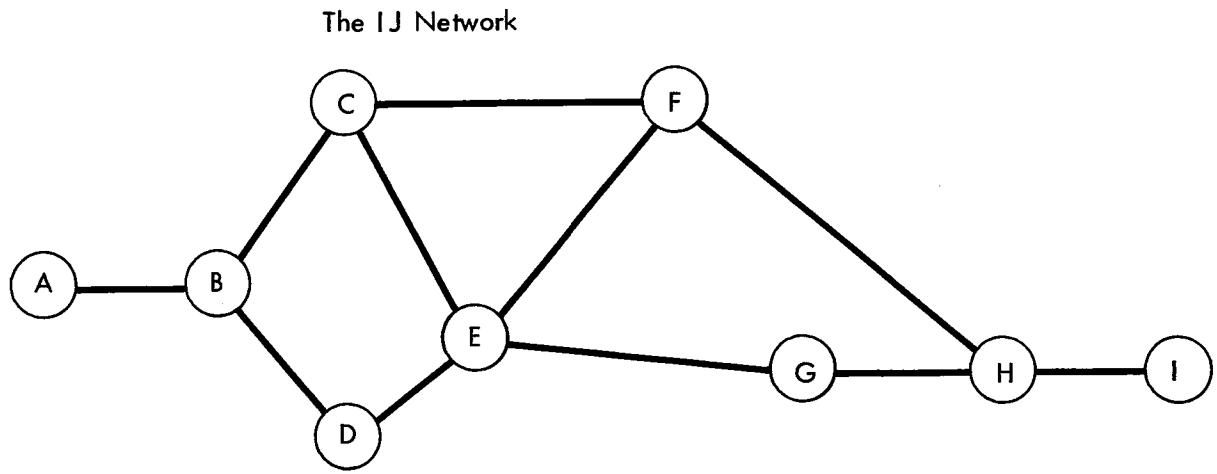
FIGURE 1. AN IJ/PERT/CPM NETWORK AND ITS EQUIVALENT PRECEDENCE NETWORK

Three different relationships are accomodated by 1130 PCS:

<u>Relationship</u>   <u>Explanation</u>

Start to start   The start of a work item depends upon
                               the start of a previous work item (that
                               is, an item that appears before the
                               subject item in the network).

Completion to completion   The completion of a work item depends
                               on the completion of a previous work
                               item.

Completion to start   The start of a work item depends on the
                               completion of a previous work item.

The user may specify (see "Preceding Work Item Card Form",
Chapter 2) different relationships for each work item in the
network.

The user may specify relationships between one work item and
any number of other work items in the network.

The user may specify more than one relationship for the same
pair of work items, as long as no two relationships are of the
same type.

If more than one relationship is specified for the same work
item, 1130 PCS uses the relationship that produces the longest
time delay (see "Time Delays" below).

Relationships that create loops should not be specified
(see "Loops" below).

1130 PCS permits a total of 4500 relationships to be specified
within a network.

   <u>Note</u>: In a precedence network, every work item must be
   involved in at least one specified relationship.

   <u>Diagramming Relationships</u>. 1130 PCS precedence network
relationships are diagrammed as follows:

Start to Start

Completion to Completion

Completion to Start

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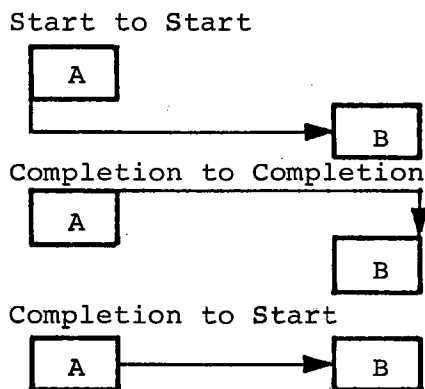
Loops

Loops are an undesirable property that may exist in a network. A loop exists when, either directly or indirectly, a work item is used as its own preceding work item. The following is an example of a loop:

```
  ┌──────►┌─────┐    ┌─────┐
  │       │  A  │───►│  B  │─┐
  │       └─────┘    └─────┘ │
  └─────────────────────────┘
```
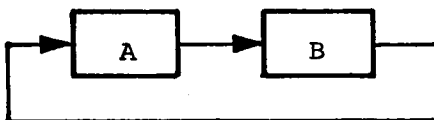
Note that work item A is the predecessor of work item B, and work item B is the predecessor of work item A. Therefore, work item A is an indirect predecessor of itself.

1130 PCS detects the presence of all loops and generates program messages (see "Program Messages", Chapter 3) that identify all work items involved in loops.

The user must correct the logic or structure of the network by respecifying any relationships that create loops. When a loop exists, it must be removed before computation can be made. The network must be restructured through either a generation or an update computer run.

Time Delays

The time delays, sometimes referred to as lags, that exist in a network are inherent in every relationship and consist of the amount of time between:

°   The start of one work item and the start of a previous work item in a start-to-start relationship

°   The completion of one work item and the completion of a previous work item in a completion-to-completion relationship

°   The start of one work item and the completion of a previous work item in a completion-to-start relationship

The user can specify (see "Preceding Work Item Card Form", Chapter 2) a time delay either in the time units of the base work item, or as a percentage of the estimated duration of the base work item (see "Duration" earlier in this chapter and "Base Work Item" below).

If a time delay is specified in time units, the specified delay may be associated with any of the three types of relationships.

If a time delay is specified as a percentage of the estimated duration of the base work item, the specified delay may only be associated with start-to-start and completion-to-completion relationships.

The user may specify only one time delay for each relationship.

If a time delay is not specified for a relationship, 1130 PCS assumes a time delay equal to zero for that relationship.

Base Work Items

A base work item is any work item used as the base from which the time delay between two items -- one of which must be the base item -- is figured.

The base work item in a relationship varies with the type of relationship, as follows:

Relationship	Base Work Item
Start to start	The previous or preceeding work item in the relationship
Completion to completion	The succeeding -- as opposed to previous or preceding -- work item in the relationship
Completion to start	None

These relationships are diagrammed as follows:

Start to Start

Completion to Completion

```
        ┌──────────┐
        │ A     │  │─────────────────┐
        └──────────┘                 │
                                      ▼
                          ┌──────────────────┐
                          │        B         │
                          │    BASE WORK     │
                          │      ITEM        │
                          └──────────────────┘
```
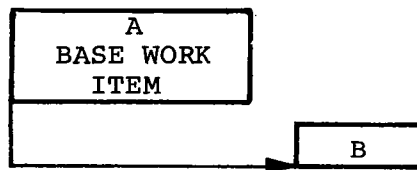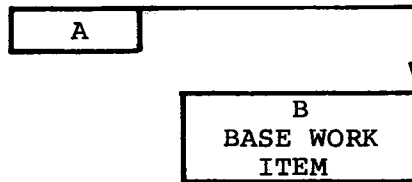
Calculation Dates

In order to calculate early start and completion, and late start and completion for each work item in a network, 1130 PCS requires, among others, three dates -- called calculation dates -- on which to base its computations.

The three calculation dates have to do with the project as a whole. They are the project base date, the calculation base date, and the data date.

Project Base Date. The project base date is the day specified by the user that the project is to start or has started.

This date is specified on the network title card (see "Network Title Card Form", Chapter 2).

This date must not be earlier than March 1, 1965.

1130 PCS converts the project base date into a decimal number that represents the number of days that have elapsed between March 1, 1964 and the specified project base date.

The user must specify the project base date.

Calculation Base Date. The calculation base date is the date considered by 1130 PCS to be the first day of the project.

1130 PCS calculates this date by subtracting 364 (days) from the project base date.

The calculation base date is used by 1130 PCS in calculating early and late start and completion dates for the work item in a network.

Using this date in these calculations ensures that start and completion times are positive even if late start or completion for some items is computed to be earlier than the project base date.

Data Date. The data date is the date for which all progress reporting data and network structuring information is effective.

The data date is often earlier than the run date because of inherent delays between the data gathering and the actual computer run.

The data date must be equal to or later than the project base date and must be specified on the network title card.

Scheduled start or scheduled completion dates that are earlier than this date are ignored.

No work item's early or late start or completion dates are calculated by the system to be earlier than the data date, unless an actual start and/or actual completion date for the work item (see "Actual Dates" in this chapter) is specified.

Calendars

1130 PCS allows any work items to use one of three work day calendars:

Calendar	Explanation
Standard	A normal year consisting of 365 days (leap year consists of 366 days)
Holiday	The standard calendar less any specified holidays
Special	The standard calendar less any specified holidays and any specified special nonwork days

The holiday and special calendars may be used in addition to the work week specifications (see "Work Item Card Form", Chapter 2) for a work item. While the work week specification provides for the exclusion of specific days of the week for a work item, regardless of when it is scheduled to be worked, the holiday and special calendars permit a higher level of exclusion based on specific dates.

1130 PCS always assumes the standard calendar, and no user specifications are necessary for its creation. The holiday and special calendars are based on two types of specified dates supplied by the user:

1. Holidays. The user may specify a set of holidays encompassing the anticipated duration of the project. There is only one set of holidays covering the entire duration of the project. Each work item may optionally use the holiday calendar, in which case no work will ever be scheduled for that work item on any of the holidays specified.

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2. Special Nonwork days. The user may specify a set of special nonwork days encompassing the anticipated duration of the project. There is only one set of special nonwork days for the entire duration of the project. Each work item may optionally use the special calendar, in which case no work will ever be scheduled for that work item on any special nonwork day or on any holiday.

The specific means of specifying either holidays or special nonwork days is described in "Chapter 2: Preparation of Input." The addition or deletion of these specified dates may be accomplished during any type of computer run.

The total number of holidays and special nonwork days that may be specified must not exceed 480.

Resources

Resources are considered to be any user-specified parameter which, together with time and money (money may however also be considered as a resource under 1130 PCS), constitute the basic controllable elements of a project.

Any network can include up to 100 resources.

Resource Groups

A resource group is a collection of from 1 to 20 different resources.

A resource group code is a two-digit number (for example, 12) that identifies a group of resources.

The user may specify (see "Resource Grouping Card Form", Chapter 2) up to 19 different resource group codes, each resource group containing any mix (up to 20) of resources.

OUTPUT REPORTS

The output reports provided by 1130 PCS constitute a basic set of informational listing which relate to the latest status of the project as stored on the disk.

1130 PCS has 13 standard types

Report	Explanation	Audience
Bar chart	A bar chart that shows graphically the calculated duration of all the work items specified	First-line managers
Summary bar	A bar chart that shows graphically the total calculated duration of several work items grouped according to the organization codes specified	Higher management
Milestone	A listing of all milestones in the network, together with their early or late, calculated or actual, and schedule dates	Higher management
Schedule	A listing of all the work items specified, together with the early and late start and completion dates, and start and completion floats of each	Project analysts
Work status and progress	A listing of every work item in the network, together with their scheduled start and completion dates, their remaining durations, and their preceding work items	Project supervisors
Work status cards	A deck of punched cards, each containing the identification code, and early start and late completion dates of a work item specified. These cards can be used as input to another program that might, for example, generate printed work orders	Project analysts
Resource assignment	A listing by resource code of the daily resource utilization and daily resource utilization totals for all the work items using that resource within the time span specified	First-line managers
Resource utilization	A graphical representation by resource of the weekly (specific and cumulative) resource utilization for all selected work items using that resource	First-line and higher management

Lump sum cost	A listing of all the work items specified, together with the estimated total and the actual cost to date of each	First-line managers and financial personnel
Monthly cost	A listing of all the work items specified, together with the total estimated cost and the actual cost to date for each by calendar month	First-line managers and financial personnel
Precedence	A listing of the predecessor work items for all the work items specified, together with the early and late completion dates of each predecessor work item	First-line managers and project analysts
Calendar	A listing of the standard calendar, between specified dates, equating project days to standard calendar dates. Holidays and special non-work days are indicated	Project analysts
Master file list and cards	A listing and punched card deck of all data stored on the master file (see "Master File" below)	Project analysts

Note: Relevant work items are listed by identification code and description.

One or more of the possible output reports may be requested in any type of run by means of the output request card (see "Output Request Card", Chapter 3).

All types of reports, with several different data formatting options for each report type, may be requested during the same run.

SYSTEM RUNS

A system run (generally referred to simply as a "run") con-sists of feeding the applicable input cards (see "Chapter 2: Preparation of Input") to the system and having the system process them.

1130 PCS makes provision for four different types of runs, listed below.

Run	Explanation
Network Generation	A run that initializes the 1130 PCS disk with: 1. The identifying parameters of the network 2. The initial structure of the network based on the work items and their relationships
Update	A run that changes the data association with individual work items and/or the structure of the network by the addition or deletion of individual work items or relationships between work items
Maintenance	A run that recomputes the dates or individual work items based on current data. This type of run cannot be used if a network's structure is to be altered.
Output request	A run limited to producing any of the available output reports based on calculations previously done through a network generation, updates, or maintenance run

Only one type of run may be specified at any given time. Note, however, that output reports can be obtained under any type of run. The type of run desired is specified by means of the processing control card (see "Processing Control Card Form", Chapter 2).

The subject of system runs is covered in more detail in Chapter 2 of this publication.

MASTER FILE

The master file comprises those disk files built and maintained by 1130 PCS. They always contain the most current information about the network.

CHAPTER 2: PREPARATION OF INPUT

This chapter discusses the input that must be provided to
1130 PCS in order to make one of the four available types of runs.
The major topics covered are input cards, 1130 PCS coding forms,
and input card decks.

INPUT CARDS

The input required by 1130 PCS in order to make one of the
four available types of runs consists primarily of data concerning:

- The individual work items that make up the network

- The network itself

- The output report, or reports, the user wants generated

- The type of run desired

All input must be submitted to 1130 PCS in the form of punched
cards. There are twelve different types of cards that may be
submitted. These cards are divided into four general categories:
work item properties cards, network cards, output report cards, and
run cards.

Work Item Properties Cards

The work item properties cards are the input cards on which
the user specifies:

- What work items are to be included in the network

- The properties of each such work item; that is, time frame,
work dates, duration, percent complete, codes, cost and
milestone

Within the category of work item description cards, there are
five different types of cards: work item cards, milestone cards,
progress reporting cards, schedule cards, and resource cards.

Each of these types is described briefly in the material that
follows and is explained in more detail later in this chapter under
"1130 PCS Coding Forms".

Work Item Cards

Work item cards are used to specify:

° What work items are to be included in the network

° What work items that are already in the network are to be changed

° What work items that are already in the network are to be deleted

Milestone Cards

Milestone cards are used to specify that either the start or completion of individual work items is to be considered a network milestone.

Progress Reporting Cards

Progress reporting cards are used to specify the actual start date, actual completion date, remaining duration, percent complete this period, percent complete to date, actual cost this period, and actual cost to date of individual work items in the network.

Schedule Cards

Schedule cards are used to specify, change, or delete the scheduled start date, scheduled completion date, and organization codes of individual work items in the network.

Resource Cards

Resource cards are used to associate resource codes and resource elements with individual work items in the network, or to change the codes and elements that have previously been associated with individual items.

Network Cards

The network cards are the input cards on which the user specifies data concerned with the various properties of the network as a whole; that is, relationships, time delays, calculation dates, calendars, resources, and resource descriptions.

Within the general category of network cards, there are five different types of cards: the network title cards, preceding work item cards, calendar cards, resource description cards, and resource grouping cards.

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Each of these types is described briefly in the material that follows, and is discussed in more detail later in this chapter under "1130 PCS Coding Forms".

Network Title Card

The network title card is used to identify the network and to specify the calculation dates for the network.

Preceding Work Item Cards

Preceding work item cards are used to specify the relationships that exist between the various work items in the network, and to specify the time delay the user wants associated with each such relationship.

Calendar Cards

Calendar cards are used to specify days that are to be deleted from or restored to the special nonwork day and/or the holiday calendar associated with the network.

Resource Description Cards

Resource description cards are used to associate a code with, and to provide a description of, the resources that are to be assigned to work items in the network, or to disassociate a code from a resource to which it was previously assigned.

Resource Grouping Cards

Resource grouping cards are used to add resources to or delete them from resource groups.

Output Report Cards

The output report cards are the input cards on which the user specifies what output reports he wants 1130 PCS to generate in the course of a particular run.

Within the category of output report cards there is only one type of card--the output request card.

This card is described briefly in the paragraph that follows, and is discussed in more detail later in this chapter under "1130 PCS Coding Forms".

Output Request Card

The output request card is used to specify which of the 14 available kinds of output reports the user wants generated during a particular system run, and to control the extent and scope of each such report.

Run Cards

The run cards are the input cards on which the user specifies the kind of run he desires.

Within the category of run cards there is only one type of card--the processing control card.

This card is described briefly in the paragraph that follows, and is explained in more detail under "1130 PCS Coding Forms".

Processing Control Card

The processing control card is used to specify the type of run desired and to indicate whether the network is a precedence or an IJ/PERT/CPM network.

Card Identification Codes

Every type of input card has a card identification code. This code permits 1130 PCS to determine what type of input card it is dealing with in any given instance.

The twelve card identification codes are:

Card	Identification Code
Processing control	A
Network title	B
Calendar	C
Resource description	D
Resource grouping	E
Output request	F
Work Item	G
Preceding work item	H
Schedule	I
Progress reporting	J
Resource	K
Milestone	L

Card Modification Codes

Every input card of each specific card type--with the exception of processing control cards--must contain a card modification code. This code permits 1130 PCS to determine whether the card contains newly specified data, data that is to replace previously specified data, or previously specified data that is to be deleted from the network.

The three card modification codes are:

Code	Explanation
blank	The data specified on the card is to be added to the network.
C	The data specified on the card is to replace data previously added to the network.
D	The data specified on the card has previously been added to the network and is now to be deleted from the network.

Not all three card modification codes are available on all types of cards. The codes that are available for each type are pointed out in the discussions of the various 1130 PCS coding forms.

1130 PCS CODING FORMS

There are twelve 1130 PCS coding forms, one for specifying each type of input card (See Figures 2 through 12).

The name of each form reflects the type of card for which the form is used to specify what is to be punched on a particular card or cards.

The names of the twelve forms are as follows:

° Work item card form

° Progress reporting card form

° Schedule card form

° Resource card form

° Milestone card form

° Network title card form

° Preceding work item card form

° Calendar card form

° Resource description form

° Resource grouping card form

° Output request card form

° Processing control card form

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Each of the preceding forms is discussed in detail and illustrated in the material that follows.

Each line of a form corresponds to one punched card, and each column on the line corresponds to a column on the punched card.

Dates. Every date specified on a line of an 1130 PCS form, must be entered on the line according to the form DDMMMYY where:

DD -- a two-digit number representing the day of the month

MMM -- a three-letter abbreviation of the month

YY -- the last two digits of the year

For example, September 1, 1966 would be entered as 01SEP66.

The allowable abbreviations for months (MMM) are JAN, FEB, MAR, APR, MAY, JUN, JUL, AUG, SEP, OCT, NOV, and DEC.

Duration, Percent Complete, Time Delays. If estimated and/or remaining duration, or time delays expressed in time units, are specified, they must be entered according to the form XXXX.X, where the decimal point is implied.

If percent complete to date and/or percent complete this period, or time delays expressed as a percentage are specified, they must be entered according to the form X.XXXX, where the decimal point is implied.

In both these forms, the decimal point is only implied and is not punched into the resultant card.

Work Item Card Form

The work item card form is shown in Figure 2 and discussed in the paragraphs that follow. Each line of this form can be used to specify the contents of one work item card.

The breakdown of this form by columns is as follows:

Column 1. The work item card identification code G is preprinted in cc 1 on every line of this form. This code must be punched in cc 1 of every work item card.

Columns 2-5. The network identification code of the network the user is working with must be entered in cc 2-5 of every line used to specify the contents of a work item card.

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| NAME | | DEPT. | BLDG. | PHONE NO. | PROJECT NO. | PROJECT I.D. | PROJECT NAME | DATE DUE OUT | SHEET____OF____ |

| NET WORK CODE | MOD CODE | WORK ITEM | | | | DESCRIPTION | | DURATION | START WEEK | DAYS | CAL | C.F. | REVISED WORK ITEM | | |
| | | I | | J | | | | | | | | | I | | J |

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

G
G
G
G
G
G
G

FIGURE 2.   WORK ITEM CARD FORM

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Column 6. The work item card-modification code must appear in cc 6. The modification codes that can appear in cc 6 on a line of this form are blank, C, and D.

Columns 7-16. If the network is a precedence network, the identification code of the work item to be added, changed, or deleted must be entered in cc 7-16. This code may be alphameric.

If the network is an IJ/PERT/CPM network, the predecessor event code (I-node) of the activity to be added, changed, or deleted must be entered in cc 7-10. Columns 11-12 must be left blank. The successor event code (J-node) of this activity must be entered in cc 13-16. The I-node and J-node may be alphameric.

Columns 18-61. The description of the work item to be added, changed, or deleted may be entered in cc 18-61.

Columns 63-66. The estimated duration of the work item may be entered in cc 63-66. If it is not (the field left blank), the duration is assumed to be zero units. The duration is entered in the form XXX.X, where the decimal point is implied.

Column 67. The starting day of the work item may be entered in cc 67. If none is entered, Monday (equivalent to entering a 1) is assumed.

Column 68. The work week of the work item may be entered in cc 68. If none is entered, a five-day work week (equivalent to entering a 5) is assumed.

Column 69. The calendar that is to be associated with the work item may be entered in cc 69. The allowable entries and their implications are:

blank   The holiday calendar is indicated. No work will be scheduled for this work item on any holiday.

1   The special calendar is indicated. No work will be scheduled for this work item on any holiday or any special nonwork day.

2   The standard calendar is indicated. Work will be scheduled on all acceptable work week days regardless of any holidays or any special non-work days.

Column 70. The time unit of the work item may be entered in cc 70. If the column is left blank, the time unit is assumed to be days. The allowable time unit entries and their meanings are:

blank	Days
1	Hours
2	Half days
3	One-shift days
4	Two-shift days
5	Three-shift days
6	Weeks

NOTE: Regardless of the time unit entered for a work item, all calculations and output reporting is done in days.

Columns 71-80. A revised work item code may be entered in cc 71-80. If a revised work item code is entered, the card modification code (column 6) for this line must be a C. All references to this particular work item must then use this revised work item code.

Progress Reporting Card Form

The progress reporting card form is shown in Figure 3 and discussed, column by column, in the material that follows. Each line of the form can be used to specify the contents of one progress reporting card.

Column 1. The progress reporting card identification code J is preprinted in cc 1. This code must be punched in cc 1 of every progress reporting card.

Columns 2-5. The network identification code must be entered in cc 2-5.

Column 6. The time/cost code is in cc 6.

The time/cost code is a code that indicates one of the following.

° Only cost information (for example, actual cost this period) is entered on the same line.

° Only time information (for example, estimated duration) is intered on the line.

° Both cost and time information are entered.

NAME						DEPT.		BLDG.		PHONE NO.		PROJECT NO.		PROJECT I.D.		PROJECT NAME				DATE DUE OUT		SHEET___ OF___

	NETWORK CODE	MOD CODE	WORK ITEM					ACTUAL DATES					REM. DUR.		C.F.	PERCENT THIS PERIOD	COMPLETE TO DATE			COST ACTUAL THIS PERIOD		COST TO DATE
			I		J			START		FINISH												

Column numbers: 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

(Rows marked J)

FIGURE 3.   PROGRESS REPORTING CARD FORM

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Enter the letter C in cc 6 of the line to specify that only cost information is entered on the line.

Leave cc 6 blank to indicate that only time, or both time and cost information, are entered.

Columns 7-16. If the network in use is a precedence network, the work item identification code of the work item whose status the user wishes to update must be entered in cc 7-16.

If the network is an IJ/PERT/CPM network, the user must enter in cc 7-16 the predecessor event code of the activity whose status he wishes to update, must leave cc 11-12 blank, and must enter the appropriate successor event code in cc 13-16.

Columns 18-24. The actual start date of the work item may be entered in cc 18-24.

Columns 26-32. The actual completion date of the work item may be entered in cc 26-32.

Columns 34-37. The remaining duration of the work item may be entered in cc 34-37.

Column 39. The time unit of the work item must appear in cc 39 if remaining duration was entered in cc 34-37 on the same line.

The time unit parameters that may be entered are identical to those described under the heading "Column 70" in the discussion of the work item card form.

Columns 41-45. The percent complete this period of the work item may be entered in cc 41-45.

Columns 47-51. The percent complete to date of the work item may be entered in cc 47-51.

Columns 66-72. The actual cost this period of the work item may be entered in cc 66-72.

If it is specified, it must be in whole dollars. For example, an entry of 57683 is interpreted as $57,683.00.

Columns 74-80. The actual cost to date of the work item may be entered in cc 66-72. If it is, it must be entered according to the same form used to enter actual cost this period.

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SCHEDULE CARD FORM

     The schedule card form is shown in Figure 4 and discussed in
the text that follows. Every line of this form can be used to
specify the contents of one schedule card.

     The breakdown of the schedule card form by columns is as
follows:

     Column 1. The schedule card identification code I is preprinted
on every line of the form. It must be punched in cc 1 of every
schedule card.

     Columns 2-5. The network identification code must be entered
in c 2-5 on every line of the form used to specify the contents
of a schedule card.

     Column 6. The schedule card modification code is cc 6 on every
line of this form that is used. The modification codes that are
valid in cc 6 on this form are blank, and C.

     Columns 7-16. If the network in use is a precedence network,
the work item identification code of the relevant work item must be
entered in cc 7-16.

     If the network in use is an IJ/PERT/CPM network, the predecessor
event code must be entered in cc 7-10, cc 11 and 12 must be left
blank, and the successor event code must be entered in cc 13-16.

     Column 18. The type of scheduled start date desired for the
work item whose identification code is entered in cc 7-16 must be
entered in cc 18 if the user intends to enter a scheduled start
date in cc 20-26.

     To specify a Type I start date, enter the number 1 in cc 18.

     To specify a Type II start date, enter the number 2.

     To specify a Type III start date, enter the number 3.

     Columns 20-26. The scheduled start date of the work item may
be specified in cc 20-26. If this date is specified, the form
DDMMMYY must be used.

     Column 28. The type of scheduled completion date must be
entered in cc 28 if the user intends to enter a scheduled complete
date in cc 30-36. The numbers that may be entered in cc 28 and the
type of date each indicates are the same as those discussed under
the heading "Column 18".

     Columns 30-36. The scheduled completion date for the affected
work item may be entered in cc 30-36.

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NAME			DEPT.	BLDG.	PHONE NO.	PROJECT NO.	PROJECT I.D.	PROJECT NAME		DATE DUE OUT	SHEET___ OF___

FIGURE 4.   SCHEDULE CARD FORM

Columns 38-41, 43-46, 48-51, 53-56. A different organization code that 1130 PCS is to associate with the relevant work item may be entered in each of these groups of columns.

Columns 38-41 are considered organization level 1; columns 43-46, level 2; columns 48-51, level 3; and columns 53-56, level 4.

Resource Card Form

The resource card form is shown in Figure 5 and explained in the text that follows. Each line of this form can be used to specify the contents of one resource card.

The breakdown of this form by columns is:

Column 1. The resource card identification code K is pre-printed in cc 1 on every line of this form. It must be punched in cc 1 of every resource card.

Columns 2-5. The network identification code must be entered in cc 2-5.

Column 6. The schedule card modification code in cc 6 may be blank or C.

Columns 7-16. For a precedence network, enter the appropriate work item identification code in cc 7-16.

For an IJ/PERT/CPM network, the predecessor event code must be entered in cc 7-16, cc 11 and 12 must be left blank, and the successor event code must be entered in cc 13-16.

Columns 19-22, 29-32, 39-42, 49-52. A different resource code that is to be associated with the work item whose identification was entered in cc 7-16 may be entered in each of these groups of columns.

Resource codes are entered beginning in the leftmost group of these columns.

Columns 23, 33, 43, 53. A resource code flag precedes the affected resource element in the above column. Leave the appropriate column blank if the resource element is the quantity of the resource used in one day.

Enter the number 1 if the resource element is the total quantity of the resource used to perform the work item.

Columns 24-27, 34-37, 44-47, 54-57. A resource element may be entered, following the resource code and resource code flag in each of these groups of columns.

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| NAME | | | | DEPT. | BLDG. | PHONE NO. | PROJECT NO. | PROJECT I.D. | PROJECT NAME | | DATE DUE OUT | SHEET____ OF____ |

NETWORK CARD · MOD CODE · WORK ITEM · I · J · CODE · FLAG · UNITS · CODE · FLAG · UNITS · RESOURCE ELEMENTS · CODE · FLAG · UNITS · CODE · FLAG · UNITS · CODE · FLAG · UNITS · TOTAL ESTIMATED COST

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

K
K
K
K
K
K
K
K
K

FIGURE 5. RESOURCE CARD FORM

Columns 61-67. The total estimated cost in whole dollars of the work item whose identification code is entered in cc 7-16 of the same line may be entered in cc 61-67.

Milestone Card Form

The milestone card form is shown in Figure 6 and discussed in the material that follows. Each line of this form may be used to specify the contents of one milestone card.

The breakdown of this form by columns is as follows:

Column 1. The milestone card identification code L is pre-printed in cc 1 or every line of this form. This code must be punched in cc 1 of every milestone card.

Columns 2-5. The identification code of the relevant network must be inserted in cc 2-5.

Column 6. The milestone card modification code in cc 6 may be blank, C, or D.

Columns 7-16. The identification code of the work item, the start or completion of which is to be considered a milestone, must be entered in cc 7-16.

Column 18. If the completion of the work item is to be con-sidered the milestone, cc 18 must be left blank.

If the start of the relevant item is to be considered the milestone, the number 1 must be entered in cc 18.

Columns 20-63. The description of the milestone may be entered in cc 20-63.

Network Title Card Form

The network title card form is shown in Figure 7 and discussed in the paragraphs that follow.

The breakdown of this form by columns is as follows:

Column 1. The network title card identification code B is preprinted in cc 1. This code must be punched in cc 1 of the net-work title card.

Columns 2-5. The network identification code of the network in use must be entered in cc 2-5.

Column 6. The network title card, card modification code in cc 6 may be either blank or the letter C.

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FIGURE 6. MILESTONE CARD FORM

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FIGURE 7. NETWORK TITLE CARD FORM

Columns 8-14. The project base date must be entered in cc 8-14 in the form DDMMMYY.

Columns 16-22. The data date must be entered in cc 16-22 in the form DDMMMYY.

Columns 24-67. The network title may be entered in cc 24-67.

Columns 69-75. The date on which the card deck containing this title card is to be run may be entered in cc 69-75. This date will appear on all output reports.

Column 77. The user may enter any character in cc 77 he wishes to use to indicate what run this title card represents, if he runs the same network more than once the same day.

Preceding Work Item Card Form

The preceding work item card form is shown in Figure 8 and discussed in the material that follows. Each line of this form can be used to specify the contents of one preceding work item card.

The breakdown of this form by columns is:

Column 1. The preceding work item card identification code H is preprinted in cc 1 on every line of this form. This code must be punched in cc 1 of every preceding work item card.

Columns 2-5. The identification code of the network in use must be entered in cc 2-5 of every line used to specify the contents of a preceding work item card.

Column 6. The preceding work item card modification code in cc 6 may be either blank or ¸the letter D.

Columns 7-16. The work item identification code of the common work item in the relationships specified in cc 18-76, must be entered in cc 7-16.

Columns 18-27, 38-47, 58-67. The identification code of a work item between which and the common work item the user plans to specify a relationship, must be entered in one of these groups of columns. This work item must precede the common work item in the network.

Columns 29, 49, 69. The relationship the user wants established between a work item specified in cc 18-27, 38-44, or 58-67 and the common work item, is specified in cc 29, 49, or 69--whichever is appropriate.

Enter the letter S to indicate a start-to-start relationship.

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| NAME | | | | | | | DEPT. | BLDG. | PHONE NO. | PROJECT NO. | PROJECT I.D. | PROJECT NAME | | | | DATE DUE OUT | SHEET___ OF___ |

FIGURE 8.   PRECEDING WORK ITEM CARD FORM

Enter the letter F to indicate a completion-to-completion relationship.

Leave the relevant column blank to indicate a completion-to-start relationship.

Columns 30, 50, 70. The type of time delay the user wants associated with the relationship specified in the preceding column is entered in cc 30, 50 or 70--whichever is appropriate.

Enter P to indicate a time delay expressed as a percentage.

Enter blank, 1, 2, 3, 4, 5 or 6--whichever identifies the applicable time unit--to indicate that the delay is expressed in time units. (See "Column 70" under the discussion of the work item card form.)

Columns 32-36, 52-56, 72-76. The time delay the user wants associated with the relationship specified in the preceding group of columns may be entered in each of these groups of columns.

Calendar Card Form

The calendar card form is shown in Figure 9 and discussed in the text that follows. Each line of this form can be used to specify the contents of one calendar card.

The breakdown of this form by columns is as follows:

Column 1. The calendar card type identification code (C) is preprinted in cc 1 of every line of this form. This type code must be punched into cc 1 of every calendar card.

Columns 2-5. The 4-digit network identification code of the network for which the calendar dates apply must be entered in cc 2-5.

Column 6. A valid calendar card modification code must be present in cc 6. Only the following two modification codes are valid for the calendar card:

blank   Indicates that any calendar dates appearing
                        in cc 10-80 are to be added to the set of
                        either holidays or special nonwork days as
                        determined by the code appearing in cc 8 of
                        the calendar card

D   Indicates that any calendar dates appearing
                        in cc 10-80 are to be removed from the set of
                        either holidays of special nonwork days as
                        determined by the code appearing in cc 8 of
                        the calendar card

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FIGURE 9.   CALENDAR CARD FORM

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Column 8. The code which specifies whether the dates appearing in cc 10-80 of the calendar card apply to the set of holidays or special nonwork days must appear in cc 8. The two possible codes are:

1   Indicates that the dates in cc 10-80 relate to the set of holidays

2   Indicates that the dates in cc 10-80 relate to the set of special nonwork days

Columns 10-16, 18-24, 26-32, 36-40, 42-48, 50-56, 58-64, 66-72, 73-80. A day that is to be deleted from or restored to the calendar specified in cc 8 may be entered in each of these groups of columns.

Days to be deleted or restored should be specified beginning in cc 10-16.

Resource Description Card Form

The resource description card form is shown in Figure 10 and described in the paragraphs that follow. Each line of this form can be used to specify the contents of one resource description card.

The breakdown of this form by columns is as follows:

Column 1. The resource description card identification code D is preprinted on every line of this form. This code must be punched in cc 1 of every resource description card.

Column 6. The resource description card modification code in cc 6 may be blank or D.

Columns 8-11, 30-33, 52-55. A different resource code may be entered in each of these groups of columns.

Columns 13-27, 35-49, 57-71. The description of a resource whose code was entered in cc 8-11, 30-33, or 52-55 may be entered following the appropriate code in cc 13-27, 35-49, or 57-71, respectively.

Resource Grouping Card Form

The resource grouping card form is shown in Figure 11. Each line of this form can be used to specify the contents of one resource grouping card.

The breakdown of this form by columns is:

Column 1. The resource grouping card identification code E is preprinted in cc 1 on every line of this form.

This code must be punched in cc 1 of every resource grouping card.

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FIGURE 10. RESOURCE DESCRIPTION CARD FORM

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FIGURE 11. RESOURCE GROUPING CARD FORM

Column 6. The resource grouping card modification code in cc 6 may be a blank or the letter D.

> Note: To delete an entire group, enter the letter D in cc 6 and leave cc 30-78 blank.

Columns 8-9. The resource group code that identifies the resource group to which resources are to be added, or from which resources are to be deleted, must be entered in cc 8-9.

Columns 14-28. The description of the resource group identified by the resource group code entered in cc 8-9 may be entered in cc 14-28.

Columns 30-33, 35-38, 40-43, 45-48, 50-53, 54-58, 60-63, 64-68, 70-73, 75-78. A resource code that identifies a resource the user wants added to or deleted from the effected resource group may be entered in each of these groups of columns.

Output Request Card Form

The output request card form is discussed in detail in Chapter 3 of this manual.

Processing Control Card Form

The processing control card form is shown in Figure 12 and discussed in the text that follows.

Column 1. The processing control card, card identification code A is preprinted in cc 1. This code must be punched in cc 1 of the processing control card.

Column 7. The type of run desired must be specified in cc 7.

Enter the letter G for a network generation run.

Enter the letter U for an update run.

Enter the letter Z for a maintenance run.

Enter the letter R for an output report run.

Columns 9-11. The type of network in use is specified in cc 9-11.

Leave cc 9-11 blank to indicate a precedence network.

Enter CPM to indicate an IJ/PERT/CPM network.

IBM 1130 PROJECT CONTROL SYSTEM

| NAME | | DEPT. | BLDG. | PHONE NO. | PROJECT NO. | PROJECT I.D. | PROJECT NAME | DATE DUE OUT | SHEET____ OF____ |

RUN TYPE   NET TYPE   INPUT LIST

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

A
A
A
A
A

FIGURE 12.   PROCESSING CONTROL CARD FORM

Columns 13-14. If the user wants the contents of each card in the input card deck (see "Input Card Decks" below) printed out, he must leave cc 13-14 blank.

If he does not want them printed, he must enter the letter NO in cc 13-14.

Column 16. Column 16 is reserved for the future expansion of 1130 PCS.

INPUT CARD DECKS

All 1130 PCS input cards must be submitted in the form of input card decks.

There are four types of input card decks: network generation, update, maintenance, and output report card decks.

Each type of card deck, as implied by their names, can only be submitted for one kind of system run. The type of deck that can be submitted for each kind of run is as follows:

Input Card Deck	System Run
Network generation	Network generation
Update	Update
Maintenance	Maintenance
Output report	Output report

Each of the four card decks is illustrated and discussed in the material that follows. However, there are three types of special input cards that have not been previously discussed in this manual and must be explained before the decks are dealt with on an individual basis. These three types of cards are 1130 monitor control cards, the group header card, and the end-of-file card.

1130 Monitor Control Cards

The 1130 monitor control cards are a group of special input cards that must be the first cards in every 1130 PCS input card deck.

These cards are discussed in detail in IBM 1130 Project Control System - Operator's Manual (H20-0343).

Group Header Card

A group header card is a special input card that indicates to the computer what type of 1130 PCS standard input cards follow it (for example, work item cards--type G, resource description cards--type D, milestone cards--type L, and so on). All input cards of any one type must be read as a group. Note that the cards within a group need not be in sequence.

The format of the group header card is:

Column	Information
1	Card type code
2-5	Must be blank
6	An asterisk (*)
7-80	Must be blank

End-Of-File Card

The end-of-file card is a special input card that indicates to the computer that the end of the input card deck for a run has been reached.

The format of the end-of-file card is:

Column	Information
1-5	Must be blank
6	An asterisk (*)
7-80	Must be blank

Network Generation Run

The input card deck for a network generation run is shown in Figure 13.

The cards marked "required" in Figure 13 must be included in the input deck.

The cards marked "optional" may be included in the input deck.

The progress reporting card (card type--J) must not be included in the input deck for a network generation run.
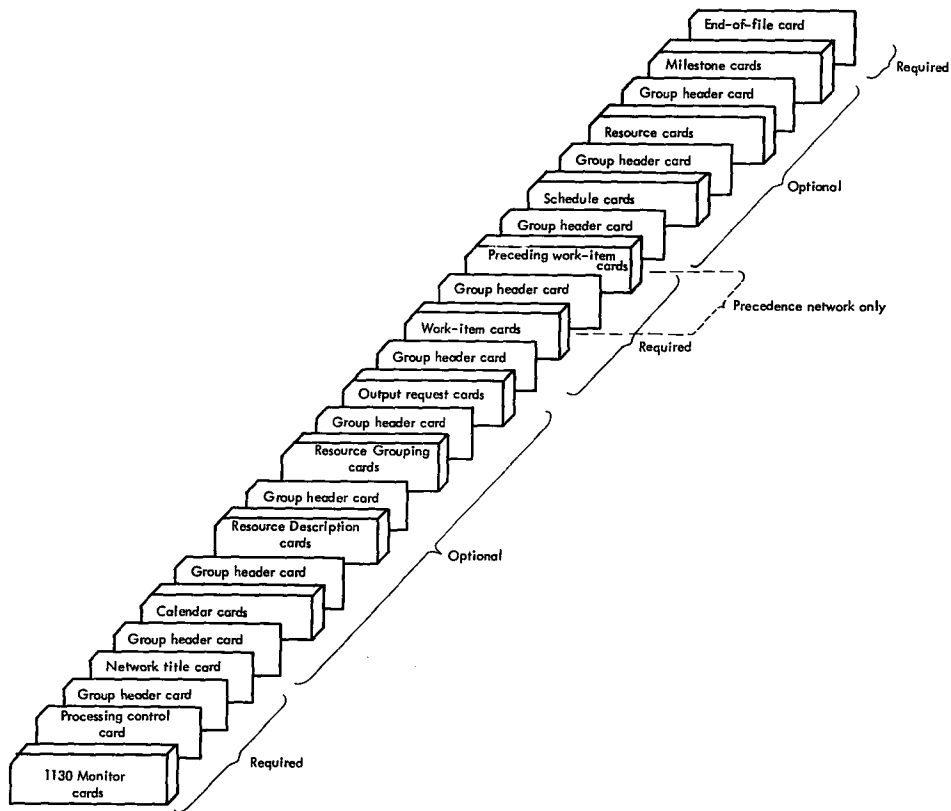
FIGURE 13 NETWORK GENERATION RUN INPUT CARD DECK

Update Run

The input card deck for an update run is shown in Figure 14.

The cards marked "required" in Figure 14 must be included in the deck.

The cards marked "optional" may be included in the deck.

Maintenance Run

The input card deck for a maintenance run is shown in Figure 15.

The cards marked "required" in Figure 15, must be included in the deck.

The cards marked "optional" in Figure 15, may be included.

Individual cards that belong to a type of card (for example, work item card) that is not shown in Figure 15 may not be included in the deck.

Output Report Run

The input card deck for an output report run is shown in Figure 16.

The cards marked "required" in Figure 16, must be included in the deck.

The cards marked "optional" may be included.

Individual cards that belong to a type of card that is not shown in Figure 16 may not be included.

Summary

The kinds of input cards that may or must be included in the input decks for the four different types of runs are shown in the following table.

Boxes from bottom to top:

1130 Monitor cards

Processing control card

Group header card

Network title card

Group header card

Calendar cards

Group header card

Resource description cards

Group header card

Resource grouping cards

Group header card

Output request cards

Group header card

Work-item cards

Group header card

Preceding work-item cards

Group header card

Schedule cards

Group header card

Progress reporting cards

Group header card

Resource cards

Group header card

Milestone cards

End-of-file cards

Required

Optional

Precedence network only

FIGURE 14 UPDATE RUN INPUT CARD DECK

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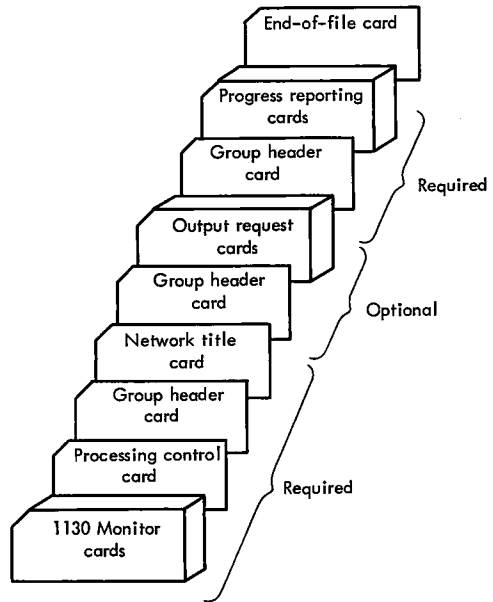
FIGURE 15 MAINTENANCE RUN INPUT CARD DECK
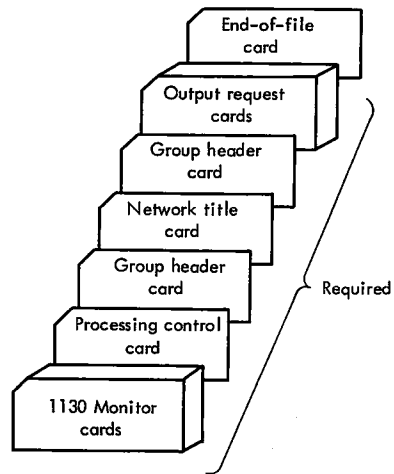
FIGURE 16 OUTPUT REPORT RUN, INPUT CARD DECK

REQUIRED AND OPTIONAL INPUT VS. RUN TYPE

	Network Generation	Update	Maintenance	Output Report
1130 Monitor control cards	R	R	R	R
Processing control card	R	R	R	R
Network title card	R	R	R	R
Group header cards	R	R	R	R
Calendar cards	O	O	O	O
Resource description cards	O	O	O	O
Resource grouping cards	O	O	O	O
Output request cards	O	O	O	R
Work item cards	R	O	X	X
Preceding work item cards	R (Precedence only)	O (Precedence only)	X	X
Schedule cards	O	O	X	X
Progress reporting	X	O	R	X
Resource cards	O	O	X	X
Milestone cards	O	O	X	X
End-of-file card	R	R	R	R

where: R = required   O = optional   X = may not be included

CHAPTER 3: 1130 PCS OUTPUT

Output from 1130 PCS falls into three categories:

Input lists

Program messages

Reports

INPUT LISTS

The contents of all 80 columns of each input card to 1130 PCS is printed as it is read. This input list is automatically produced by the system, unless the user requests its suppression by specifying "NO" in cc 13 and 14 of the processing control card.

PROGRAM MESSAGES

There are two types of program messages in 1130 PCS:

Diagnostics

Audit trails

Diagnostics

Diagnostics indicate errors encountered by 1130 PCS during a run. Chapter 4 of this manual provides a detailed discussion of these messages.

Audit Trails

Audit trails trace 1130 PCS through its processing cycle. Although they are intended for use by the computer operator primarily, they can also serve as a valuable diagnostic aid should it become necessary to trace the system's processing of a particular network. The audit trail should never be discarded until it is certain that all output is satisfactory.

Audit trails assume one of the following forms:

1. The name of a section; for example, "Initilization Proce-
   dures"

2. The phrase "Execute XXX", where XXX is the code name of a
   subroutine

3. A count of the number of items in the resource file and
   in the resource grouping file, and a count of the number
   of days in both the holiday and special day calendar lists

4. The sentence, "There are x output requests", where x is
   the number of reqests

OUTPUT REPORTS

There are thirteen basic types of 1130 PCS reports. These
reports have been designed to fulfill the needs of three major
audience categories: project analysts, first-line managers or
supervisors, and high-level managers. A capsule description of
each report type plus an indication of its probable audience is
included in Chapter 1 of this manual. Following is a list of
these reports:

Schedule

Precedence

Calendar

Master file list and/or cards

Work status cards

Bar chart

Work status and progress

Resource assignment

Resource utilization

Lump sum cost

Monthly cost

Milestone

Summary bar chart

Through the options provided by the 1130 PCS system, a user can customize these basic reports to his own needs. He can cut through project data at many different angles in order to highlight certain requirements or critical points. He can also choose to either skim off broad outlines or plunge deeply into details.

The user can restrict or select the information to be included in a report. He can restrict it to those work items occurring during a particular segment of time, or to those work items having a particular organization code, or using a resource belonging to a particular resource group, or using one particular resource.

The user can specify that the selected information be sorted (ordered) according to various sequences. He can choose, for the major category, one of the four organization code levels (fields) and, for the minor category, one of the following: organization code level 1 or 2, work item code, early start date, late start date, early finish date, late finish date, or start float.

The user can also specify whether dates will print in calendar date format or in project days (elapsed time from the project base date).

Of course, more options are available than will normally be required for any single report, and not every option is applicable to every report type. More about how these options function is covered immediately below under "Output Request Card", and additional details are supplied in the report descriptions later in this chapter.

Output Request Card

The output request card is shown in Figure 17.

Column 1--F, the card code--must be specified.
      2.5--the network ID code--must be specified.

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| NAME | | | DEPT. | BLDG. | PHONE NO. | PROJECT NO. | PROJECT I.D. | PROJECT NAME | DATE DUE OUT | SHEET____ OF____ |

| NET CODE | | | SPAN DATES | | | MAJOR KEY | ORGANIZATION CODE | RES. GROUP | RESOURCE CODE | SUM BAR | MILESTONE | WORK STA CARDS | WORK STA & PRGS | SCHEDULE | BAR CHART | RESOURCE ASIGNMENT | RESOURCE UTILIZATION | LUMP SUM COST | MONTHLY COST | PRECEDENCE | CALENDAR | MASTER FILE |
| | | | LOWER | | UPPER | | | | | | | | | | | | | | | | | | |

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80

F
F
F
F
F

FIGURE 17.   OUTPUT REQUEST CARD FORM

Span Dates

These dates allow the user to restrict a report to those work items which fall within a particular segment of time; that is, work items which have any date (early or late start or finish) contained within the time span specified.

Span dates are not required by 1130 PCS. When present, they are applicable to the report types in the following list. They do not affect reports of any other type specified on the same output request card. (Multiple report requests can be made on a single output request card.)

Bar chart

Lump sum

Monthly cost

Resource assignment (Lower span only. The time span of this report is always seven weeks unless the network completion date is reached first.)

Schedule

Work status cards

Work status and progress

If no span dates are specified, the project base date and the computed project completion date are assumed.

Lower Span Date--Columns 11-17. This specifies the beginning date of the time period to be included in the report. If these columns are left blank or if the date specified is earlier than the project base date (PBD), the PBD is assumed.

Upper Span Date--Columns 19-25. This specifies the ending date of the time period to be included in the report. If these columns are left blank or if the date specified is an earlier date than the lower span date, the calculated network completion date is assumed.

Major Output Sort Key--Column 27

This field allows the user to specify overall sequencing of the work items by one of the four levels of organization codes as specified on the schedule card. This key is required for the summary bar chart and, when present, applies to the other report types

in the following list. Report types not listed, if present on the same card, are not affected.

Lump sum cost

Monthly cost

Schedule

Summary bar chart

Work status and progress

This key can be assigned a value of:

Blank--No effect (invalid for the summary bar chart)

1--Sequence the work items to appear on the report according to the codes contained in the first organization level.

2--Sequence the work items to appear on the report according to the codes contained in the second organization level.

3--Sequence the work items to appear on the report according to the codes contained in the third organization level.

4--Sequence the work items to appear on the report according to the codes contained in the fourth organization level.

Organization Codes--Columns 29-32, 34-37, 39-42

These three fields allow the user to specify from one to three organization codes which restrict printing to work items containing these particular codes in the organization code level designated (in cc 27) as the major output sort key. These codes can be specified for the bar chart in addition to all of the report types to which the major sort key is applicable. They are not required for any report type, even the summary bar chart.

Resource Grouping Code--Columns 44-45

This field allows the user to restrict printing to work items using a resource belonging to a particular group code. This option is applicable to two report types:

Resource assignment

Resource utilization

Resource Code--Columns 47-50

This field allows the user to restrict printing to:

1. Work items using the resource specified--if no resource
    group code is specified in columns 44-45

2. Work items using this particular resource as well as work
    items using resources belonging to the resource grouping
    code--if a group code is specified in columns 44-45

This option is applicable to two report types:

    Resource assignment

    Resource utilization

Report Requests--Columns 53-80

There are two columns (in some cases, only one) in which to
specify a request for each type of report:

Columns 53-54	Summary bar chart
Columns 55-56	Milestone
Columns 57-58	Work status card
Columns 59-60	Work status and progress report
Columns 61-62	Schedule report
Columns 63-64	Bar chart
Columns 65-66	Resource assignment report
Columns 67-68	Resource utilization report
Columns 69-70	Lump sum cost report
Column 71	Monthly cost report
Column 72	(Reserved for growth)
Columns 73-74	Precedence report
Column 75	Calendar report
Column 76	(Reserved for growth)
Column 77	Master file list
Column 78	Master file card
Columns 79-80	(Reserved for growth)

Requesting a Report

A report is requested by punching a valid numeric code (N) into one of the columns assigned for that report in the output request card. Each type of report has its own set of valid numeric codes which can be used to request the report. These codes are also used by 1130 PCS as a minor sort key, and are fully described under "Minor Sort Key", below. Most of the available reports can be requested by punching either or both of their assigned columns in the output request card. The implications of using an odd- or even-numbered column to request a report is described immediately below.

Report Dates

Punching the code (N) in an odd-numbered column will cause all assigned and computer-calculated dates to be printed as calendar dates in the form DDMMMYY. Punching the code (N) in an even-numbered column will cause all assigned and computer-calculated dates to be printed as project days (number of days elapsed from the project base date) in the form XXX.X, where the tenths-of-day figure indicates that portion of the day through which work has been scheduled. A code may be punched in both the odd- and even-numbered columns for the same report if two similar reports are wanted, one with calendar dates and one with project days. The value of the code (N), or minor sort key, need not be the same between the odd- and even-numbered columns.

Minor Sort Key

The value assigned to the code (N) when requesting a report designates the minor sort key, if any, for the report. The value of N can designate the major sort key if no major sort key is specified. This is the usual method employed to limit sequencing to one level.

The values which N can assume are:

1. Organization code 1 sequence (major sort key must not be 1)

2. Organization code 2 sequences (major sort key must not be 2)

3. Work item (or J within I) sequence

4. Early start sequence

5. Late start sequence

6. Early finish sequence

7. Late finish sequence

8. Start float sequence

Not all of these values are valid for every type of report. Following is a list of the minor sort keys which can be assigned to each kind of report.

Bar chart	N can equal 1, 2, 3, 4, 5, 6, 7 or 8.
Calendar	N can equal any number ≠ 0 (since value of N is ignored in this report).
Master file listing or cards	N can equal any number ≠ 0 (since value of N is ignored in this report).
Milestone	N can equal 3, 4, 5, 6, 7 or 8.
Monthly cost	N can equal 4 or 5.
Precedence	N can equal any number ≠ 0 (since value of N is ignored in this report).
Resource assignment	N can equal 1, 2, 3, 4, 5, 6 or 7.
Resource utilization	N can equal 1, 2, 3, 4, 5, 6 or 7.
Schedule	N can equal 1, 2, 3, 4, 5, 6, 7 or 8.
Summary bar chart	N can equal 4, 5, 6 or 7.
Work status card	N can equal any number ≠ to 0 (since value of N is ignored in this report).
Work status and progress	N can equal 1, 2, 3, 4, 5, 6, 7 or 8.

N can be assigned different values for two reports of the same type requested on the same card.

Multiple Requests--Multiple Cards

From 1 to 14 report types can be requested per output request card--provided the options specified on the card are appropriate to all of the reports which they will affect. A maximum of 16 output request cards per run is allowed by 1130 PCS.

General Format--Output Reports

For the most part the format and the meanings of the headings in 1130 PCS reports are self-explanatory; that is, titles, dates, and field descriptors. The following abbreviations are used to specify the major and minor sort keys of the report. These keys are printed (major and minor) immediately following the word SEQUENCE.

Abbreviation	Meaning
ORG	Organization
LEV	Level
WI	Work item
ES	Early start
LS	Late start
EF	Early finish
LF	Late finish
SF	Start float

Schedule Report

The schedule report gives the following information for each work item included in the report. (See Figure 18.)

1. Description. This is the work item description as it appeared on the work item card.

2. Total duration. The total duration XXXX.X, except for these work items which are in progress as of the data date, is the duration which appeared on the work item card. It is specified in tenths of days. For those work items in progress, total duration is calculated according to the formula:

Total duration = (Data date-Early start) + Remaining duration

If an actual start has been specified for a work item, this date replaces the early start date.

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RUN DATE 01 JAN 66   * *   S C H E D U L E   R E P O R T   * *   DATA DATE 01 JAN 66

RUN SEQUENCE 1   NETWORK ID 1515   SCHOOL PLAYGROUND CONSTRUCTION PROJECT   FROM 01 JAN 66 TO 05 FEB 66

SEQUENCE E S   PAGE 1 PART 0

WI	DESCRIPTION	TOT DURAT	CAL	START EARLY	LATE	ST FLOAT	FINISH EARLY	LATE	FIN FLOAT
0000001	START CONSTRUCTION OF PLAYGROUND	0.0	61	3JAN66	3JAN66	0.0	3JAN66	3JAN66	0.0
0000002	GENERAL PREPARATION AND WORK ASSIGNMENT	1.0	61	3JAN66	4JAN66	1.0	3JAN66	4JAN66	1.0
000262A	PROCURE SPECIAL BRICK MORTAR	1.0	61	3JAN66	22JAN66	17.0	3JAN66	22JAN66	17.0
000362A	PROCURE RED BRICKS	1.0	61	3JAN66	22JAN66	17.9	3JAN66	24JAN66	17.9
000413A	PROCURE BULLDOZER	1.0	61	3JAN66	15JAN66	11.0	3JAN66	15JAN66	11.0
000511A	PROCURE EARTH FILL	3.0	61	3JAN66	3JAN66	0.0	5JAN66	5JAN66	0.0
001352A	PROCURE IRON PIPE	1.0	61	3JAN66	6JAN66	3.0	3JAN66	6JAN66	3.0
001452A	PROCURE CONCRETE CONDUIT	1.0	61	3JAN66	6JAN66	3.0	3JAN66	6JAN66	3.0
002322A	PROCURE MATERIAL FOR CONCRETE CURBING	1.0	61	3JAN66	7JAN66	4.0	3JAN66	7JAN66	4.0
002422A	PROCURE CURBING FORMS	1.0	61	3JAN66	7JAN66	4.0	3JAN66	7JAN66	4.0
002532A	PROCURE MATERIAL FOR CONCRETE CHANNELING	1.0	61	3JAN66	15JAN66	11.0	3JAN66	15JAN66	11.0
002614A	PROCURE ASPHALT FOR BLACK PAVEMENT	1.0	61	3JAN66	20JAN66	15.0	3JAN66	20JAN66	15.0
002814A	PROCURE ASPHALT FOR RED PAVEMENT	1.0	61	3JAN66	28JAN66	22.0	3JAN66	28JAN66	22.0
0008110	CLEAR UNDERBRUSH	1.0	611	4JAN66	5JAN66	1.0	4JAN66	5JAN66	1.0
0016520	LAY PIPES AND CONDUITS	4.0	61	4JAN66	7JAN66	3.0	7JAN66	11JAN66	3.0
0027420	PREPARE AND SET DRAIN TILES	8.0	611	4JAN66	10JAN66	5.0	12JAN66	19JAN66	5.0
0009110	GRADE PLAY AREAS	1.0	611	6JAN66	6JAN66	0.0	6JAN66	6JAN66	0.0
000611A	FILL LOW SPOTS	8.0	61	7JAN66	7JAN66	0.0	15JAN66	15JAN66	0.0
0010110	SPREAD FOUNDATION OF CRUSHED ROCK & FILL	3.0	611	7JAN66	12JAN66	4.0	10JAN66	14JAN66	4.0
0017220	ERECT CURB FORMS AND POUR CURBS	7.0	61	7JAN66	8JAN66	1.0	14JAN66	15JAN66	1.0
001513A	PROCURE GRAVEL	1.0	61	11JAN66	17JAN66	5.0	11JAN66	17JAN66	5.0

SEQUENCE E S   PAGE 2 PART 0

WI	DESCRIPTION	TOT DURAT	CAL	START EARLY	LATE	ST FLOAT	FINISH EARLY	LATE	FIN FLOAT
0018320	POUR CONCRETE CHANNELS	4.0	61	15JAN66	17JAN66	1.0	19JAN66	20JAN66	1.0
0011130	APPLY WATERPROOF SEALER TO FOUNDATION	1.0	611	17JAN66	17JAN66	0.0	17JAN66	17JAN66	0.0
0012000	DRY OUT SEALER	3.0	712	18JAN66	18JAN66	0.0	20JAN66	20JAN66	0.0
0007620	BUILD PROTECTIVE BRICK BARRIER AROUND TREES	5.0	611	21JAN66	24JAN66	2.0	26JAN66	28JAN66	2.0
0019140	PAVE WITH BLACK ASPHALT	4.0	611	21JAN66	21JAN66	0.0	25JAN66	25JAN66	0.0
0021140	PAVE WITH RED ASPHALT	3.0	611	29JAN66	29JAN66	0.0	1FEB66	1FEB66	0.0
0029000	FINAL CLEANUP	0.2	61	5FEB66	5FEB66	0.0	5FEB66	5FEB66	0.0

PROJECT BASE DATE   1 JAN 66   PROJECT DURATION   35.2   PROJECT COMPLETION DATE   5 FEB 66

FIGURE 18 SCHEDULE REPORT

3. Calendar indicators (Cal). Four calendar indicators are printed in the field following the total duration

First indicator = number of days in the work week

Second indicator = start day of work week (Monday = 1)

Third indicator = calendar used:

Blank = No work on holidays

1 = No work on both holidays and special nonwork days

2 = Work on all holidays and special nonwork days

Fourth indicator = time unit in which the duration was specified on the work item card (as designated by the conversion factor code)

4. Early and late start and completion dates. These dates are printed as either calendar dates or as project days, as specified in the request. Actual or schedule dates are indicated by a code printed before early start or early finish dates:

A = Actual date

2 = Type II schedule date

3 = Type III schedule date

5. Start float and finish float. The unit in which these floats are printed is tenths of days.

The project base date, project duration in tenths of days, and project end date are printed at the bottom of the report. These dates are also subject to the date option.

The schedule report can restrict and order the work items in the report by the following options:

Span dates

Major sort by organization code field (1, 2, 3 or 4)

Designation of particular organization codes

Minor sort by:

Organization code field 1

Organization code field 2

Work item code

Early start

Late start

Early finish

Late finish

Start float

Precedence Report

　　The precedence report gives the following information for all
the work items in the network which have a preceding work item.
(See Figure 19.)

1.　Description.　This is the work item description as it
    appeared on the work item card.

2.　Preceding work item.　All of a work item's predecessors
    are given by work item number.

3.　Relationship between WI and PWI (R).　A code in the column
    labelled R indicates the relationship:

        Blank = end to start
            S = start to start
            F = end to end

4.　Lag value (time delay).　If this value is a percentage,
    "p" is printed in the column labelled F.　Otherwise,
    the unit in which this value is printed is tenths of days.

5.　PWI start date.　The early start date of the work item is
    printed.

6.　Elapsed time.　This is the length of time between the
    start and finish of the work item, reported in tenths of
    days.

7.　PWI finish date.　The early finish date of the work item is
    printed.

8.　Float.　This is the work item float in tenths of days.

　　The precedence report lists all the work items in the network
and sequences them by work item code only.

　　Only the calendar date/project days option is applicable to the
precedence report.

IBM PROJECT CONTROL SYSTEM

RUN DATE 20 JAN 66 * *   P R E C E D E N C E   R E P O R T   * *   DATA DATE 20 JAN 66

RUN SEQUENCE 1   NETWORK ID 1515   SCHOOL PLAYGROUND CONSTRUCTION PROJECT   FROM 01 JAN 66 TO 05 FEB 66

SEQUENCE E S   PAGE 1

WI	WORK ITEM DESCRIPTION	PRECEDING WORK ITEM	R F	LAG VALUE	P W I START DATE	ELAPSED TIME	P W I FINISH DATE	FLOAT
0000002	GENERAL PREPARATION AND WORK ASSIGNMENT	0000001			03JAN66		03JAN66	
000262A	PROCURE SPECIAL BRICK MORTAR	0000001			03JAN66		03JAN66	
000362A	PROCURE RED BRICKS	0000001			03JAN66		03JAN66	
000413A	PROCURE BULLDOZER	0000001			03JAN66		03JAN66	
000511A	PROCURE EARTH FILL	0000001			03JAN66		03JAN66	
000611A	FILL LOW SPOTS	0009110			06JAN66	1.0	06JAN66	
0007620	BUILD PROTECTIVE BRICK BARRIER AROUND TREES	000262A			03JAN66	1.0	22JAN66	17.0
		000362A	S P	.2500	03JAN66	1.0	24JAN66	17.9
		0012000			18JAN66	3.0	20JAN66	
0008110	CLEAR UNDERBRUSH	0000002			03JAN66	1.0	04JAN66	1.0
0009110	GRADE PLAY AREAS	000511A			03JAN66	3.0	05JAN66	
		0008110			04JAN66	1.0	05JAN66	1.0
0010110	SPREAD FOUNDATION OF CRUSHED ROCK & FILL	0009110			06JAN66	1.0	06JAN66	
0011130	APPLY WATERPROOF SEALER TO FOUNDATION	000413A			03JAN66	1.0	15JAN66	11.0
		000611A			07JAN66	8.0	15JAN66	
		0010110			07JAN66	3.0	14JAN66	4.0
0012000	DRY OUT SEALER	0011130			17JAN66	1.0	17JAN66	
		001513A			11JAN66	1.0	17JAN66	5.0
001352A	PROCURE IRON PIPE	0000001			03JAN66		03JAN66	
001452A	PROCURE CONCRETE CONDUIT	0000001			03JAN66		03JAN66	

FIGURE 19 PRECEDENCE REPORT

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IBM PROJECT CONTROL SYSTEM

RUN DATE 20 JAN 66   * *   P R E C E D E N C E   R E P O R T   * *   DATA DATE   20 JAN 66

RUN SEQUENCE 1   NETWORK ID 1515   SCHOOL PLAYGROUND CONSTRUCTION PROJECT   FROM 01 JAN 66 TO 05 FEB 66

SEQUENCE E S   PAGE 2

WI	WORK ITEM DESCRIPTION	PRECEDING WORK ITEM	R F	LAG VALUE	P W I START DATE	ELAPSED TIME	P W I FINISH DATE	FLOAT
001513A	PROCURE GRAVEL	0010110			07JAN66	3.0	14JAN66	4.0
0016520	LAY PIPES AND CONDUITS	0000002			03JAN66	1.0	04JAN66	1.0
		001352A			03JAN66	1.0	06JAN66	3.0
		001452A			03JAN66	1.0	06JAN66	3.0
0017220	ERECT CURB FORMS AND POUR CURBS	0009110			06JAN66	1.0	06JAN66	
		0016520	S	1.0	04JAN66	4.0	11JAN66	3.0
		0016520	F P	.5714	04JAN66	4.0	11JAN66	3.0
		002322A			03JAN66	1.0	07JAN66	4.0
		002422A			03JAN66	1.0	07JAN66	4.0
0018320	POUR CONCRETE CHANNELS	0017220			07JAN66	7.0	15JAN66	1.0
		002532A			03JAN66	1.0	15JAN66	11.0
		0027420	F	1.0	04JAN66	8.0	19JAN66	5.0
0019140	PAVE WITH BLACK ASPHALT	0012000			18JAN66	3.0	20JAN66	
		0018320			15JAN66	4.0	20JAN66	1.0
		002614A			03JAN66	1.0	20JAN66	15.0
0021140	PAVE WITH RED ASPHALT	0007620			21JAN66	5.0	28JAN66	2.0
		0019140		3.0	21JAN66	4.0	25JAN66	
		002814A			03JAN66	1.0	28JAN66	22.0
002322A	PROCURE MATERIAL FOR CONCRETE CURBING	0000001			03JAN66		03JAN66	
002422A	PROCURE CURBING FORMS	0000001			03JAN66		03JAN66	

FIGURE 19 PRECEDENCE REPORT (Continued)

WI	WORK ITEM DESCRIPTION	PRECEDING WORK ITEM	R F	LAG VALUE	P W I START DATE	ELAPSED TIME	P W I FINISH DATE	FLOAT
002532A	PROCURE MATERIAL FOR CONCRETE CHANNELING	0000001			03JAN66		03JAN66	
002614A	PROCURE ASPHALT FOR BLACK PAVEMENT	0000001			03JAN66		03JAN66	
0027420	PREPARE AND SET DRAIN TILES	0000002			03JAN66	1.0	04JAN66	1.0
002814A	PROCURE ASPHALT FOR RED PAVEMENT	0000001			03JAN66		03JAN66	
0029000	FINAL CLEANUP	0021140		3.0	29JAN66	3.0	01FEB66	

N U M B E R   O F   W O R K   I T E M S   27

N U M B E R   O F   P R E C E D I N G   W O R K   I T E M S   45

END OF REPORT

FIGURE 19 PRECEDENCE REPORT (Continued)

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Calendar Report

The calendar report prints the calendar which 1130 PCS used in calculating the network, in the following format (see Figure 20):

Both the project day number and the calendar date are printed.

A day can be both a holiday and a special nonwork day. Holidays are indicated by printing "H" to the left of the day number. Special nonwork days are indicated by printing "NW" to the right of the day number.

If span dates are not specified, the calendar starts on the Sunday before (or of) the project base date and ends on the Saturday after (or of) the project completion date. All seven days of the week are assigned project day numbers, even when al all work weeks in the network are shorter than seven days.

Only the span date option is applicable to the calendar report.

Master File List

The master file list is a printout of all data stored on the master file, printed by file.

Master File Cards

This is a binary card dump of the master file. Its purpose is to free the disk for other uses between 1130 PCS runs. Refer to IBM 1130 Project Control System--Operator's Manual (H20-0343) for instructions on reloading these cards.

Word Status Cards

These cards are designed to function as input to installation programs. Their format is as follows:

```
        Columns    1- 4--Network ID
                   5-14--WI code
                  15-49--WI description
                  50-53--Original duration
                  54-56--Duration
                  57-60--Remaining duration
                  61-65--Percent to date
                     66--"A", if the start date in columns 67-73 is
                          actual; "blank", otherwise
                  67-73--Start date
                  74-80--Finish date
```

IBM
PROJECT CONTROL SYSTEM

CALENDAR REPORT

SCHOOL PLAYGROUND CONSTRUCTION PROJECT   (1515)

SUNDAY	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY
-5	-4	-3	-2	-1	0	H 1
26DEC65	27DEC65	28DEC65	29DEC65	30DEC65	31DEC65	1JAN66
2	3	4	5	6	7	8
2JAN66	3JAN66	4JAN66	5JAN66	6JAN66	7JAN66	8JAN66
9	10	11	12	13	14	15 NW
9JAN66	10JAN66	11JAN66	12JAN66	13JAN66	14JAN66	15JAN66
16	17	18	19	20	21	22
16JAN66	17JAN66	18JAN66	19JAN66	20JAN66	21JAN66	22JAN66
23	24	25	26	27	28	29
23JAN66	24JAN66	25JAN66	26JAN66	27JAN66	28JAN66	29JAN66
30	31	32	33	34	35	36
30JAN66	31JAN66	1FEB66	2FEB66	3FEB66	4FEB66	5FEB66

END OF REPORT

FIGURE 20 CALENDAR REPORT

Cards are always sequenced by work item code.

Only the span dates option is applicable to this request.

Bar Chart

The bar chart indicates the days on which actual work is scheduled to be performed on selected work items. (See Figure 21.)

Work items, sequenced according to the sort key specified, are listed down the left side of the page.

The beginning date (Monday) of every other work week within the span of the report is printed across the top of the page. Alloted to each week are seven columns (Monday through Staurday), the first of which is marked by "I" unless replaced by one of the following report codes:

* = Duration

X = Critical duration

- = Float

N = Negative float

The following options are applicable to the bar chart.

Span dates

Designation of particular organization codes

Minor sort by:

Organization code field 1

Organization code field 2

Work item code

Early start

Late start

Early finish

Late finish

Start float

IBM PROJECT CONTROL SYSTEM

RUN DATE 01 JAN 66   * *   B A R   G R A P H   * *   DATA DATE 01 JAN 66

RUN SEQUENCE 1   NETWORK ID 1515   SCHOOL PLAYGROUND CONSTRUCTION PROJECT   FROM 01 JAN 66 TO 05 FEB 66

SEQUENCE E S   ORGANIZATION   PAGE 1 PART 1

　　　　* DURATION, X CRITICAL DURATION, - FLOAT, N NEGATIVE FLOAT

```
                                                           MTWTFSS       MTWTFSS        MTWTFSS        MTWTFSS
      W I    D E S C R I P T I O N        WORK ITEM   MTWTFSS       MTWTFSS        MTWTFSS        MTWTFSS
                                                      27DEC65       10JAN66        24JAN66        07FEB66

START CONSTRUCTION OF PLAYGROUND          0000001    I     I       I       I       I       I       I       I       I
GENERAL PREPARATION AND WORK ASSIGNMENT   0000002    I     *-      I       I       I       I       I       I       I
PROCURE SPECIAL BRICK MORTAR              000262A    I     *----- ------ ------ I       I       I       I       I
PROCURE RED BRICKS                        000362A    I     *----- ------ ------ -       I       I       I       I
PROCURE BULLDOZER                         000413A    I     *----- ------ I       I       I       I       I       I
PROCURE EARTH FILL                        000511A    I     XXX    I       I       I       I       I       I       I
PROCURE IRON PIPE                         001352A    I     *---   I       I       I       I       I       I       I
PROCURE CONCRETE CONDUIT                  001452A    I     *---   I       I       I       I       I       I       I
PROCURE MATERIAL FOR CONCRETE CURBING     002322A    I     *----  I       I       I       I       I       I       I
PROCURE CURBING FORMS                     002422A    I     *----  I       I       I       I       I       I       I
PROCURE MATERIAL FOR CONCRETE CHANNELING  002532A    I     *----- ------ I       I       I       I       I       I
PROCURE ASPHALT FOR BLACK PAVEMENT        002614A    I     *----- ------ ----   I       I       I       I       I
PROCURE ASPHALT FOR RED PAVEMENT          002814A    I     *----- ------ ------ -----  I       I       I       I
CLEAR UNDERBRUSH                          0008110    I     I*-    I       I       I       I       I       I       I
LAY PIPES AND CONDUITS                    0016520    I     I****- --      I       I       I       I       I       I
PREPARE AND SET DRAIN TILES               0027420    I     I***** ***--- ---     I       I       I       I       I
GRADE PLAY AREAS                          0009110    I     I  X    I       I       I       I       I       I       I
FILL LOW SPOTS                            000611A    I     I  XX XXXXXX I       I       I       I       I       I
SPREAD FOUNDATION OF CRUSHED ROCK & FILL  0010110    I     I  ** *----  I       I       I       I       I       I
ERECT CURB FORMS AND POUR CURBS           0017220    I     I  ** *****- I       I       I       I       I       I
PROCURE GRAVEL                            001513A    I     I     I*---- -       I       I       I       I       I
POUR CONCRETE CHANNELS                    0018320    I     I     I     * ***-  I       I       I       I       I
APPLY WATERPROOF SEALER TO FOUNDATION     0011130    I     I     I       X      I       I       I       I       I
DRY OUT SEALER                            0012000    I     I     I       IXXX   I       I       I       I       I
BUILD PROTECTIVE BRICK BARRIER AROUND TREES 0007620  I     I     I       I   ** ***--  I       I       I       I
PAVE WITH BLACK ASPHALT                   0019140    I     I     I       I   XX XX     I       I       I       I
PAVE WITH RED ASPHALT                     0021140    I     I     I       I      I  X XX  I       I       I
FINAL CLEANUP                             0029000    I     I     I       I      I       I       I       I       I
```

　　　　　　　　END OF REPORT

FIGURE 21 BAR CHART

Work Status and Progress Report

The work status and progress report lists crucial information concerning selected work items. Completed work items are automatically excluded from this report. (See Figure 22.)

1. PWI's. The work items upon which this work item depends and their scheduled finish dates are listed.

2. Original duration. This value is printed in the unit of time in which it was specified on the work item card.

3. Unit. This specifies the unit of time in which the durations are specified.

4. Calendar (CAL). The first column in this field lists the number of days in the work week. The third column indicates the calendar used:

    blank = Gregorian

        1 = Holiday

        2 = Special

5. Remaining duration

6. Percent complete

7. Expected start date. Actual or schedule dates are indicated by a code printed before the date:

    A = Actual date

    2 = Type II schedule date

    3 = Type III schedule date

8. Latest finish date. The following options are applicable to the work status and progress report.

    Span dates

    Organization sort key (1, 2, 3 or 4)

    Specified organization codes

    Minor sort by:

        Organization code field 1

        Organization code field 2

RUN DATE   1 JAN 66   * *   W O R K   S T A T U S   A N D   P R O G R E S S * *   DATA DATE   1 JAN 66

RUN SEQUENCE   NETWORK ID 1515 TITLE SCHOOL PLAYGROUND CONSTRUCTION PROJECT   FROM 1 JAN 66 TO 5 FEB 66

SEQUENCE   LS 0   PAGE   1

WI	DESCRIPTION	ORIGL DURAT	UNIT	CAL	REMAI DURAT	PERCNT COMPLT	EXPECTED START DATE	LATEST FINISH DATE
0000001	START CONSTRUCTION OF PLAYGROUND	0.0	DAY	61	0.0	0.0000	3 JAN 66	3 JAN 66
0000002	GENERAL PREPARATION AND WORK ASSIGNMENT	1.0	DAY	61	1.0	0.0000	3 JAN 66	4 JAN 66
	PWI 0000001 DATE 3 JAN 66							
000262A	PROCURE SPECIAL BRICK MORTAR	1.0	DAY	61	1.0	0.0000	3 JAN 66	22 JAN 66
	PWI 0000001 DATE 3 JAN 66							
000362A	PROCURE RED BRICKS	1.0	DAY	61	1.0	0.0000	3 JAN 66	24 JAN 66
	PWI 0000001 DATE 3 JAN 66							
000413A	PROCURE BULLDOZER	1.0	DAY	61	1.0	0.0000	3 JAN 66	15 JAN 66
	PWI 0000001 DATE 3 JAN 66							
001352A	PROCURE IRON PIPE	1.0	DAY	61	1.0	0.0000	3 JAN 66	6 JAN 66
	PWI 0000001 DATE 3 JAN 66							
001452A	PROCURE CONCRETE CONDUIT	1.0	DAY	61	1.0	0.0000	3 JAN 66	6 JAN 66
	PWI 0000001 DATE 3 JAN 66							
002322A	PROCURE MATERIAL FOR CONCRETE CURBING	1.0	DAY	61	1.0	0.0000	3 JAN 66	7 JAN 66
	PWI 0000001 DATE 3 JAN 66							
002422A	PROCURE CURBING FORMS	1.0	DAY	61	1.0	0.0000	3 JAN 66	7 JAN 66
	PWI 0000001 DATE 3 JAN 66							
002532A	PROCURE MATERIAL FOR CONCRETE CHANNELING	1.0	DAY	61	1.0	0.0000	3 JAN 66	15 JAN 66
	PWI 0000001 DATE 3 JAN 66							

FIGURE 22 WORK STATUS AND PROGRESS REPORT

WI	DESCRIPTION	ORIGL DURAT	UNIT	CAL	REMAI DURAT	PERCNT COMPLT	EXPECTED START DATE	LATEST FINISH DATE
002614A	PROCURE ASPHALT FOR BLACK PAVEMENT	1.0	DAY	61	1.0	0.0000	3 JAN 66	20 JAN 66
	PWI 0000001 DATE 3 JAN 66							
002814A	PROCURE ASPHALT FOR RED PAVEMENT	1.0	DAY	61	1.0	0.0000	3 JAN 66	28 JAN 66
	PWI 0000001 DATE 3 JAN 66							
0008110	CLEAR UNDERBRUSH	1.0	DAY	61 1	1.0	0.0000	4 JAN 66	5 JAN 66
	PWI 0000002 DATE 4 JAN 66							
000511A	PROCURE EARTH FILL	3.0	DAY	61	3.0	0.0000	3 JAN 66	5 JAN 66
	PWI 0000001 DATE 3 JAN 66							
0009110	GRADE PLAY AREAS	1.0	DAY	61 1	1.0	0.0000	6 JAN 66	6 JAN 66
	PWI 000511A DATE 5 JAN 66 PWI 0008110 DATE 5 JAN 66							
0016520	LAY PIPES AND CONDUITS	4.0	DAY	61	4.0	0.0000	4 JAN 66	11 JAN 66
	PWI 0000002 DATE 4 JAN 66 PWI 001352A DATE 6 JAN 66 PWI 001452A DATE 6 JAN 66							
0010110	SPREAD FOUNDATION OF CRUSHED ROCK & FILL	3.0	DAY	61 1	3.0	0.0000	7 JAN 66	14 JAN 66
	PWI 0009110 DATE 6 JAN 66							
001513A	PROCURE GRAVEL	1.0	DAY	61	1.0	0.0000	11 JAN 66	17 JAN 66
	PWI 0010110 DATE 14 JAN 66							
0027420	PREPARE AND SET DRAIN TILES	8.0	DAY	61 1	8.0	0.0000	4 JAN 66	19 JAN 66
	PWI 0000002 DATE 4 JAN 66							
0017220	ERECT CURB FORMS AND POUR CURBS	7.0	DAY	61	7.0	0.0000	7 JAN 66	15 JAN 66
	PWI 0009110 DATE 6 JAN 66 PWI 0016520 S DATE 4 JAN 66 PWI 0016520 F DATE 11 JAN 66 PWI 002322A DATE 7 JAN 66 PWI 002422A DATE 7 JAN 66							

FIGURE 22 WORK STATUS AND PROGRESS REPORT (Continued)

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WI	DESCRIPTION	ORIGL DURAT	UNIT	CAL	REMAI DURAT	PERCNT COMPLT	EXPECTED START DATE	LATEST FINISH DATE
000611A	FILL LOW SPOTS	8.0	DAY	61	8.0	0.0000	7 JAN 66	15 JAN 66
	PWI 0009110 DATE 6 JAN 66							
0011130	APPLY WATERPROOF SEALER TO FOUNDATION	1.0	DAY	61 1	1.0	0.0000	17 JAN 66	17 JAN 66
	PWI 000413A DATE 15 JAN 66							
	PWI 000611A DATE 15 JAN 66							
	PWI 0010110 DATE 14 JAN 66							
0018320	POUR CONCRETE CHANNELS	4.0	DAY	61	4.0	0.0000	15 JAN 66	20 JAN 66
	PWI 0017220 DATE 15 JAN 66							
	PWI 002532A DATE 15 JAN 66							
	PWI 0027420 F DATE 19 JAN 66							
0012000	DRY OUT SEALER	3.0	DAY	71 2	3.0	0.0000	18 JAN 66	20 JAN 66
	PWI 0011130 DATE 17 JAN 66							
	PWI 001513A DATE 17 JAN 66							
0019140	PAVE WITH BLACK ASPHALT	4.0	DAY	61 1	4.0	0.0000	21 JAN 66	25 JAN 66
	PWI 0012000 DATE 20 JAN 66							
	PWI 0018320 DATE 20 JAN 66							
	PWI 002614A DATE 20 JAN 66							
0007620	BUILD PROTECTIVE BRICK BARRIER AROUND TREES	5.0	DAY	61 1	5.0	0.0000	21 JAN 66	28 JAN 66
	PWI 000262A DATE 22 JAN 66							
	PWI 000362A S DATE 3 JAN 66							
	PWI 0012000 DATE 20 JAN 66							
0021140	PAVE WITH RED ASPHALT	3.0	DAY	61 1	3.0	0.0000	29 JAN 66	1 FEB 66
	PWI 0007620 DATE 28 JAN 66							
	PWI 0019140 DATE 25 JAN 66							
	PWI 002814A DATE 28 JAN 66							
0029000	FINAL CLEANUP	0.2	DAY	61	0.2	0.0000	5 FEB 66	5 FEB 66
	PWI 0021140 DATE 1 FEB 66							

FIGURE 22 WORK STATUS AND PROGRESS REPORT

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Work item

Early start

Late start

Early finish

Late finish

Start float

Resource Assignment Report

A separate resource assignment report is printed for each resource selected (see Figure 23). This report lists the daily requirement of each work item using the resource, as well as giving a total daily requirement.

The resources are identified, by group and individual codes, following the sequencing information on the fourth line of the heading. The major sequencing of the report is by resource code.

The quantity of the resource is given in tenths.

The following options are applicable to the resource assignment report.

Lower span date (The time span of this report is seven weeks unless project completion comes first.)

Resource grouping code

Resource code

Sort (within resource code) by:

Organization code field 1

Organization code field 2

Work item

Early start

Late start

Early finish

Late finish

```
                                      IBM  PROJECT  CONTROL  SYSTEM

RUN DATE    1 JAN 66            * *            R E S O U R C E    A S S I G N M E N T        * *           DATA DATE    1 JAN 66

RUN SEQUENCE         NETWORK ID 1515   TITLE SCHOOL PLAYGROUND CONSTRUCTION PROJECT                FROM  1 JAN 66 TO   5 FEB 66

SEQUENCE    RES- LS  LABORER              3                                                                PAGE    1  PART    1
```

		START I		RESOURCE	DAILY	RATE		I	
WI	W I DESCRIPTION	FLOAT I	MON . TUE . WED .		THU . FRI .	SAT . SUN	I	MON . TUE	

```
                                                          27DEC65                                           3JAN66
                                                          I    •    •    •    •    •    •     I    •
0008110  CLEAR UNDERBRUSH                            1.0
                                                          I    •    •    •    •    •    •     I    •
0009110  GRADE PLAY AREAS                            0.0
                                                          I    •    •    •    •    •    •     I    •
0016520  LAY PIPES AND CONDUITS                      3.0
                                                          I    •    •    •    •    •    •     I    •
0010110  SPREAD FOUNDATION OF CRUSHED ROCK & FILL    4.0
                                                          I    •    •    •    •    •    •     I    •
0027420  PREPARE AND SET DRAIN TILES                 5.0
                                                          I    •    •    •    •    •    •     I    •
0017220  ERECT CURB FORMS AND POUR CURBS             1.0
                                                          I    •    •    •    •    •    •     I    •
0011130  APPLY WATERPROOF SEALER TO FOUNDATION       0.0
                                                          I    •    •    •    •    •    •     I    •
0018320  POUR CONCRETE CHANNELS                      1.0
                                                          I    •    •    •    •    •    •     I    •
0019140  PAVE WITH BLACK ASPHALT                     0.0
                                                          I    •    •    •    •    •    •     I    •
0007620  BUILD PROTECTIVE BRICK BARRIER AROUND TREES 2.0
                                                          I    •    •    •    •    •    •     I    •
0021140  PAVE WITH RED ASPHALT                       0.0
                                                          I    •    •    •    •    •    •     I    •
0029000  FINAL CLEANUP                               0.0
                                                          I    •    •    •    •    •    •     I    •

                                   TOTAL   FOR   RESOURCE
```

FIGURE 23 RESOURCE ASSIGNMENT REPORT

```
----------------------------------------------------------------------------------------------------
                         I            RESOURCE  DAILY  RATE          I                                I
WED . THU . FRI . SAT . SUN I MON . TUE . WED . THU . FRI . SAT . SUN I MON . TUE . WED . THU . FRI . SAT . SUN I MON
----------------------------------------------------------------------------------------------------
                         10JAN66                                    17JAN66                          24JAN66
 4.0 .    .     .     .   I    .     .     .     .     .     .   I    .     .     .     .     .     .   I
      .  2.0   .     .     I    .     .     .     .     .     .   I    .     .     .     .     .     .   I
      .   .   4.0   4.0    I  4.0   4.0   .     .     .     .   I    .     .     .     .     .     .   I
      .   .     .     .   I    .     .   4.0   4.0   4.0   .   I    .     .     .     .     .     .   I
      .   .     .     .   I  2.0   2.0   2.0   2.0   2.0   .   I  2.0   2.0   2.0   .     .     .   I
      .   .   4.0   .     I  4.0   4.0   4.0   4.0   4.0   4.0  I    .     .     .     .     .     .   I
      .   .     .     .   I    .     .     .     .     .     .   I  3.0   .     .     .     .     .   I
      .   .     .     .   I    .     .     .     .     .     .   I  2.0   2.0   2.0   2.0   .     .   I
      .   .     .     .   I    .     .     .     .     .     .   I    .     .     .   3.0   3.0   I  3.0
      .   .     .     .   I    .     .     .     .     .     .   I    .     .     .     .     .   I  2.0
      .   .     .     .   I    .     .     .     .     .     .   I    .     .     .     .     .     .   I
      .   .     .     .   I    .     .     .     .     .     .   I    .     .     .     .     .     .   I
      .   .     .     .   I    .     .     .     .     .     .   I    .     .     .     .     .     .   I
----------------------------------------------------------------------------------------------------
 4.0       4.0              10.0         10.0         4.0         7.0         4.0         3.0
      2.0         8.0   10.0       10.0         10.0              4.0         2.0         3.0         5.0
----------------------------------------------------------------------------------------------------
```

FIGURE 23 RESOURCE ASSIGNMENT REPORT (Continued)

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```
-----------------------------------------------------------------------------------------------------------------------
  RESOURCE  DAILY  RATE                    I                                    I            RESOURCE  DAILY   RATE
TUE . WED . THU . FRI . SAT . SUN I MON . TUE . WED . THU . FRI . SAT . SUN I MON . TUE . WED . THU . FRI . SAT . SUN
-----------------------------------------------------------------------------------------------------------------------

                                    31JAN66                                      7FEB66
     .      .      .      .      .   I       .      .      .      .      .      .  I       .      .      .      .      .      .

     .      .      .      .      .   I       .      .      .      .      .      .  I       .      .      .      .      .      .

     .      .      .      .      .   I       .      .      .      .      .      .  I       .      .      .      .      .      .

     .      .      .      .      .   I       .      .      .      .      .      .  I       .      .      .      .      .      .

     .      .      .      .      .   I       .      .      .      .      .      .  I       .      .      .      .      .      .

     .      .      .      .      .   I       .      .      .      .      .      .  I       .      .      .      .      .      .

     .      .      .      .      .   I       .      .      .      .      .      .  I       .      .      .      .      .      .

     .      .      .      .      .   I       .      .      .      .      .      .  I       .      .      .      .      .      .

3.0
     .      .      .      .      .   I       .      .      .      .      .      .  I       .      .      .      .      .      .
2.0    2.0    2.0    2.0
     .      .      .      .      .   I       .      .      .      .      .      .  I       .      .      .      .      .      .
                            3.0         3.0    3.0
     .      .      .      .      .   I       .      .      .      .      .      .  I       .      .      .      .      .      .
                                                                         0.2
     .      .      .      .      .   I       .      .      .      .      .      .  I       .      .      .      .      .      .
-----------------------------------------------------------------------------------------------------------------------
  5.0       2.0       3.0       3.0
      2.0       2.0                 3.0                                  0.2
-----------------------------------------------------------------------------------------------------------------------
```

FIGURE 23 RESOURCE ASSIGNMENT REPORT (Continued)

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Resource Utilization Report

     This report summarizes on a line graph the daily total requirement for all or selected resources. A cumulative requirement is also plotted. (See Figure 24.)

     These scales are divided into tenths, relative to the quantity scale. It is helpful in reading this report as a graph to turn the page 90 degrees counter-clockwise.

     The resource is identified, by group and individual codes, on the fourth line of the heading.

     An "*" is used to plot the daily requirement; a "C" is used to plot the cumulative requirement.

     The following options are applicable to this report.

        Resource grouping code

        Resource code

        Sort by:

            Early start

            Late start

            Early finish

            Late finish

     (The sort sequence affects the time period in which a resource requirement is placed.)

Lump Sum Cost Report

     This report gives the estimated and actual cost (in whole dollars only) by work item. Included also are the work item's start date, remaining duration, percent complete, finish date, and float. Total cost figures are accumulated within each organization code of the major sort field. (See Figure 25.)

IBM PROJECT CONTROL SYSTEM

RUN DATE   1 JAN 66   * *   R E S O U R C E   U T I L I Z A T I O N   * *   DATA DATE   1 JAN 66

RUN SEQUENCE   NETWORK ID 1515   TITLE SCHOOL PLAYGROUND CONSTRUCTION PROJECT   FROM   1 JAN 66 TO   5 FEB 66

SEQUENCE   RES= ES LABORER   3   PAGE   1

PERIOD STARTNG	PERIOD AMOUNT	I	PERIOD AND CUMULATIVE REQUIREMENTS WHOLE UNITS								I	CUMULATIVE AMOUNT	PERIOD STARTNG
		I	.	.	.	.	.	.	.	.I		
	SCALE	I	10	20	30	40	50	60	70	80I	PITCH	1
CUMULATIVE	SCALE	I	50	100	150	200	250	300	350	400I	PITCH	5
		I	.	.	.	.	.	.	.	.I		
27DEC65	0.0	I..I									0.0	27DEC65
3JAN66	48.0	I	C	.	.	.	* .	.	.	.I	48.0	3JAN66
10JAN66	32.0	I	.	C	.	. *	.	.	.	.I	80.0	10JAN66
17JAN66	19.0	I	.	*C	.	.	.	.	.	.I	99.0	17JAN66
24JAN66	15.0	I	.	*	. C	.	.	.	.	.I	114.0	24JAN66

FIGURE 24 RESOURCE UTILIZATION REPORT

IBM PROJECT CONTROL SYSTEM

```
                                   IBM PROJECT CONTROL SYSTEM
RUN DATE  01 JAN 66          * *       LUMP SUM COST REPORT                    * *          DATA DATE  01 JAN 66

RUN SEQUENCE 1     NETWORK ID 1515   TITLE SCHOOL PLAYGROUND CONSTRUCTION PROJECT      FROM 01 JAN 66 TO 05 FEB 66

SEQUENCE  E S                    ORGANIZATION                                              PAGE  1 PART  1
```

WI	W I DESCRIPTION	START DATE	REMAI DURAT	PERCNT COMPLT	FINISH DATE	FLOAT	I I	ESTIM D COST	ACTUAL COST T-D
0000001	START CONSTRUCTION OF PLAYGROUND	03JAN66			03JAN66		I		
0000002	GENERAL PREPARATION AND WORK ASSIGNMENT	03JAN66	1.0		04JAN66	1.0	I		
000262A	PROCURE SPECIAL BRICK MORTAR	03JAN66	1.0		22JAN66	17.0	I		
000362A	PROCURE RED BRICKS	03JAN66	1.0		24JAN66	17.9	I		
000413A	PROCURE BULLDOZER	03JAN66	1.0		15JAN66	11.0	I		
000511A	PROCURE EARTH FILL	03JAN66	3.0		05JAN66		I		
001352A	PROCURE IRON PIPE	03JAN66	1.0		06JAN66	3.0	I		
001452A	PROCURE CONCRETE CONDUIT	03JAN66	1.0		06JAN66	3.0	I		
002322A	PROCURE MATERIAL FOR CONCRETE CURBING	03JAN66	1.0		07JAN66	4.0	I		
002422A	PROCURE CURBING FORMS	03JAN66	1.0		07JAN66	4.0	I		
002532A	PROCURE MATERIAL FOR CONCRETE CHANNELING	03JAN66	1.0		15JAN66	11.0	I		
002614A	PROCURE ASPHALT FOR BLACK PAVEMENT	03JAN66	1.0		20JAN66	15.0	I		
002814A	PROCURE ASPHALT FOR RED PAVEMENT	03JAN66	1.0		28JAN66	22.0	I		
0008110	CLEAR UNDERBRUSH	04JAN66	1.0		05JAN66	1.0	I	693	
0016520	LAY PIPES AND CONDUITS	04JAN66	4.0		11JAN66	3.0	I	2710	
0027420	PREPARE AND SET DRAIN TILES	04JAN66	8.0		19JAN66	5.0	I	2785	
0009110	GRADE PLAY AREAS	06JAN66	1.0		06JAN66		I	970	
000611A	FILL LOW SPOTS	07JAN66	8.0		15JAN66		I		
0010110	SPREAD FOUNDATION OF CRUSHED ROCK & FILL	07JAN66	3.0		14JAN66	4.0	I	12050	
0017220	ERECT CURB FORMS AND POUR CURBS	07JAN66	7.0		15JAN66	1.0	I	6520	
001513A	PROCURE GRAVEL	11JAN66	1.0		17JAN66	5.0	I		
0018320	POUR CONCRETE CHANNELS	15JAN66	4.0		20JAN66	1.0	I	2595	
0011130	APPLY WATERPROOF SEALER TO FOUNDATION	17JAN66	1.0		17JAN66		I	2235	
0012000	DRY OUT SEALER	18JAN66	3.0		20JAN66		I		
0007620	BUILD PROTECTIVE BRICK BARRIER AROUND TREES	21JAN66	5.0		28JAN66	2.0	I	2820	
0019140	PAVE WITH BLACK ASPHALT	21JAN66	4.0		25JAN66		I	18050	
0021140	PAVE WITH RED ASPHALT	29JAN66	3.0		01FEB66		I	22610	
0029000	FINAL CLEANUP	05FEB66	.2		05FEB66		I		

```
                                                                          T O T A L         $74038

    TOTAL PROJECT ESTIMATED COST  $        74038.  TOTAL PROJECT ACTUAL COST TO DATE  $           0.
                                                   END OF REPORT
```

FIGURE 25 LUMP SUM COST REPORT

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The following options apply to the lump sum cost report.

    Span dates

    Organization sort key

    Organization codes

    Minor sort by:

        Organization code field 1

        Organization code field 2

        Work item code

        Early start

        Late start

        Early finish

        Late finish

Monthly Cost Report

This report gives actual and estimated monthly expenditures for selected work items (see Figure 26). Locating the expenditure in time is facilitated by assuming that the total cost of a work item is incurred at either its early or late finish. The minor sort key will determine whether early or late finish dates are assumed for estimated expenditures. If no minor key is specified, the early finish dates will be chosen.

The following options apply to the monthly cost report.

    Span dates

    Organization code sort field

    Organization codes

    Minor sort by:

        Early start

        Late start

IBM PROJECT CONTROL SYSTEM

RUN DATE   01 JAN 66   * *   M O N T H L Y   C O S T   R E P O R T   * *   DATA DATE   01 JAN 66

RUN SEQUENCE 1   NETWORK ID 1515   TITLE SCHOOL PLAYGROUND CONSTRUCTION PROJECT   FROM 01 JAN 66 TO 05 FEB 66

SEQUENCE E S   PAGE   1

COST PERIOD	ORG. CODE	WORK ITEM DESCRIPTION	W.I. NO	ESTIMATED COST	ACTUAL COST TO DATE
JAN 66		START CONSTRUCTION OF PLAYGROUND	0000001	0.	0.
		GENERAL PREPARATION AND WORK ASSIGNMENT	0000002	0.	0.
		PROCURE SPECIAL BRICK MORTAR	000262A	0.	0.
		PROCURE RED BRICKS	000362A	0.	0.
		PROCURE BULLDOZER	000413A	0.	0.
		PROCURE EARTH FILL	000511A	0.	0.
		FILL LOW SPOTS	000611A	0.	0.
		BUILD PROTECTIVE BRICK BARRIER AROUND TREES	0007620	2820.	0.
		CLEAR UNDERBRUSH	0008110	693.	0.
		GRADE PLAY AREAS	0009110	970.	0.
		SPREAD FOUNDATION OF CRUSHED ROCK & FILL	0010110	12050.	0.
		APPLY WATERPROOF SEALER TO FOUNDATION	0011130	2235.	0.
		DRY OUT SEALER	0012000	0.	0.
		PROCURE IRON PIPE	001352A	0.	0.
		PROCURE CONCRETE CONDUIT	001452A	0.	0.
		PROCURE GRAVEL	001513A	0.	0.
		LAY PIPES AND CONDUITS	0016520	2710.	0.
		ERECT CURB FORMS AND POUR CURBS	0017220	6520.	0.
		POUR CONCRETE CHANNELS	0018320	2595.	0.

FIGURE 26 MONTHLY COST REPORT

IBM PROJECT CONTROL SYSTEM

RUN DATE 01 JAN 66   * *   M O N T H L Y   C O S T   R E P O R T   * *   DATA DATE 01 JAN 66

RUN SEQUENCE 1   NETWORK ID 1515   TITLE SCHOOL PLAYGROUND CONSTRUCTION PROJECT   FROM 01 JAN 66 TO 05 FEB 66

SEQUENCE E S   PAGE 2

COST PERIOD	ORG. CODE	WORK ITEM DESCRIPTION	W.I. NO	ESTIMATED COST	ACTUAL COST TO DATE
		PAVE WITH BLACK ASPHALT	0019140	18050.	0.
		PAVE WITH RED ASPHALT	0021140	22610.	0.
		PROCURE MATERIAL FOR CONCRETE CURBING	002322A	0.	0.
		PROCURE CURBING FORMS	002422A	0.	0.
		PROCURE MATERIAL FOR CONCRETE CHANNELING	002532A	0.	0.
		PROCURE ASPHALT FOR BLACK PAVEMENT	002614A	0.	0.
		PREPARE AND SET DRAIN TILES	0027420	2785.	0.
		PROCURE ASPHALT FOR RED PAVEMENT	002814A	0.	0.
		TOTAL FOR MONTH $ 74038.		$	0.
FEB	66	FINAL CLEANUP	0029000	0.	0.
		TOTAL FOR MONTH $ 0.		$	0.

TOTAL PROJECT ESTIMATED COST $ 74038. TOTAL PROJECT ACTUAL COST TO DATE $ 0.
                                                END OF REPORT

FIGURE 26 MONTHLY COST REPORT (Continued)

Milestone Report

This report lists each milestone in the network, its scheduled date, and its float (see Figure 27).

The following options are applicable to the milestone report.

Sort by:

Work item

Early start

Late start

Early finish

Late finish

Start float

Summary Bar Chart

The summary bar chart indicates the calendar weeks when work is scheduled to be performed on one or more work items having the same organization code (see Figure 28). The organization codes included in the report are determined by the major sort key and any particular organization codes specified in the output request card.

The following options apply to the summary bar chart.

Organization code sort field (required).

Organization codes

Minor sort by:

Early start

Late start

Early finish

Late finish

RUN DATE   01 JAN 66   * *   M I L E S T O N E   R E P O R T   * *   DATA DATE   01 JAN 66

RUN SEQUENCE 1   NETWORK ID 1515   SCHOOL PLAYGROUND CONSTRUCTION PROJECT   FROM 01 JAN 66 TO 05 FEB 66

SEQUENCE ORG LEV 1, E S   PAGE 1

MILESTONE DESCRIPTIONS	WI	CALC/ACTUAL	SCHEDULED	T	FLOAT	REMARKS
START OF WORK ON PLAYGROUND PROJECT	(0000001)	03 JAN 66				
BLACK PAVEMENT COMPLETE	(0019140)	25 JAN 66				
FINISH OF SCHOOL PLAYGROUND PROJECT	(0029000)	05 FEB 66				

PROJECT BASE DATE   01 JAN 66   PROJECT DURATION   35.2   PROJECT COMPLETION   05 FEB 66
                                               END OF REPORT

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FIGURE 27 MILESTONE REPORT

IBM PROJECT CONTROL SYSTEM

RUN DATE   01 JAN 66   * *   SUMMARY GRAPHIC DISPLAY (BAR GRAPH)   * *   DATA DATE   01 JAN 66

RUN SEQUENCE 1   NETWORK ID 1515   TITLE SCHOOL PLAYGROUND CONSTRUCTION PROJECT   FROM 01 JAN 66 TO 05 FEB 66

SEQUENCE ORG LEV 1, E S   PAGE   1 PART 1

```
------------------------------------------------------------------------------------------------------------
ORGANIZATION CODES    -    1Q66   -    2Q66   -    3Q66   -    4Q66   -    1Q67   -    2Q67   -    3Q67
                      JA  FE  MA  AP  MA  JU  JL  AU  SE  OC  NO  DE  JA  FE  MA  AP  MA  JU  JL  AU  SE
------------------------------------------------------------------------------------------------------------
                      •           •           •           •           •           •           •           •
    AA10              W       W    •           •           •           •           •           •           •
    START   03 JAN 66 •           •           •           •           •           •           •           •
    FINISH 05 FEB 66
    FLOAT      0.0    •           •           •           •           •           •           •           •

                      •           •           •           •           •           •           •           •
    BB23              WWW         •           •           •           •           •           •           •
    START   03 JAN 66 •                 ⸢     •           •           •           •           •           •
    FINISH 17 JAN 66
    FLOAT      0.0    •           •           •           •           •           •           •           •

                      •           •           •           •           •           •           •           •
    BC22              WWWW        •           •           •           •           •           •           •
    START   03 JAN 66 •           •           •           •           •           •           •           •
    FINISH 26 JAN 66
    FLOAT      1.0    •           •           •           •           •           •           •           •

                      ꞋꞋ•         •           •           •           •           •           •           •
    0434              W    WW     •           •           •           •           •           •           •
    START   03 JAN 66 •           •           •           •           •           •           •           •
    FINISH 01 FEB 66
    FLOAT     '0.0    •           •           •           •           •           •           •           •

                      •           •           •           •           •           •           •           •
    1B01              WWW         •           •           •           •           •           •           •

    START   03 JAN 66 •           •           •           •           •           •           •           •
    FINISH 15 JAN 66
    FLOAT      0.0    •           •           •           •           •           •           •           •

                      •           •           •           •           •           •           •           •
                      WW          •           •           •           •           •           •           •
    START   03 JAN 66 •           •           •           •           •           •           •           •
    FINISH 10 JAN 66
    FLOAT      4.0    •           •           •           •           •           •           •           •
```

                              END OF REPORT

FIGURE 28 SUMMARY BAR CHART

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CHAPTER 4: DIAGNOSTIC PROGRAM MESSAGES

1130 PCS will print a diagnostic program message to indicate an error in input specifications, or an error discovered during network processing or output preparation. When the diagnostic refers to an input error, it is printed immediately below the pertinent card in the input listing. The printing of· diagnostic messages and related input cards cannot be suppressed by the user (see "Chapter 3:1130 PCS Output").

A list of 1130 PCS diagnostic messages, accompanied by their associated meanings and remedial actions, is provided in this chapter. With the exception of the verbal messages, which appear at the end of this list, 1130 PCS diagnostic messages print in the following format:

ERROR 12 xxx TYPE y

where xxx is a three-digit message identification and y can be any one of three values--R, I or F--which indicates the class of the error.

R indicates an error for which the program has attempted to make a logical adjustment. Card reading and/or processing were then resumed.

I indicates an error which the program has ignored. Card reading and/or processing were resumed. Errors which do not critically affect other data and/or processing, but for which no longical adjustment is apparent, fall into this class.

F indicates an error which critically affects other data and/ or calculations. The program continues to read any remaining input cards in order to locate any other errors. Then the run is terminated. If an error of this type occurs during network processing, the run is immediately terminated.

ERROR 12002 TYPE F

Explanation: No network ID code has been specified in cc 2-5 of card B.

Action: Enter the network ID code in cc 2-5 of card B and rerun.

ERROR 12003 TYPE F

Explanation: The data date, cc 16-22 of card B, is invalid.

Action: Check cc 16-22 of card B, correct, and rerun.

ERROR 12004 TYPE F

Explanation: The project base date, cc 8-14 of card B, is invalid.

Action: Check cc 8-14 of card B, correct, and rerun.

ERROR 12005 TYPE F

Explanation: The project base date, cc 8-14 of card B, is later than the data date, cc 16-22 of card B in a maintenance run.

Action: Check these cc of card B, correct, and rerun.

ERROR 12006 TYPE F

Explanation: The modification code, cc 6 of card B, is neither blank nor C.

Action: Check cc 6 of card B, correct, and rerun.

ERROR 12007 TPYE F

Explanation: The modification code on card B is C (change), but there is no network ID on the disk which corresponds to the network ID specified in cc 2-5 of card B.

Action: Check cc 2-5 of card B, correct and rerun.

ERROR 12008 TYPE F

Explanation: The modification code on card B is C (change); however, the new data date, cc 16-22 of card B, is earlier than the data date on the disk.

Action: Check cc 16-22 of card B, correct, and rerun.

ERROR 12009 TYPE F

Explanation: An attempt was made to add a network which is already contained on the disk.

Action: If this was specified as a G type run in cc 7 of card A, the disk was not cleared and therefore should be. If the run type in cc 7 of card A is specified as U, A, or R, a C (change code) should be placed in cc 6 of card B.

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ERROR 12010 TPYE I

Explanation: The modification code in cc 6 of card C is neither
blank nor D. Dates on that card were ignored by the program.

Action: Check cc 6 of C card(s) and, if necessary, correct and
rerun.

ERROR 12011 TYPE I

Explanation: The calendar card type in cc 8 of card C is neither
1 nor 2. Dates on that card were ignored by the program.

Action: Check cc 8 of C card(s) and, if necessary, correct and
rerun.

ERROR 12012 TYPE I

Explanation: One or more of the holidays or nonwork dates in the
C card(s) is not valid. The invalid date(s) were ignored by the
program; the valid dates were accepted.

Action: Check the C card(s) and if necessary, correct and rerun.

ERROR 12014 TYPE F

Explanation: A calendar can be generated only in a generation
run, and this run is one of the three other types.

Action: Resubmit entire network for a generation run if a calendar
must be generated.

ERROR 12015 TYPE R

Explanation: An attempt was made to delete holidays or nonwork days
in a run specified as a generation run. Program treated the
specified dates as additions (entries) rather than deletions.

Action: Check the C card(s) and, if necessary, correct and rerun.

ERROR 12016 TYPE I

Explanation: An attempt was made either to delete holidays or non-
work days not in the calendar, or to add holiday or nonwork days
already in the calendar. The program ignored these dates.

Action: Check C card(s) and, if necessary, correct and rerun.

ERROR 12017 TYPE I

Explanation: The modification code in cc 6 D card is neither blank or D. The program ignored the contents of this card.

Action: Check D card(s) and, if necessary, correct and rerun.

ERROR 12018 TYPE I

Explanation: An attempt was made to specify more than 100 (the maximum) resources. Only the first 100 were retained.

Action: Check D cards and, if necessary, delete the unnecessary or least critical resources and rerun.

ERROR 12019 TYPE I

Explanation: An attempt was made to delete a resource code not on the disk. The program ignored the information.

Action: Check D card(s) and, if necessary, correct and rerun.

ERROR 12020 TYPE I

Explanation: An attempt was made to add a resource code already on the disk. The program ignored the information.

Action: Check the D card(s) and, if necessary, correct and rerun.

ERROR 12021 TYPE I

Explanation: Twenty (20) resource codes have already been specified for this group. The first 20 only were retained by the program.

Action: Check E card(s) and, if necessary, redefine resource groupings and rerun.

ERROR 12022 TYPE I

Explanation: An attempt was made to add a resource code which is either already in this group or not in the resource file. The program ignored this information.

Action: Check E card(s) and, if necessary, correct and rerun.

ERROR 12023 TYPE I

Explanation: An attempt was made to delete from the resource file
a resource code which is specified as part of a group. The program
ignored the information.

Action: Check D cards and, if necessary, correct and rerun.

ERROR 12024 TYPE I

Explanation: An attempt was made to delete a resource grouping code
not on the disk. The program ignored the information.

Action: Check E card(s) and, if necessary, correct and rerun.

ERROR 12025 TYPE I

Explanation: The modification code, cc 6 of card E, is neither
blank nor D. The contents of the card were ignored by the program.

Action: Check E card(s) and, if necessary, correct and rerun.

ERROR 12026 TYPE I

Explanation: An attempt was made to specify more than 19 resource
group codes. Only the first 19 were retained.

Action: Check E card(s) and, if necessary, delete obsolete groupings
and rerun.

ERROR 12027 TYPE I

Explanation: The network ID code, cc 2-6 of card F, is different
from the network ID of the network title card (card B). The program
ignored the card.

Action: Check F card(s) and, if necessary, correct and rerun.

ERROR 12028 TYPE R

Explanation: The major sorting key, cc 27 of card F, is invalid.
The program assumed a blank entry.

Action: Check F card(s) and, if necessary, correct and rerun.

ERROR 12029 TYPE R

Explanation: The resource grouping code, cc 44-45 of card F, or
the resource code, cc 47-50 of card F, is invalid. The program
assigned a value of 0.

Action: Check F card(s) and, if necessary, correct and rerun.

ERROR 12030 TYPE I

Explanation: An attempt was made to exceed 16 output request cards.
The card was ignored by the program.

Action: The excess cards will require another run if these reports
are desired.

ERROR 12032 TYPE F

Explanation: The first card in a network's initial run does not
specify G as the run type, cc 7 of card A.

Action: Correct and rerun.

ERROR 12033 TYPE I

Explanation: An invalid card code has been detected. This card
was ignored, as were all succeeding cards until a valid card code
was reached.

Action: Check card file and, if necessary, correct and rerun.

ERROR 12034 TYPE I

Explanation: An invalid card code has been detected in a maintenance
run. Only A, B, and J (progress reporting card) are allowed. This
card was ignored, as were all succeeding cards until a J code was
reached.

Action: Check card file and, if necessary, correct and rerun.

ERROR 12035 TYPE I

Explanation: An invalid card code, a J, has been detected in a
generation run. This card was ignored, as were all succeeding cards
until a valid code was reached.

Action: Check card file and, if necessary, correct and rerun.

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ERROR 12036 TYPE F

Explanation: Run code is not G, U, R, or Z.

Action: Correct and rerun.

ERROR 12037 TYPE I

Explanation: A card code of H, a preceding work item card, has been detected in a run where the network type was specified as IJ/PERT/ CPM in cc 9-11 of the A card. This card was ignored, as were all succeeding cards until a valid card code was reached.

Action: Check card file and, if necessary, correct and rerun.

ERROR 12041 TYPE I

Explanation: A card has been detected which was neither a card of the type currently being processed nor a beginning-of-file card. The program ignored that card and all following cards until encountering a beginning-of-file card.

Action: Check the card file and, if necessary, correct and rerun.

ERROR 12042 TYPE I

Explanation: The network identification on a card does not match the ID for the network currently being run. The card was ignored.

Action: Check card file and, if necessary, correct and rerun.

ERROR 12042 TYPE R

Explanation: There is no network identification in a card. The program processed the card in the usual manner, assuming that the condition had been caused by an oversight.

Action: Check card file and, if necessary, correct and rerun.

ERROR 12043 TYPE I

Explanation: An invalid modification code, cc 6, was detected.

    1. The code was not blank nor c nor D on a G card or an L
        card.
    2. The code was neither blank nor C for an I, J, or K card.
    3. The code was neither blank nor D for an H card.

The card was ignored by the program.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12044 TYPE I

Explanation: No work item identification cc 7-16 of card G, H, I,
J, K, or L, is present. The program ignored the card.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12045 TYPE I

Explanation: The same identification was given for both the I and
the J of a work item, cc 7-16 of a G, I, J, K, or L card. The
program ignored the card.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12046 TYPE R

Explanation: Characters 5 and 6 of an IJ network's WI identification,
specified in cc 7-16 of a G, I, J, K, or L card, are not blank.
The program processed the card in the usual manner, overlooking this
discrepancy.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12047 TYPE I

Explanation: A work item referred to in cc 7-16 of a G, H, I, J,
K, or L card is not on the master file. The program ignored that
card.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12050 TYPE I

Explanation: The revised work item code, cc 71-80 of a G card, is
the same as the code to be revised. The program ignored this
revision.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12051 TYPE R

Explanation: An invalid number of work days in the week, cc 68 in the G card, has been specified. The program assigned a value of 5.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12052 TYPE R

Explanation: The calendar code, cc 69 of card G, was invalid, that is, not blank, 1, or 2. The program assigned a blank code.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12053 TYPE R

Explanation: The conversion code, specified in cc 70 of a G card, is invalid. The program assigned a code of blank.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12052 TYPE R

Explanation: The calendar code, cc 69 of card G, was invalid, that is, not b, 1, or 2. The program assumed a code of blank.

Action: Check the card and if necessary, correct and rerun.

ERROR 12054 TYPE I

Explanation: A revised WI code, cc 71-80 of a G card, was specified in a work item card which did not specify a change (a modification code of C in cc 6). The revision was ignored.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12055 TYPE I

Explanation: There are more than 2240 WI cards present. Only the first 2240 cards are read by the program.

Action: Check the card file and, if necessary, correct and rerun.

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ERROR 12056 TYPE I

Explanation: A revised WI code, cc 71-80 of a G card, is already
present on the master file.   The revision was ignored by the
program.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12057 TYPE I

Explanation: An attempt was made to specify a work item which is
already present on the master file. The information on that card
was ignored.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12058 TYPE I

Explanation: More than 2000 WI records are on the master file.
The program ignored any work items in excess of the maximum 2000.

Action: Check the number of valid work items and, if necessary,
correct and resubmit.

ERROR 12059 TYPE R

Explanation: A work item is specified as finished after an original
duration modification has been made. The program sets the percent
complete to date to 1, the remaining duration to 0, and the current
duration equal to the original duration. Then processing is
continued.

Action: Check and, if necessary, correct and resubmit. If the
assumption was correct, all the time information on the master file
must be updated in a succeeding run with a progress reporting card.

ERROR 12060 TYPE R

Explanation: A time delay, specified in a field of the H card, for
a delay type other than a percentage has exceeded the limit of four
digits. The program changes this value to 0 and proceeds. The PWI
in error is indicated.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12061 TYPE I

Explanation: More than 2008 PWI cards have been submitted in any one run. The excess cards are not read by the program.

Action: Check card file and, if necessary, correct and rerun.

ERROR 12062 TYPE R

Explanation: The relationship code, cc 29 of an H card, is invalid. A code of blank is assumed by the program. The PWI in error is indicated.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12063 TYPE R

Explanation: The type of time delay, cc 30 of the H card, is invalid. A code of blank is assigned by the program. The PWI in error is indicated.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12064 TYPE R

Explanation: The type of time delay for a PWI is specified as a percentage (P in cc 30 of card H), although the relationship is specified as finish to start (blank in cc 29 of the same card). The program changes the type of time delay to blank (days). The PWI in error is indicated.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12065 TYPE I

Explanation: An H card specifies the same identification for a PWI as it does for the WI on that card. The program ignored this PWI. The PWI in error is indicated.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12067 TYPE I

Explanation: A PWI, specified on an H card, is not present as a WI on the master file. The program ignored this PWI. The PWI in error is indicated.

Action: Check the card file and, if necessary, correct and rerun.

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ERROR 12068 TYPE I/F

Explanation: More than 4500 PWI records are on the master file.

    1. In a precedence network, the excess PWI's are ignored and
        card input is continued.

    2. In an IJ network, the error is not detected until network
        processing. The run is aborted.

Action: Check the network and card file in order to reduce the
number of PWI's in the network by deletion, and resubmit.

ERROR 12069 TYPE I

Explanation: An attempt has been made to add a PWI which is already
present on the master file. The program ignores the information.
The PWI in error is indicated.

Action: Check the card input file and, if necessary, correct and
rerun.

ERROR 12070 TYPE I

Explanation: An attempt was made to delete a preceding work item
not in the PWI file. The program ignored the revision. The PWI in
error is indicated.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12071 TYPE R

Explanation: The schedule start date type, cc 18 of card I, is
invalid. The program assigned a type of 1.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12072 TYPE I

Explanation: The scheduled start date, cc 20-26 of card I, is
invalid. The program ignored the date.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12073 TYPE R

Explanation: The scheduled finish date type, cc 28 of card I, is
invalid. The program assigned a type of 1.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12074 TYPE I

Explanation: The schedule finish date, cc 30-36 of the I card, is
invalid. The program ignored the date.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12075 TYPE R

Explanation: The schedule finish date, cc 30-36 of card I, is
earlier than the schedule start date; however, the information was
accepted by the program. This error can lead to inaccurate Network
Calculations.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12077 TYPE R

Explanation: Actual finish date, cc 26-32 of card J, is earlier
than the actual start date on the master file; however, the program
accepted the information.

Action: All the time information on the master file must be revised
in a subsequent run.

ERROR 12078 TYPE R

Explanation: There are no dates present, either on the card or on
the master file, for a finished work item; therefore, the current
duration was not updated by the program.

Action: Check, and submit the dates necessary to complete the
updating.

ERROR 12079 TYPE I/R

Explanation: No actual start date is present, either in the J card
or on the master file.

    1. For a finished work item (actual finish date is present
        on the card), the current duration is not updated (I).
    2. For a work item that has started, an actual start date is
        estimated (R).

Action: Check, and submit the necessary date in a subsequent run.

ERROR 12080 TYPE R

Explanation: No actual finish date is specified on the J card for a finished work item, but the actual start date is present either on the card or on the master file; therefore, the program did not update the current duration.

Action: Check, and submit the date in a subsequent run.

ERROR 12081 TYPE R

Explanation: The conversion factor for the remaining duration, specified in cc 39 of a J card, is invalid. The program assumed a code of blank. Only blank, 1, 2, 3, 4, 5, and 6 are valid codes.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12082 TYPE R

Explanation: The percentage complete specified in columns 41-45 of a J card, is greater than 1. The program assumes a percentage of 100. The field is assumed to have the format x.xxxx with decimal point implied.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12083 TYPE R

Explanation: The percent complete to date is greater than 100 (1) as specified in cc 47-51 of a J card, or (2) as calculated using percent complete this period, cc 41-45 of a J card.

The program assumes that this percentage is 100.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12084 TYPE I

Explanation: No cost information appears in cc 66-72 or 74-80 of a J card which specified a "C" (cost information) in cc 6. The card was ignored by the program.

Action: Check the card and, if necessary, correct and rerun.

ERROR 12085 TYPE I

Explanation: The actual start date, specified in cc 18-24 of a J
card, is invalid. This date was ignored by the program.

Action: Check the card and, if necessary, correct and resubmit.

ERROR 12086 TYPE I

Explanation: The actual start date, specified in cc 18-24 of the
J card, is later than the data date. This date was not accepted.

Action: Check the card and, if necessary, correct and resubmit.

ERROR 12087 TYPE I

Explanation: The actual finish date, specified in cc 26-32 of the
J card, is invalid. The date was not accepted.

Action: Check the card, correct, and resubmit.

ERROR 12088 TYPE R

Explanation: The actual finish date, specified in cc 26-32 of the
J card, is later than the data date. The program replaces this
date with the data date.

Action: Check the card and, if necessary, correct and resubmit.

ERROR 12089 TYPE I

Explanation: The actual start date, specified in cc 18-24 of card
J, is later than the actual finish date, specified in cc 26-32 of
the card. The dates are not accepted.

Action: Check the card, correct, and resubmit.

ERROR 12090 TYPE I

Explanation: There is insufficient or no time information on a
progress reporting card (J) which specified blanks (time) as the
time/cost code in cc 6. The card is ignored.

Action: Check and resubmit.

ERROR 12091 TYPE R

Explanation: Two overlapping pieces of time information (that is,
remaining duration, percent complete this period, and percent
complete to date) are reported on the J card. The program selected
the remaining duration if it was one of the two; if it was not, the
program selected the percent complete to date. Card processing is
continued.

Action: Check and, if necessary, change and resubmit.

ERROR 12092 TYPE R

Explanation: Three overlapping pieces of time information (that
is, remaining duration, percent complete this period, and percent
complete to date) are reported on the J card. The program selected
the remaining duration.

Action: Check and, if necessary, change and resubmit.

ERROR 12093 TYPE R

Explanation: Both cost fields (66-72) (74-80) on J card have values.
There is more than one cost figure on the J card. The actual cost
to date (74-80) is selected by the program.

Action: Check and if necessary, change and resubmit.

ERROR 12094 TYPE R

Explanation: The remaining duration, specified in cc 34-37 of the
J card, is longer than the original duration. The program changes
the percent complete to date on the master file to 0.

Action: Check, and if necessary, correct and resubmit.

ERROR 12095 TYPE R

Explanation: Actual start date on the master file is not in accordance
with the updating information in the J card. The updating infor-
mation is accepted by the program.

Action: All the time information on the master file must be
revised in a subsequent run.

ERROR 12096 TYPE R

Explanation: The units code, specified in cc 23, 33, 43 or 53 of
the K card, is invalid. The program assumed a code of blank. The
code in error is indicated.

Action: Check the card and, if necessary, change and resubmit.

ERROR 12098 TYPE I

Explanation: The resource code, specified in cc 19-22, 29-32,
39-42, or 49-52 of the K card is invalid; that is, it does not
appear in the resource description file. The code was ignored by
the program. The code in error is indicated.

Action: Check, and if necessary, change and resubmit.

ERROR 12101 TYPE I

Explanation: More than 240 milestone records are on the master
file. The card is ignored.

Action: Reduce the number of milestones by deletion.

ERROR 12102 TYPE R

Explanation: The position code specified in cc 18 of the L card,
is invalid. The program assumed a code of blank.

Action: Check the card and, if necessary, change and resubmit.

ERROR 12105 TYPE I

Explanation: An attempt was made to modify or to delete a milestone
which is not on the master file. The program ignored the information.

Action: Check the card and, if necessary, change and resubmit.

ERROR 12110 TYPE F

Explanation: The card which sould be the first PCS data card is
not a processing control card (type A).

Action: Check the card input deck.

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ERROR 12111 TYPE F

Explanation: Run type, cc 7 in card A, is not one of the specified codes (G, U, R, or Z).

Action: Check cc 7 in card A, change and rerun.

ERROR 12112 TYPE F

Explanation: Network type, cc 9-11 in card A, is neither CPM nor blank.

Action: Check cc 9-11 in card A, change and rerun.

ERROR 12115 TYPE R

Explanation: An invalid date was specified for the lower span date (cc 11-17 of card F) of a report, or the lower span date was specified as earlier than the project base date. The program then assumes that the early span date was equal to the project base date.

Action: Check cc 11-17 of the F card(s). If the program's assumptions are incorrect, correct the input and rerun.

ERROR 12116 TYPE R

Explanation: A nonnumeric (invalid) minor sort key for an output report request has been detected. The program assumed a blank.

Action: Check cc 53-80 of F cards for a nonnumeric card column. Correct the card and rerun.

ERROR 12117 TYPE R

Explanation: An invalid date was specified for the upper span date (cc 19-25 of card F) of a report, or the upper span date was specified as an earlier date or the same date as the lower span date. The lower span date is set equal to the project base date and the upper span date is assumed to be equal to the calculated completion date.

Action: Check cc 19-25 of the F card. If the program's assumptions are incorrect, correct the input and rerun.

ERROR 12150 TYPE F

Explanation: The start and finish work items for this network are
identical. The work item number is printed following the above
program message.

Action: Correct and rerun.

ERROR 12151 TYPE F

Explanation: No start work item has been specified; that is, there
is no work item without a predecessor.

Action : Correct and rerun.

ERROR 12152 TYPE F

Explanation: More than one start work item has been specified. The
work item numbers are listed following the above program message.

Action: Correct and rerun.

ERROR 12153 TYPE F

Explanation: No finish work item has been specified; that is, there
is no work item which is not a predecessor.

Action : Correct and rerun.

ERROR 12154 TYPE F

Explanation: More than one finish work item has been specified.
The work item numbers are printed following the above program message.

Action: Correct and rerun.

ERROR 12155 TYPE F

Explanation: At least one loop has been found in the network. Con-
trol has been sent to the LOOP routine in order to cause printing
of the work items on the loop(s).

Action: Consult the alphabetic program messages to locate the
message which the LOOP routine has caused to be printed following
the above message.

ERROR 12160 TYPE I

Explanation: While the program was attempting to print the summary bar graph, an invalid character in a file or in core was detected. The report is bypassed and control returned to report controller.

Action: Take a master file print to determine if the files are bad. If so, the network must be regenerated. If not, try the run again.

ERROR 12161 TYPE I

Explanation and Action: Same as (12160) but for bar graph.

ERROR 12162 TYPE I

Explanation and Action: Same as (12160) but for lump sum cost report.

ERROR 12163 TYPE I

Explanation and Action: Same as (12160) but for monthly cost report.

ERROR 12164 TYPE I

Explanation and Action: Same as (12160) but for milestone report.

ERROR 12168 TYPE F

Explanation: An internally generated error has been detected by the early times routine of the network processor. No program recovery is possible.

Action: An update run against the network must be made with a WI or PWI being added or deleted. This may be simulated by deleting and adding the same WI in that sequence. This forces 1130 PCS to topologically renumber the network for valid network processing.

        The following error messages relate to errors identified by the generalized SORT routines.

ERROR 12201 TYPE F

Explantion: The sort program has received a negative record count as the number of records it is to sort.

Action: Rerun the job. If the job was a generation run, ascertain whether or not the initial network was stored by using the master file list option described in the Operator's Manual. If the data is good, an update run may be attempted.

ERROR 12202 TYPE F

Explanation: More than 642 sectors are to be sorted, exceeding the capacity of the sort.

Action: Attempt a rerun as explained for Error 12201.

ERROR 12203 TYPE F

Explanation: The length of the record to be sorted is zero or negative.

Action: Attempt a rerun as explained for Error 12201.

ERROR 12204 TYPE F

Explanation: The number of sort keys is zero or negative.

Action: Attempt a rerun as explained for Error 12201.

ERROR 12205 TYPE F

Explanation: The number of sectors to be sorted is zero or negative.

Action: Attempt a rerun as explained for Error 12201.

ERROR 12206 TYPE F

Explanation: The number of records in a sector to be sorted is a negative value.

Action: Attempt a rerun as explained for Error 12201.

ERROR 12207 TYPE F

Explanation: A sort field is zero or greater than the record length.

Action: Attempt a rerun as explained for Error 12201.

ERROR 12208 TYPE F

Explanation: An unidentifiable machine or program error has prevented continuation of the sort.

Action: Attempt a rerun as explained for Error 12201.

ERROR 12209 TYPE F

Explanation: An unidentifiable machine or program error has prevented continuation of the sort (SORT).

Action: Attempt a rerun as explained for Error 12201.

ERROR 12210 TYPE F

Explanation: The count of the number of records on input does not agree with the internal count maintained by the sort program (SORT A).

Action: Attempt a rerun as explained for Error 12201.

ERROR 12211 TYPE F

Explanation: An unidentifiable machine or program error has prevented continuation of the sort (SORT D).

Action: Attempt a rerun as explained for Error 12201.

MAJOR KEY = MINOR KEY

THEN MINOR KEY = EARLY START DATE

Explanation: The major sort key, cc 27 of the F card, is either 1 or 2. A report request on the same card specifies a minor sort key, a column between 53 and 80, of identical value. The program sets the minor keys to 4, and the report is processed.

Action: If the program's remedial action was incorrect, change the keys and resubmit.

MINOR KEY INVALID. BAR CHART REPORT BYPASSED.

Explanation: The minor sort key for a bar chart report, cc 63 or 64 of the F card, contains an invalid value, that is, a value other than 1 through 8. The report was eliminated from this run.

Action: Correct and resubmit.

MINOR KEY INVALID. LUMP SUM COST REPORT BYPASSED.

Explanation: The minor sort key for a lump sum cost report,
cc 69-70 of the F card, contains an invalid value, that is, a value
other than 1 through 7. The report was eliminated from the run.

Action: Correct and resubmit.

MINOR KEY INVALID. MILESTONE REPORT BYPASSED.

Explanation: The minor sort key for a milestone report, cc 55 or
56 of the F card, contains an invalid value; that is, a value other
than 3 through 8. The report was eliminated from this run.

Action: Correct and resubmit.

MINOR KEY INVALID. MONTHLY COST REPORT BYPASSED.

Explanation: The minor sort key for a monthly cost report, cc 71
of the F card, contains an invalid value, that is, a value other
than 4 or 5. The report was eliminated from this run.

Action: Correct and resubmit.

MINOR KEY INVALID. RESOURCE ASSIGNMENT IGNORED.

Explanation: The minor sort key for a Resource Assignment report,
cc 65 or 66, of the F card contains an invalid value, that is, a
value greater than 7. The report was eliminated from this run.

Action: Correct and resubmit.

MINOR KEY INVALID. RESOURCE UTILIZATION IGNORED.

Explanation: The minor sort key for a resource utilization report,
cc 67 or 68 of the F card, contains an invalid value, that is, a
value other than 4, 5, 6, or 7. The report was eliminated from
this run.

Action: Correct and resubmit.

MINOR KEY INVALID. SCHEDULE REPORT BYPASSED.

Explanation: The minor sort key for a schedule report, cc 61 or 62
of the F card, contains an invalid value, that is, a value other
than 1-8. The report was eliminated from this run.

Action: Correct and resubmit.

MINOR KEY INVALID.   SUMMARY BAR CHART REPORT BYPASSED.

Explanation: The minor sort key for a summary bar chart report,
cc 53 or 54 of the F card contains an invalid value, that is, a
value other than 4, 5, 6, or 7. The report is eliminated from this
run.

Action: Correct and resubmit.

MINOR KEY INVALID.   WORK STATUS AND PROGRESS REPORT BYPASSED.

Explanation: The minor sort key for a work status and progress
report, cc 59 or 60 of the F card, contains an invalid value, that
is, a value other than 1 through 8. The report was eliminated from
this run.

Action: Correct and resubmit.

NO MAJOR KEY FOR THE ORGANIZATION CODE.   REPORT BYPASSED.

Explanation: The major sort key, cc 27 of the F card was blank,
but from 1 to 3 organization codes were specified in cc 29-42 of the
same card. The reports specified on this card are eliminated from
this run.

Action: Correct and resubmit.

NO MAJOR KEY FOR THE SUMMARY BAR CHART.   REPORT BYPASSED.

Explanation: Column 27 of the F card, the major sort key, is
blank. Since this key is required for the summary bar chart, the
report is eliminated from this run.

Action: Correct and resubmit.

The following messages may occur during network processing:

1. XXXXXXXXXX WI COMPLETED BUT NO SA

2. XXXXXXXXXX WI COMPLETED BUT NO FA

3. XXXXXXXXXX WI COMPLETED BUT NO SA AND NO FA

4. NETWORK COMPLETED

    This message is printed when both an actual start and
    actual finish date have been submitted for the end WI of
    a network.

5.   FLOAT OF WI XXXXXXXXXX EXCEEDS ONE YEAR

The program will continue processing if possible. The
final results of the network calculations may be invalid.

The following may occur during loop detection:

1.   ONE LOOP

The network contains one loop.

2.   SEVERAL LOOPS

The network contains more than one loop.

If the program detects a loop, it pauses and types the follow-
ing message on the console typewriter:

PRESS START TO OPTIONALLY ENTER LOOP DETECTION

This gives the user the option of entering or aborting a possible
lengthy run to detect loops when he considers the error message
and the work item list sufficient information.

On recognizing a G in cc7 of the processing control card, the
program pauses and types on the console typewriter:

NEW NETWORK TO BE GENERATED
PRESS START TO CONTINUE PROCESSING

This gives the operator an opportunity to check that he has a clean
disk pack mounted, thus providing protection against the destruction
of valuable data.

The following message occurs if there are no blank cards in
the reader/punch at the start of the master file dump:

NPRO, INSERT BLANK CARDS, PRESS READER START, PROGRAM START

If the cards run out in the middle of the routine, no message is
printed--refer to Operator's Manual.

The message:

END OF JOB - PCS

will print for either the end of a complete job or termination due
to errors. Control is returned to the resident monitor.

The following message is typed if a loop has been detected during topological ordering:

A LOOP HAS BEEN DETECTED IN TOPOLOGICAL ORDERING.

PREPROCESSING FOR THE LOOP IDENTIFICATION PHASE IS NOW TAKING PLACE.

TO TERMINATE LOOP DETECTION AT THIS POINT PUT CONSOLE DATA ENTRY SWITCH 2 UP. IN ANY CASE PRESS START.

If the user feels that the loop can be identified without the aid of computer processing, he can terminate loop detection and identification at this point by putting console switch 2 up before pressing console START.

The following message appears on the printer when work status punched cards have been requested by the user:

NPRO, INSERT BLANK CARDS, PRESS READ START, CON START

At this point, the reader/punch should be cleared, and blank cards inserted prior to pressing START on the reader and console.

CHAPTER 5: SAMPLE PROBLEM

This chapter presents the sample problem for the 1130 Project Control System. This problem has three objectives:

1. To illustrate the features and reports available with 1130 PCS

2. To serve as a teaching aid for new users of the system

3. To provide a diagnostic program that the user can run to check the performance of his system

The sample problem has intentionally been kept small so that users can compute all output by hand. Rather than attempt to include all the features of 1130 PCS in a small problem, the problem was structured to include those features that will be in most common use.

The sample project is the building of a school playground. It involves four basic activities: clearing, grading, installation of a drainage system, and paving. Each follows a logical sequence, with some of the preliminary work shown. As often as possible the work is overlapped, as it would be in a larger, real-life project.

Figure 29 is the precedence network diagram for the sample problem.

A machine listing of the input data is shown. The program outputs are the same as those used for illustrating the output reports in Chapter 3.

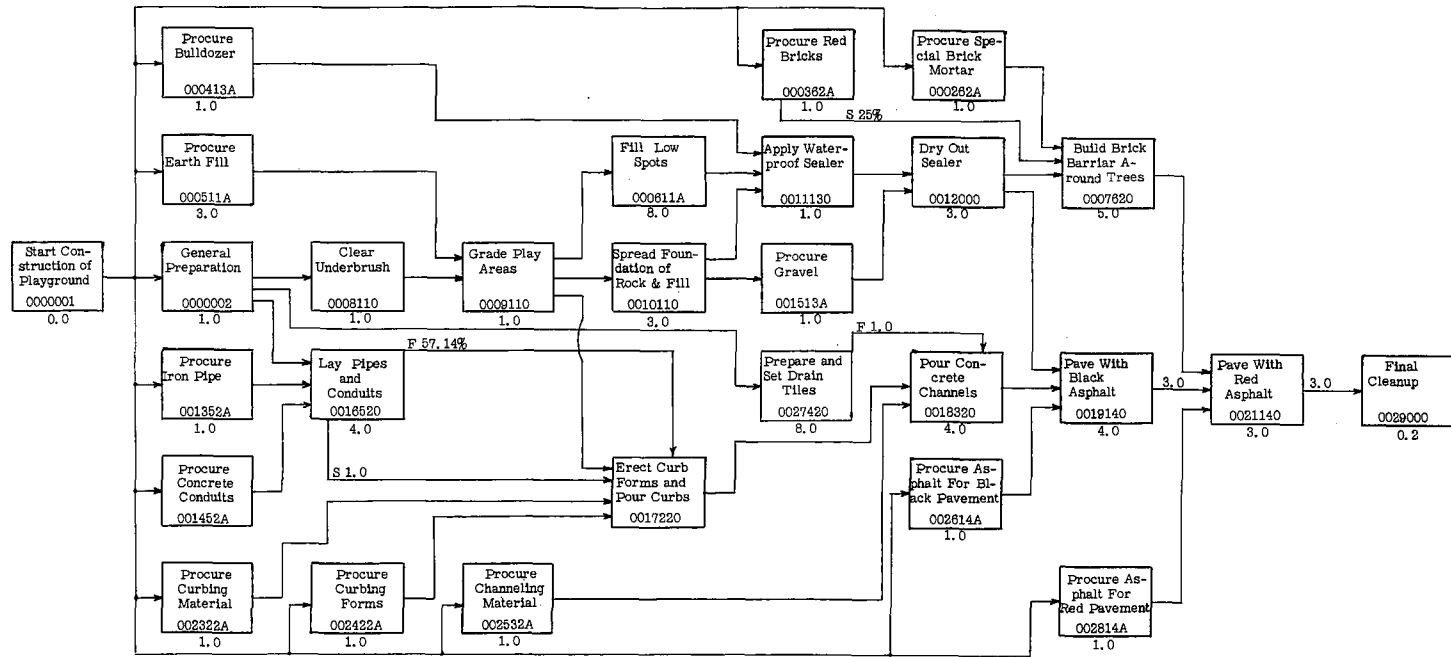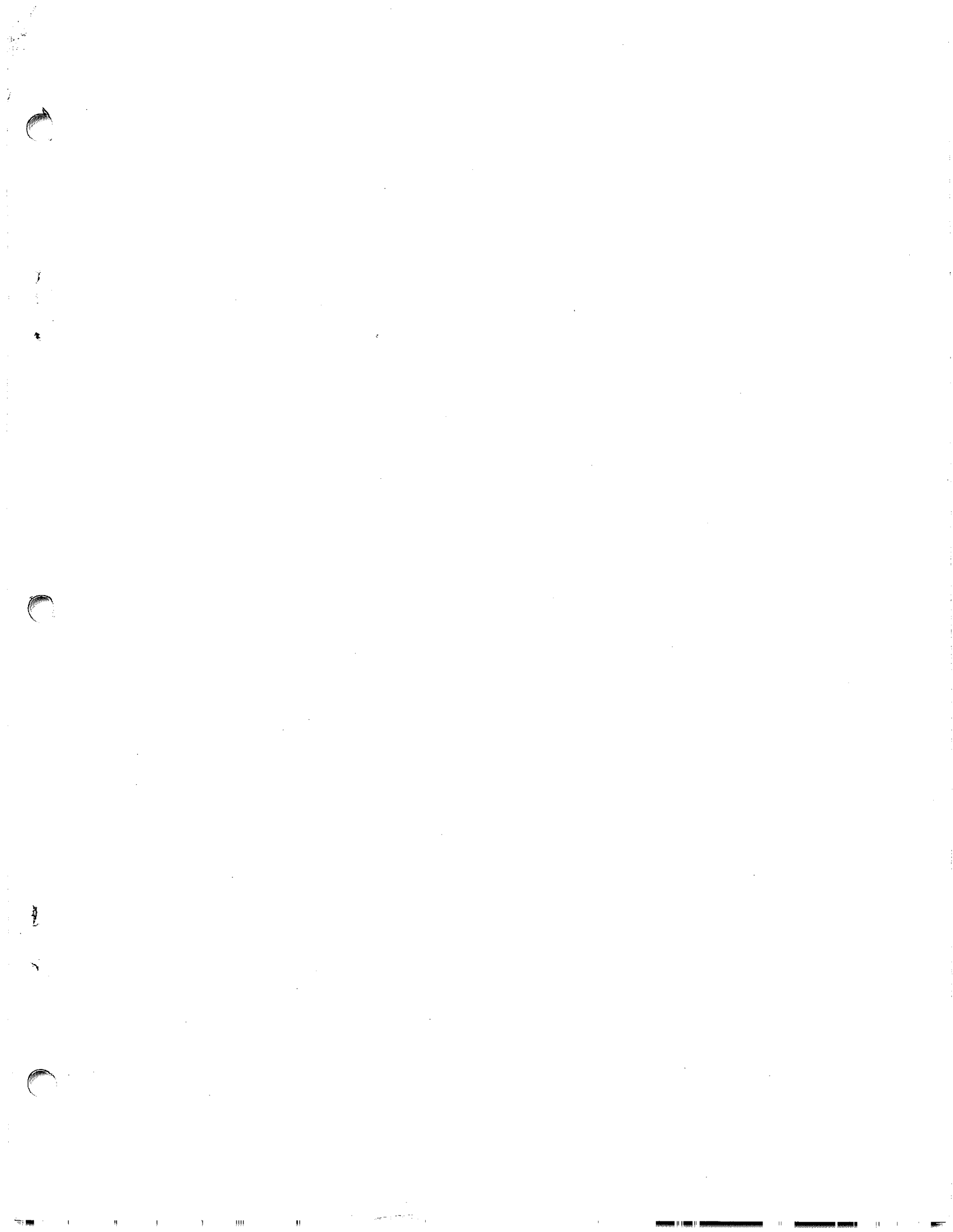The problem requires thirty minutes to process on the IBM 1130.

| Procure Bulldozer 000413A 1.0 |
| Procure Earth Fill 000511A 3.0 |

Start Construction of Playground 0000001 0.0

General Preparation 0000002 1.0

Clear Underbrush 0008110 1.0

Grade Play Areas 0009110 1.0

Fill Low Spots 000611A 8.0

Spread Foundation of Rock & Fill 0010110 3.0

Procure Red Bricks 000362A 1.0   S 25%

Procure Special Brick Mortar 000262A 1.0

Apply Waterproof Sealer 0011130 1.0

Dry Out Sealer 0012000 3.0

Build Brick Barrier Around Trees 0007620 5.0

Procure Gravel 001513A 1.0   F 1.0

Procure Iron Pipe 001352A 1.0

Lay Pipes and Conduits 0016520 4.0   F 57.14%

Procure Concrete Conduits 001452A   S 1.0

Procure Curbing Material 002322A 1.0

Procure Curbing Forms 002422A 1.0

Procure Channeling Material 002532A 1.0

Erect Curb Forms and Pour Curbs 0017220

Prepare and Set Drain Tiles 0027420 8.0

Pour Concrete Channels 0018320 4.0

Pave With Black Asphalt 0019140 4.0   3.0

Procure Asphalt For Black Pavement 002614A 1.0

Procure Asphalt For Red Pavement 002814A 1.0

Pave With Red Asphalt 0021140 3.0   3.0

Final Cleanup 0029000 0.2

FIGURE 29 SAMPLE PROBLEM NETWORK DIAGRAM--PRECEDENCE FORM