SIMPLIFIED COST CONTROL TECHNIQUE FOR SMALL AND MEDIUM SIZED BUILDING CONTRACTORS

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FOR
SMALL AND MEDIUM SIZED
BUILDING CONTRACTORS

by

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ABSTRACT

During the last thirty years, smaller building contractors who do jobs up to five million dollars in value and who make up approximately ninety percent of the construction industry, have experienced increasing difficulties and failures in completing construction projects on time and within budget. The factors responsible are generally identified as today's more complex projects and environmental protection demands, inflation and financing difficulties, and multiplicity of union demands. Since monitoring of these factors is complex, it is difficult to control them using traditional cost control methods.

To understand these real life problems faced by smaller building contractors, the present construction industry practice has been studied both through interviews and survey of recent publications. In spite of low profits, only a minority gives up the traditional practices in favour of modern techniques. They are afraid that the transition will be costly, will require new expertise and will cause implementation difficulties. Their reluctance is understandable, since most modern techniques are computer based and the available package programs are tailored to meet the needs of large organizations or are very specific, capable of meeting limited needs.

This Project Report presents a Simplified Cost Control Technique (SCCT) which is easy and simple for adoption by these contractors and at the same time overcomes the drawbacks of traditional methods. SCCT proposes the preparation of workbreakdown structure, rate table, bar charts and seven periodic cost reports to monitor and control the construction costs effectively. This Project Report also presents a few other possible uses of SCCT, in addition to cost control. To ensure the timely availability of

these periodic reports. a method of computerizing this technique has also been outlined in this report.

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CHAPTER 1

TRADITIONAL COST CONTROL AND MODERN TECHNIQUES

In spite of fast technological progress, particularly during the last thirty years, traditional cost control methods still form the backbone of the building construction industry. During the same period, large construction projects have so grown in size and complexity, that they have become difficult to manage. Concurrently, the growth of complexity in environmental protection demands, changes in tax structures and multiplicity of union demands have significantly decreased the effectiveness of traditional methods. As a result, large construction organizations have felt strongly the need for modern methods to replace the traditional ones. Modern technology has responded to such needs with time, resource, and cost analysis techniques. However, these developments have stayed mainly with large organizations, and until now small and medium sized contractors who form ninety percent of the building industry, have not accepted them (Berger et al. 1977).

The reason generally given for this is that the construction process for smaller buildings is less complex, not requiring the employment of any special scheduling techniques. If this is true, then what is the explanation for the low profit margin of these building contractors? It is either because of uncontrollable factors such as labour strikes, poor weather and so forth, or these contractors have failed to adopt modern techniques available for schedule and cost control.

In spite of the low profit, contractors generally are not anxious to give up their practices in favour of modern techniques. They are afraid that the transition will be costly, will require new expertise and will cause

implementation difficulities. Their reluctance is understandable, since most modern techniques are computer based and the available programs are tailored either to meet the needs of large organizations or are very specific, capable of meeting limited needs.

To obtain a clear grasp of and consequently to define the problem, it is necessary to study the following:

1 A Building Contractor's Clientele,
2 Traditional Cost Control Methods,
3 Drawbacks of Traditional Cost Control,
4 Modern Cost Control Techniques,
5 The Need for a Simplified Technique, and
6 Computer Processing.

1.1.0 A building Contractor's Clientele

Traditionally, a building contractor has occupied an important place in the construction industry as one of three participants; the other two are owner and his architect/engineer (Berger et al. 1977). Both of them exercise definite influence and control over him through their contract documents. It is the duty of a building contractor to transform the obligations into construction methods, schedule and budget, which are also necessary ingredients for cost control. Therefore, a clear understanding of his traditional cost control methods depends on some knowledge of the activities and expectations of his clientele.

The owner who is also an initiator of a building project selects an architect on a time or percentage-of-project-cost basis, and approves his engineering team. Then he defines his requirements, sets up his

budgetary and time limitations, and approves plans and specifications at various design stages. At the tender stage, he accepts the successful prime contractor and his subcontractor team. At the construction stage, he approves and accepts the cost of change order proposals and makes the progress payments.

Thus, an owner's concern for the search of an economic design is translated into the search for an architect/engineer team in which he can place complete faith and good intentions. Some large owner organizations, such as Canada Public Works, instead of placing such complete reliance have started acting as initiators of change. One of their requirements is the application of Uniform Construction Index (UCI) format to their construction specifications, the other change is the encouragement for the application of Critical Path Method (CPM) network scheduling techniques. However, such requirements are still considered exceptional in the building construction industry.

The work of an architect/engineer team starts with defining a building construction project. The increase in the project costs results in an increase in his rewards. However, bound by professional ethics, fairness to client, competition and the requirement to follow the latest codes and standards in engineering design and material selection, the architect/engineer keeps project costs low. Prior to a tender, design drawings and specifications are completed with extensive detail work. This is generally necessitated by the type of intended construction contract, namely stipulated-price, in which the objective is to minimize the risk of unknowns to a prospective contractor, thereby obtaining a better price. At the construction stage, his duties include preparing proposed change orders, negotiating construction costs, monitoring progress, insuring quality and certifying progress payments (Healy 1981).

The traditional role of an owner and his architect/engineer indicates that until the bid is invited, they work in close cooperation on the preparation of design and bid documents. Thereafter, their roles are governed by the contract conditions. The contractor's bid price includes performance according to specifications. The owner and the architect/engineer do not concern themselves with the project cost.

Therefore, a building contractor is a very important member in the building construction team, who brings a project to reality. His decisions and actions are strictly related to running a profitable business. Because of this, his cost control methods are very important.

1.2.0 Traditional Cost Control Methods

The traditional cost control methods followed by small and medium sized building contrators have been studied both through recent publications and interviews with contractors. The relevant information is summarized in the following paragraphs:

1.2.1 Prebid Planning and Cost Estimate

Following a bid invitation, building contractors obtain plans and specifications of the project from the architect's office and prepare cost estimate.

Complexity in the estimating phase, usually depends, besides in the size of a project, on the amount and variety of in-house work. Nevertheless, he divides a project into its subcontract packages following the specifications which are generally based on the UCI divisions. At this stage, construction methods, labour and equipment requirements are not analyzed in detail.

The estimate of in-house work usually starts with material takeoff. For this purpose, each contractor has his own cost coding system and standard estimate forms (Appendix A). One of these coding systems, for example, may use numeric and alphabetic characters: numbers to indicate specification sections which are generally UCI division numbers, upper case letters to indicate specification subdivisions, and lower case letters are for elements of cost such as manpower, material equipment and so on.

Labour cost is estimated with the aid of in-house historical productivity data, costing guides and indices, material cost is generally obtained directly from suppliers and equipment cost is based on the rental rates or subcontract costs. Alternatively, these direct costs are derived from his own historical cost data.

Such costs are added up with the estimated indirect costs to compute the total cost of his in-house work. To this are added the subcontract costs, purchasing costs of requested bonds, the sums of permits, project insurance costs, taxes and mark up, and a bid price is arrived at.

1.2.2 Construction Cost Control

Under a stipulated-price construction contract, cost control is primarily a contractor's responsibility. Whether his operation is profitable or not depends on keeping costs within his estimate which is also his budget. Therefore, for a contractor, a sound cost control system is essential (Teicholz 1974). Among traditional practices the following procedures are widely in use:

Manpower Cost

Currently employed manpower cost control practices include the use of daily time sheets and weekly cost summary reports. The content of these

forms does not differ very much from one company to another. A typical daily time sheet is given in Appendix B. It generally consists of workman's badge number, a cost code and description for the work classification, regular and overtime work hours, and regular, overtime and total earnings. Such time sheets are filled out by foreman, checked by field engineer, and then given to a cost engineer for inclusion in the weekly labour cost summary report (Appendix C).

These reports generally consist of a cost code and description for the work classification, weekly, total-to-date and estimated costs of manhours, quantities of work and their unit prices. Furthermore, there is usually a percent-complete column.

In smaller contracting companies, undertaking a limited variety of in-house work, construction cost control methods practically end with carrying relevant information from weekly labour cost summary reports to payroll sheets. This is also true for the following remaining cost elements which are generally either fixed or controlled through bookkeeping.

Material Cost

Unlike manpower costs, material costs for a building contractor do not require any significant control. Prior to submitting his bid, the contractor obtains stipulated-price bids from several material suppliers for all the materials needed for the project except for a few minor items. After award of contract, the contractor signs a contract with one of the material suppliers and this transfers the responsibility of cost control to him. The cost of materials is then fixed for a stipulated period. In the event that the contractor requests delivery of any materials after this period, the agreed cost must be renegotiated. In any case, from takeoff to end of the period, the material supplier is responsible for all possible omissions. In a sense he functions as a stipulated-price subcontractor. Therefore, a building

contractor's material cost control is limited to the search for the best price.

Equipment Cost

Equipment used in building construction consists of mostly small and only a few large pieces of equipment. Small tools are generally charged to overhead cost. In the case of large equipment units, cost control methods vary in accordance with the mode of acquiring them. The possibilities are: subcontracting, which means transfer of cost control responsibility to a subcontractor, and renting or owning. In the latter two modes his objective is to achieve the most economical use of the equipment through control over operator manhours which is an extension of manpower cost control. When he owns the equipment he needs additional control over ownership and operating costs by individual units (Ahuja 1976). Most local contractors in building construction do not own any large equipment and use the subcontracting or renting mode of equipment acquisition (Dellinger 1974).

Subcontracting Cost

A building contractor almost always works with subcontractors on a lump-sum contract basis. The terms of such contracts are similar to his own contract with the owner. However, in this case, roles are reversed as he acts like an owner to his subcontractors. Therefore, he uses owner's construction cost control methods for the subcontracted work. These include determination of progress payments and administration of overhead charges.

Overhead Cost

Overhead cost generally consists of office, engineering and administrative staff, depreciation, office accomodation and similar expenses. Records of

overhead expenditure are maintained as part of the accounting procedures. Overhead is charged to projects as percentage of each project cost. The contractor's control over it requires periodical review of the accounting books to ascertain that it does not exceed a certain percentage of the volume of work.

There are several ways to control overhead. One of the current practices is to list and estimate every overhead cost item on a project duration basis, and add them to the in-house costs as a percentage of the total construction cost. For this practice, each overhead cost item carries an overhead cost coding.

Contingency

To cover unpredictable risks, a contractor includes a contingency item in his bid. Similar procedures as described under overhead costs, are used for controlling contingency.

Interest Cost

To keep his financing needs at a low level, the contractor tries to maintain a balance between his progress claims and payments inflating earlier progress claims (front-end loading), if necessary, and delaying expenditures as long as there is no interference with the construction schedules.

Profit Control

A study of the current practices as explained here indicates that a contractor has very little control over his material and fixed costs. The remaining elements - manhours, owned or rented equipment, overhead and contingency - are the only ones amenable to monitoring and control. A contractor can enhance his profit by taking timely corrective action increasing skill, experience and competitive judgement.

1.3.0 Drawbacks of Traditional Cost Control

During the last two decades, the competition in construction industry has become so keen that the contractors have to keep their profit margin very low (Adrian 1973, Dellinger 1974). When the prospects for new jobs are not bright, some contractors bid on break even basis in order to keep their in-house resources engaged. Hence, cost control is very essential for survival in a competitive environment. The traditional cost control methods, as described in the preceding section have proved inadequate.

An additional demand comes from today's unpredictable environment. Because the problems are no longer similar to the old ones, the tools to deal with them must be either sharpened or replaced. The real challenge is not to deal with problems as they present themselves, but to predict and prepare for them before they can crop up. Therefore, the primary purpose must be to use cost control methods that help in making such problems known in advance.

To become useful in predicting and pinpointing problem areas, should the traditional cost control methods be changed? To what extent must they be modernized? These questions should be answered from the stand point of contractor whose objective is making profit. To determine the extent to which changes should be made to the cost control methods, he must balance cost and benefits of necessary modernization(s) and also examine its effects on his company's business environment in general. A discussion of the internal and external factors that compel him to modernize the cost control tools follows.

1.3.1 External Factors

Under this group, the factors forcing a contractor to take a position between traditionalism and modernism are location, business volume, and the size of building projects to be constructed. Depending on whether his business is situated in industrial centers or in small communities, location plays an important role in enhancing his awareness of the latest developments. Increase in business volume can act as a catalyst to change. Larger projects mean an increase in complexity for which, more often, traditional methods are found inadequate.

1.3.2 Internal Factors

To run his business profitably, a contractor can not afford to cling to the traditional methods for their own sake. For survival, a contractor must adopt new methods at least to the extent that his competitors introduce them in their business. Also, if he is goal oriented, he feels motivated to try any new methods that can enhance his profit and enable him to accomplish his goal.

Because of factors such as fluctuating interest rates, unpredictable inflation, and increasing tax rates, a contractor's work has become more complex. Consequently, traditional methods fail to meet budgetary and schedule deadlines giving rise to the need for modernization (Reinschmidt et al. 1976).

Having first established the inadequacy of traditional cost control methods followed by a presentation of the factors influencing the decision to improve, it remains to determine required modernizations which forms the subject matter of the following sections.

1.4.0 Modern Cost Control Techniques

Modern cost control technique in the construction industry encompasses four basic procedures: Collection of Cost Data, Analysis of Variances, Forecast of Final Construction Costs and Cost Reporting. Each procedure is further elaborated in the following.

1.4.1 Collection of Cost Data

Modern cost control techniques generally require field cost data collection methods similar to the ones employed for traditional cost control. For example, Figure 1.1 presented daily time sheet meets the requirements of a modern cost control technique. The major difference between this time sheet and the Appendix B presented traditional one is in the inclusion of the labour trade name column. As discussed in Chapter 2, work classification code, labour trade name, and regular and overtime hours are all essential elements of a rate table. Unlike manpower costs which can be recorded by a foreman, material costs can be transferred directly from purchase requisitions on to rate tables. Both modern and traditional cost control techniques apply the same methods of equipment cost data collection.

Reliability of collected cost data requires creation of cost and responsibility centers. A cost center is the smallest unit of activity for which costs are accumulated. Usually a separate department in a construction company will be responsible for it, but often a department will have a number of cost centers. Generally, a construction project is broken down into small manageable work packages and each work package carries a definite cost. Each work package may have one or more cost centers or cost of several work packages may be collected in just one cost center depending on size of the work packages.

BETTER BUILT

FOREMAN'S DAILY TIME SHEET

PROJECT NAME:
FOREMAN :

REPORT NO:
PAGE NO :

LABOUR			WORK CLASSIFICATION						REGULAR		OVERTIME		TOTAL
TRADE	NAME	BADGE NO	03100						TOTAL HOURS	RATE $	TOTAL HOURS	RATE $	AMOUNT $
			R	O	R	O	R	O					
COST ENGINEER:											DATE:		

FIGURE 1.1 Daily Time Sheet

A responsibility center is a development of the cost center concept based on personalized responsibility. This is normally done by setting up an Organization Analysis Table (OAT) having various levels, and assigning each individual the responsibility of planning, monitoring and control of one or more work packages.

To record the performance of each work package, a suitable coding system is adopted. It is a means by which the vast amount of cost data on project time and cost can be organized, collected, manipulated, and presented in a useful form. A number of standard coding systems are available for construction cost control.

1.4.2 Analysis of Variances

The difference between an actual cost and the value of work performed (see Chapter 2) or estimate and forecast-to-complete cost is termed as 'variance'. It is a true indicator of cost performance. The variance of each cost component is analyzed, at each construction period, and necessary feedback is provided to the respective individual(s) in the OAT to take suitable corrective action at the appropriate time. For controlling costs, variance between actual and standard costs is also used. Standard costs are predetermined costs and represent targets that are an essential feature of cost control. An important measure of performance is derived from a comparison of actual with standard performance which is a vital basis for determining standard costs.

1.4.3 Forecasting Final Construction Cost

The final construction cost of a work package is comprised of 1) cost already incurred and committed, and 2) funds required to complete the remaining work. The final construction cost of a work package provides overall picture of project performance and acts as a warning system. If it is alarmingly higher than the estimate, the management may be forced to take some drastic steps in time to bring it under control.

1.4.4 Cost Reporting

Reports are designed to suit the various areas of organizational responsibility, and as one moves further up the managerial hierarchy less cost items are reported. Top management therefore receives a summary of all costs at each subordinate level, plus those relevant to the top level. Such reports help investigate causes and prevent mistakes recurring in the future.

1.5.0 The Need for a Simplified Technique

Having discussed the modern cost control technique in general, the scenario of the small and medium sized contractors may be discussed further. Essentially, the operations in any construction project, whether large or small, are similar in nature. It implies that the modern technique found succesful by large organizations can be tried by small and medium sized organizations as well. However, in practice these contractors do not require a complex technique for controlling construction costs. For example, a contractor's organization consisting of 1 to 20 employees does not have a real information distribution problem and hence there is no need to set up an OAT. Similarly, for small building works, although many principles of unit and standard costs still apply, the itinerant nature of the work force and the shorter duration of the contracts require a more rapid approach without the need for much of analyzing and cross checking of records that are necessary on large sites (Lorenzoni 1980).

Hence, in view of the size and number of projects handled by these small and medium sized contractors, and considering the managerial and administrative personnel at their disposal, the modern technique should be tailored to meet their needs. Since contractors are rather reluctant to deviate from the traditional approach in favour of a new technique, a

simplified version of the modern technique becomes all the more essential. Of course, numerous package programs are available in the market for controlling construction costs. These programs assist in implementing an ideal cost control system which, as discussed earlier, are suitable for controlling large projects. A survey of the existing programs indicates that not many meet the specific needs of small and medium sized contractors; therefore, there is a need for a simplified version of the modern cost control technique for their use.

1.6.0 Computer Processing

The cost control reports must not only be accurate but also timely. The inherent speed and accuracy of data processing systems represent the compelling reason behind adoption of mechanized cost control systems within construction industry. However, many small and medium sized contractors are not enthusiastic about computerization mainly because of fear of change and failures. The advancement in computerization has reached a stage that they can not afford not to computerize their cost control systems. Consequently, there is a need for simplified computer-based cost control technique.

1.7.0 Problem Statement

The small and medium sized building contractors stick to their traditional cost control techniques which are inadequate for today's complex problems. The package programs available for cost control at best meet the needs of large organizations and fail to adequately address the needs of small and medium sized building contractors. Hence, the contractors who, by and large, are not very enthusiastic for a change, hesitate to use such programs. A simple but effective computer-based cost control technique is required for is easy to adoption.

CHAPTER 2

SIMPLIFIED COST CONTROL TECHNIQUE

Chapter 1 dealt with the drawbacks of traditional cost control methods, and the need for a simplified technique for small and medium sized building contractors. This chapter presents the Simplified Cost Control Technique (SCCT) computerization of which is discussed in Chapter 3.

2.1.0 Description of SCCT

SCCT is comprised of the following:

1) Work Breakdown Structure
2) Rate Tables
3) Bar Charts
4) Cost Control Reports

A detailed description of each follows.

2.1.1 Work Breakdown Structure

A work breakdown structure (WBS) calls for the breakdown of project(s) into a number of manageable work packages, each having a functional importance to any user(s) (Ahuja 1976, Glew 1977). Because, work packages are also cost centres, they are hereafter also referred to as cost packages.

Systematic division of work into various work packages first starts with an identification of WBS levels as indicated in Figure 2.1. This is followed by assignment of cost code for each package at each level. The suggested levels are:

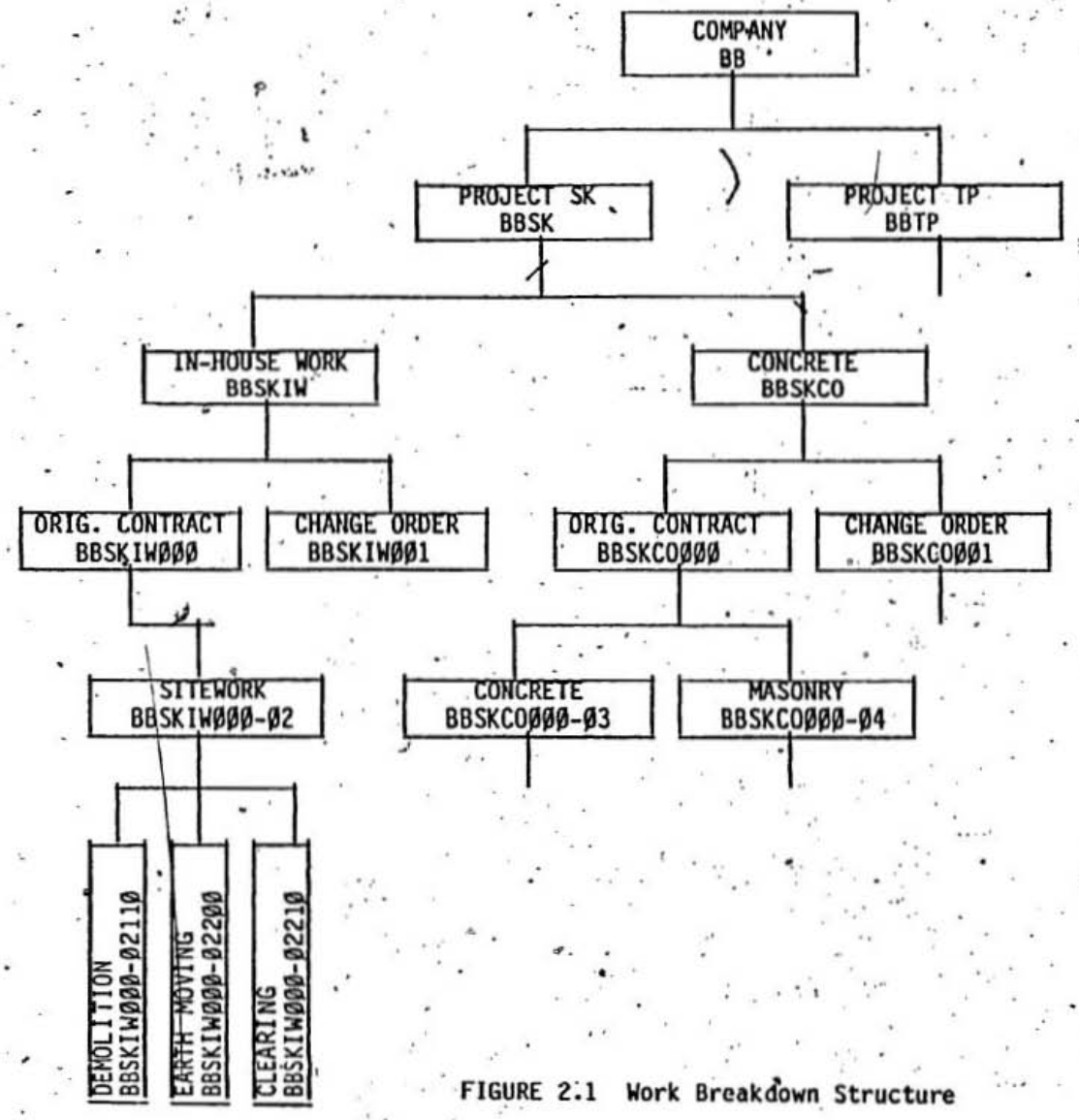


FIGURE 2.1 Work Breakdown Structure

Level 1 : Company

Level 1 deals with consolidated construction costs of all the projects handled by the company.

Level 2: Construction Projects

Level 2 is for the costs of simultaneously constructed projects, each of which needs attention. Small and medium sized contractors may not have more than three to four subdivisions at this level.

Level 3: Subcontracted Work Packages

At level 3, each project is divided into a number of contracts. Here, in-house work is also considered as a seperate work package.

Level 4: Original Contract (O.C.) and Change Order (C.O.) Packages

Very seldom a project is completed without any change order, small or large. It is necessary to keep them separate from original contract cost packages, so their cost can be tracked independently.

Level 5: Work Divisions

Level 5 relates to the costs categorized by the UCI format cost accounting system (for listing of UCI format see Appendix D). Having been accepted by the industry, individually or in combination they are potential contract packages.

Level 6: Work Classification

The ultimate breakdown of a project is achieved at this level. Here, each work classification represents the trade items which are also taken from

the UCI format. Each work classification can be further subdivided into cost elements. For clarity, the cost elements are described in Rate Tables discussed in Section 2.1.2.

The first four levels of WBS relate to the company, projects and mode of operation. Levels 5 and 6 of WBS are based on UCI format. UCI format is preferred because Federal Government building construction specifications are based on this. In addition, most of the current costing guides are keyed to UCI format (Shannon 1978).

Alphanumeric characters are assigned to each cost package. For consistency the number of characters for the cost packages in a level is kept the same. Identification of WBS levels are followed by coding of each level as indicated in Figure 2.1. The rectangular blocks depict cost packages.

Many projects may not involve all the UCI work divisions; therefore, a WBS need not consist of all the UCI work classifications. Also, the subcontracted work need not be broken down into work divisions and classifications. Consequently, a contractor's WBS at its lower levels may be either for only in-house work, or in-house work plus the subcontracted work. The second option may be adopted, only if all the project costs are required to be displayed on cost control reports at their lowest level work packages.

2.1.2 Rate Tables

Normally, small and medium sized contractors obtain the unit costs of materials and equipment from the vendors and specialty contractors for every project to be constructed. This is useful only in one-of-a-kind project or for a contractor in testing some of his own historical cost data prior to its application to a detailed estimate. A rate table is set up for

multiple projects, utilizes these costs together with manhour costs for a particular geographical location. The rates, adjusted for changes in time and location for different projects, can then be used for several projects from prebid estimate to completion (Ahuja 1976). Table 2.1 illustrates a sample rate table. Explanation of the column titles (IBM 1974) follows:

Work Classification Costing Code

This is explained in the Section 2.1.1.

Accounting Period

Accounting Period indicates the time period of predicted or incurred cost. Its inclusion permits to utilize different unit, burden, and overhead and profit rates. Each one of these rates can be applied from the beginning of the defined accounting period to beginning of the next accounting period for which a new rate is defined or to the end of the accounting calendar, if no newer rates are defined.

Foreman

Foreman is the first line supervisor responsible for a work classification under consideration.

Resource Description

This column contains the abbreviated names of resources (or resource groups) for which costs are assigned. Here, resources may be labour, material or equipment, while resource groups are groups of resources having the same cost (e.g. carpenters). Resource grouping results in the reduction of number of data to be processed.

BETTERBUILT

Project Name: Date:
Prepared By: Year:

RATE TABLE

Work Classification Description: Costing Code:

Accounting Period	Foreman	Resource Descript.	Unit Descript. Code	Unit (U)	Cost Types	Rates	
						Unit (UR)	Burden (BR)
			H O U D T		B E A R		
Updated by:					Update date:		

TABLE 2.1 Rate Table

Unit Description Code

The following abbreviation is used to define the various units contained in the rate table.

H: Hours

O: Overtime hours

U: Other units

D: Direct cost. It is obtained as the product of number of units and unit rate.

T: Total Cost. It represents the total cost of a work item under consideration and it includes burden, overhead, and profit.

Unit

Time or material units for which rates are assigned.

Cost Types

This describes the status of cost computed. Each cost type is identified by one of the following character codes:

E: Estimate to complete

B: Budget

A: Actual

R: Progress claim amount

Rates

Unit rates (direct rates) are assigned to each cost element for each cost type calculation, and burden rates are assigned as percentage of direct cost.

A rate table in the illustrated format encompasses the estimation and cost control needs of a building construction project from planning to completion. Because of its volume, data gathering is always one of the most painfull efforts in cost control. But this effort is minimized as discussed earlier by setting up a standard rate table and deriving the specific rates from the standard table after necessary adjustments for the project under consideration.

2.1.3 Bar Charts

The modern cost control programs adopt one of the networking techniques such as Critical Path Method (CPM), Program Evaluation and Review Technique (PERT), and Precedence Diagramming Method (PDM) etc. depending on the nature of the project. When many agencies are involved and when projects are large and complex, use of networks is essential for successful construction cost control. It is only through networks that interdependencies become apparent. However, when projects are small, it is rather convenient to use bar charts (Adrian 1973, Berger et al. 1977) in preference to networks. In fact, in real life situations small contractors prefer bar charts to networking techniques. Even for large projects, network is used at corporate planning level, while bar charts derived from the networks are used in the field. Hence, in the interest of practicality and ease of adoption by small and medium sized organizations, SCCT uses bar charts. However, bar charts used by SCCT are more detailed so cost control is systematized and becomes more effective.

The purpose of the bar chart from the cost control point of view, is to assign a time frame to each cost package. Hence the level of detail for the bar chart is predetermined by WBS. A bar chart containing the lowest WBS level cost packages for in-house work is necessary for computing estimate for pre-bid planning. Since the work packages do not vary from

one building to another. bar charts can be obtained with suitable modification(s) from bar charts of past projects. There remains the subcontracted work. Although, usually it has a stipulated-price, it is advantageous to relate the bar charts to the major milestones of each subcontract.

At the estimate stage, a bar chart shows the estimated duration of each cost package. During construction, progress is reflected through updating, and actual and predicted durations are included. Such a bar chart for the lowest WBS level cost packages is shown in Figure 2.2. Dashed, solid shaded and solid bars are drawn to represent budgeted, actual and updated estimated durations, at the respective time slots.

BETTER BUILT

Project Name: Date:
Prepared By : Year:

BAR CHART
(In-House Work Packages)

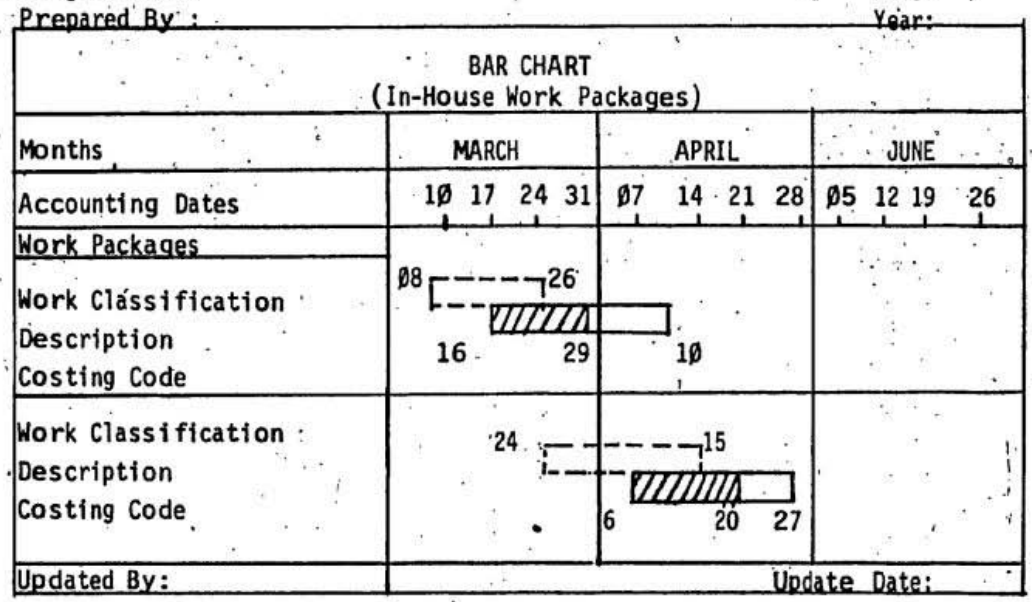


FIGURE 2.2 Bar Chart

2.1.4 Cost Control Reports

The purpose of cost control reports is to pinpoint factors that may cause budget overrun. The reports are considered as summary of specific WBS level work packages mainly for current, cumulative and to complete periods. The cost reporting system has the following objectives.

Economy

Small and medium sized projects may not justify an elaborate and expensive reporting system. Its cost should be preferably less than 0.5% of the total project cost. Small contractors will hesitate to adopt a system with higher cost.

Speed

Reports must be issued within five to seven days of the cutoff date. This is necessary in order that the reports be true representative of the most recent conditions.

Consistency

The important criterion for cost reporting is that it should be consistent. Consistency simplifies work, and reduces error.

Minimum Paperwork

Input documents in small projects are often prepared by people performing this duty as a secondary reponsibility i.e. a cost engineer is not employed primarily for this purpose. Hence the project personnel feel that excessive paperwork interferes with their main activities; therefore, they may rush through or delay completing paperwork. It is therefore necessary to keep excessive paperwork to a minimum so its importance is realized and it gets done accurately, effectively and on time.

Feedback

Feedback is the key to success in a cost control system. While progress information is collected from foremen, feedback is sent to them on regular basis and their performances are monitored in the next reporting period.

With these objectives in mind seven reporting formats are proposed. A description of terms used in these reports (IBM 1975) is given here followed by a discussion of each reporting format, particularly its WBS level, purpose, limited analysis of content, and working of each presented report to demonstrate the two aspects of SCCT: 1) monitoring in-house expenditures, and 2) monitoring the amounts payable to subcontractors and the amounts receivable from the owner as the project progresses. Presented reports are for the example project given in Chapter 4 (see also 4.1.4 Cost Control Reports).

Accounting Date

It is the cutoff date which may be a holiday or work day.

Actual Cumulative-to-date Cost or Hours

Actual cumulative-to-date cost or hours includes all costs or hours accounted for a specific resource or cost package from its start till the end of a current period.

Actual Current Period Cost or Hours

It is the incurred actual cost or hours accounted for a specified resource or cost package during current period.

Actual Disbursement

It is the approved claims less holdback.

Amount Payable

It is the cumulative claims less actual disbursement.

Approved Claim

It is the claim approved by architect/engineer for the work done in the current period.

Contract Amount

It is the prebid estimate of the project (budget).

Contract Name

It is the name of the subcontract.

Costing Code

Costing codes are described in Section 2.1.1 and the same description applies here as well.

Cumulative Claims

It represents the cumulative-to-date progress billing.

Current Period

It is an accounting period ending with accounting date. As with all work periods, current period includes its start date if it is a work day. Accounting date is accepted as the start date of the next accounting period; and hence, it is not included in current period.

Estimate

Estimate refers to the pre-bid estimate (budget) - see also 'Contract Amount'.

Expected Expenditure

It is the remaining estimated expenditure.

Forecast

Forecast covers both the actual cumulative-to-date cost and expected expenditure to complete the remaining work.

Holdback

It is the approved claims less actual disbursements.

%0 Complete

It is the ratio of claims approved to this period or cumulative-to-date to the product of contract amount and 1000.

Progress Billing (Current Period)

It is a contractor's actual progress which usually differs from the claimed amount for approval (see also progress claim reports later in this chapter). Progress billing is obtained as the product of actual current period cost and the ratio of prebid estimate to forecast. It includes the specified burden, and overhead and profit rates (see Value).

Progress Billing (Cumulative-to-date)

It is the actual progrees which usually differs from the claimed amount for approval (see also progress claims reports later in this chapter). Progress billing is obtained as the product of actual cumulative-to-date costs and the ratio of prebid estimate to forecast. It includes the specified burden, and overhead and profit rates (see Value).

Project Duration

It is the actual span of the project expressed with the start and the end dates.

Project Number

It refers to costing code of the project specified in WBS.

Run Date

The date, the report is prepared, is the run date.

Surplus/Deficit

It is the difference between the actual disbursement and actual expenditure.

Value (cumulative-to-date)

It is the product of actual cumulative-to-date cost and the ratio of prebid estimate to forecast. In the cost reports, value figures, including the ones appear at the total lines, are always separately calculated.

Value (Current Period)

It is obtained as the product of actual current period cost and the ratio of prebid estimate to forecast. In the cost reports, value figures, including the ones appear at the total lines, are always separately calculated.

Variance

It is the difference either between the value of work done and the actual cost incurred in the current period and on cumulative-to-date basis, or between the estimate and forecast.

Weekly Quantity and Cost Report-(VI)

Both the prebid estimate and forecasted cost of a resource or a work package keep changing due to resource and/or unit cost changes. There should be a yardstick to compare actual costs. The yardstick is the value which is equal to the prebid estimate at completion. since forecast and actual amount becomes equal. Moreover, the ratio of prebid to forecast as well as the difference between them provides the progress trend. This value can be compared with actual cost incurred during current period as well as on cumulative basis.

The Weekly Quantity and Cost Report which is the lowest level cost control report of SCCT makes possible the comparison of each actual cost with its value; and each prebid estimate with forecast for each resource type in an in-house work classification. There is a separate report for each work classification.

This report, illustrated in Table 2.2, is divided into three distinct cost periods: current period, cumulative-to-date and to complete. The value of the work done and the actual cost incurred are indicated in the first two periods whereas the prebid estimate and the forecast to complete costs are given in the last period. The prebid estimate, actual cost and the forecast are obtained by multiplying the corresponding unit cost and the hours required to complete. Quantities specified other than hours appear as zeros while their costs are indicated in the report. At the end of each report, all columns, but the value column, are totalled individually to present the same resource related information for a summary work classification.

REPORTING COMPANY: BETTERBUILT

PROJECT NAME: ST. KEVIN'S SCHOOL EXTENSION
CONTRACT NAME: IN-HOUSE WORK

ACCOUNTING DATE: 31MAY 82
PROJECT DURATION: 11MAR-04DEC, 1982

WEEKLY QUANTITY AND COST REPORT

WORK CLASSIFICATION DESCRIPTION: CONCRETE FORMWORK WORK CLASSIFICATION COSTING CODE: BBSK01IW000-03100

PERFORM'G DEPT.	RESOURCE CODE	CURRENT PERIOD ESTIMATE HOURS	CURRENT PERIOD ESTIMATE VALUE	CURRENT PERIOD ACTUAL HOURS	CURRENT PERIOD ACTUAL COST	CUMULATIVE TO DATE ESTIMATE HOURS	CUMULATIVE TO DATE ESTIMATE VALUE	CUMULATIVE TO DATE ACTUAL HOURS	CUMULATIVE TO DATE ACTUAL COST	TO COMPLETE ESTIMATE HOURS	TO COMPLETE ESTIMATE COST	TO COMPLETE FORECAST HOURS	TO COMPLETE FORECAST COST
CONC.FMN	B.N. WRE	0	0	0	0	0	723	0	723	0	723	0	723
CONC.FMN	CARPANTR	55	736	59	708	732	3,782	304	3,648	1,300	15,600	1,254	15,048
CONC.FMN	LABOUR	38	225	24	234	501	1,513	164	1,580	852	7,882	864	8,230
CONC.FMN	LUMBER	0	402	0	356	0	3,111	0	2,765	0	11,999	0	10,665
TOTAL		93	1,350	83	1,298	1,233	9,103	468	8,716	2,152	36,204	2,118	34,666

TABLE 2.2 Weekly Quantity and Cost Report

Working of Weekly Quantity and Cost Report

. It is seen from the Table 2.2 that both the current period and cumulative-to-date value figures for labour are less than the actual costs. Since the forecast-to-complete cost, comprising the actual cumulative-to-date cost and the expected expenditure to complete the remaining work, is higher than the estimate-to-complete cost, this is expected . This situation calls for thorough analysis. The poor performance may be due to some uncontrollable factors such as act of God, strikes, increase in unit rates caused by inflation and so on. If the increase is due only to uncontrollable factors, there is no way to bring down the cost and hence the contractor has no option, but forecast the cost to complete on this basis.

This increase in cost may also be due to some controllable factors such as decrease in productivity, lack of supervision etc.. In such cases, the respective foreman is held responsible for this. He may be formally informed, advised, warned, suspended or removed based on the extent and frequency of damage.

Cost Analysis Report-(V2)

The purpose of this report is to compute the variance of each work classification within a work division at the following two different stages:

1) The difference between the value of work done and the actual cost incurred in the current period and on cumulative-to-date basis.

2) The difference between the estimate and the forecast.

The first variance helps management to take necessary corrective action. The latter variance gives the overall picture of the performance of the cost package under consideration. a cost analysis report, illustrated in Table 2.3, is a weekly quantity and cost report summary. The major differences between these two reports are that this report includes the burden rates, variances, and the total overhead and profit rates.

Both Weekly Quantity and Cost, and Cost Analysis reports are recommended for weekly processing of in-house work classification and work division cost packages. Including the subsequently introduced three cash flow reports, all the remaining reports are for monthly processing of an entire project costs.

Working of Cost Analysis Report

Table 2.3 presented report is for the work division BBSK01IW000-03 (concrete). The current period and cumulative-to-date variances of the work classification BBSK01IW000-03301 (concrete footings and walls) are strikingly negative. The forecast of final cost is appreciably above the estimate. The reason for this poor performance is to be determined. It may be due to error in the original estimate, or poor workmanship because of which the work was rejected by the owner and it was redone or modified. In such cases, a suitable action may be taken to prevent recurrence of the same mistake. One more possibility is that the experienced unfavorable weather condition during the May month while placing concrete. Because this is an act of God, the contractor must absorb the consequential costs of preheating water, the aggregate or both so that an early gain in concrete strength be obtained, as well as, maintaining the freshly placed concrete at a temperature of 10 degree Celsius for 5 days as called in the specifications (Peurifoy 1970).

Cash Flow Reports

When a construction project is under progress, a periodic check on the amount received from the owner as well as the actual expenditure incurred, is necessary. If deficit which is the difference between the actual expenditure and the disbursement is appreciable in several consecutive reporting periods, the project cost may go up due to interest cost of the borrowed funds to meet the deficit. Moreover, in the event of termination

REPORTING COMPANY: BETTERBUILT

PROJECT NAME: ST. KEVIN'S SCHOOL EXTENSION
CONTRACT NAME: IN-HOUSE WORK

ACCOUNTING DATE: 31MAY 82
PROJECT DURATION: 11MAR-04DEC, 1982

COST ANALYSIS REPORT

WORK DIVISION DESCRIPTION: CONCRETE — WORK DIVISION COSTING CODE: BBSK01IW000-03

WORK CLASSIFICATION	CURRENT PERIOD COSTS			CUMULATIVE TO DATE COSTS			AT COMPLETION COSTS		
COSTING CODE, DESCRIPTION	VALUE	ACTUAL	VARIANCE	VALUE	ACTUAL	VARIANCE	ESTIMATE	FORECAST	VARIANCE
BBSK01IW000-03100 CONCRETE FORMWORK	1,565	1,505	60	10,259	9,867	392	41,370	39,788	1,582
BBSK01IW000-03301 CONCRETE FOOTINGS AND WALLS	1,261	1,484	(223)	9,052	10,589	(1,537)	11,154	13,048	(1,894)
BBSK01IW000-03302 CONCRETE FLOOR SLABS	0	0	0	0	0	0	30,599	30,626	(27)
TOTAL COST LESS OVERHEAD AND PROFIT	2,989	2,989	0	20,373	20,456	(83)	83,123	83,462	(339)
OVERHEAD AND PROFIT	0	0	0	0	0	0	14,961	0	14,961
TOTAL COSTS	3,497	2,989	508	24,040	20,456	3,584	98,084	83,462	14,622

TABLE 2.3 Cost Analysis Report

of the contract, the owner will have an upper hand in reaching a settlement, because money has to flow from him. The conditions are reverse for subcontracted jobs. SCCT proposes three cash flow reports to monitor the amount receivable from the owner and payable to the subcontractors.

Work Division Cash Flow Report-(V3)

Work Division Cash Flow Report is the lowest level cash flow report. The purpose of this report is to provide the management the cash flow status of each in-house work division. Any work division having alarming deficit is singled out, and the possible reasons for the same analyzed. The effect of the corrective action taken is monitored in the next reporting period. If deficit persists over several reporting periods, an analysis of the work division costs is necessary along with a review of the original estimate as well as the productivity analysis of individual resource types.

Work division cash flow report is illustrated in Table 2.4. Cumulative-to-date and current period progress billing, actual disbursement and actual expenditures of each work classification are tabulated. The surplus/deficit which is a quick check on cash flow status, is obtained as the difference between the incurred expenditure and actual disbursement. The expected expenditures for completing the balance of the work is also tabulated separately. The total line provides similar information for each work division at a summary level.

Contract Cash Flow Report-(V4)

Contract Cash Flow Report is illustrated in Table 2.5. The purpose of this report is to provide the management an overall picture of the cash flow for each subcontract. As mentioned earlier, in-house work is considered similar to a subcontract. There is a separate report for each subcontract. In short, this report is a summary report at Level 3 of WBS.

REPORTING COMPANY: BETTERBUILT

PROJECT NAME: ST. KEVIN'S SCHOOL EXTENSION
CONTRACT NAME: IN-HOUSE WORK

ACCOUNTING DATE: 31MAY 82
PROJECT DURATION: 11MAR-Ø4DEC, 1982

WORK DIVISION CASH FLOW REPORT

WORK DIVISION DESCRIPTION: CONCRETE — WORK DIVISION COSTING CODE: BBSKØ1IWØØØ-Ø3

WORK CLASSIFICATION	CURRENT PERIOD COSTS				CUMULATIAVE TO DATE COSTS				
COSTING CODE, DESCRIPTION	PROGRESS BILLING	ACTUAL DISBURS	ACTUAL EXPENDTR.	SURPLUS/ DEFICIT	PROGRESS BILLING	ACTUAL DISBURS.	ACTUAL EXPENDTR	SURPLUS/ DEFICIT	EXPECTED EXPENDTR
BBSKØ1IWØØØ-Ø31ØØ CONCRETE FORMWORK	3,488	2,25Ø	2,836	686-	12,Ø99	8,1ØØ	9,86Ø	1,76Ø-	29,921
BBSKØ1IWØØØ-Ø31Ø1 CONCRETE FOOTINGS AND WALLS	2,612	2,88Ø	2,586	294	1Ø,68Ø	14,4ØØ	1Ø,582	3,818	2,459
BBSKØ1IWØØØ-Ø33Ø2 CONCRETE FLOOR SLABS	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø	3Ø,626
TOTAL	6,1ØØ	5,13Ø	5,422	292-	22,779	22,5ØØ	2Ø,442	2,Ø58	63,ØØ6

TABLE 2.4 Work Division Cash Flow Report

REPORTING COMPANY: BETTERBUILT

PROJECT NAME: ST. KEVIN'S SCHOOL EXTENSION

ACCOUNTING DATE: 31MAY 82
PROJECT DURATION: 11MAR-Ø4DEC, 1982

CONTRACT CASH FLOW REPORT

CONTRACT DESCRIPTION: IN-HOUSE WORK — CONTRACT COSTING CODE: BBSKØ1IW

ORIGINAL CONTRACT OR C.O.: COSTING CODE, DESCRIPTION WORK DIVISION COSTING CODE WORK DIVISION DESCRIPTION	CURRENT PERIOD COSTS PROGRESS BILLING	ACTUAL DISBURS.	ACTUAL EXPENDTR	SURPLUS/ DEFICIT	CUMULATIVE TO DATE COSTS PROGRESS BILLING	ACTUAL DISBURS.	ACTUAL EXPENDTR	SURPLUS/ DEFICIT	EXPECTED EXPENDTR
BBSKØ1IWØØØ IN-HOUSE WORK ORIGINAL CONTRACT									
BBSKØ1IWØØØ-Ø3 CONCRETE	6,1ØØ	5,13Ø	5,422	292-	22,779	22,5ØØ	2Ø,442	2,Ø58	63,ØØ6
TOTAL	6,1ØØ	5,13Ø	5,422	292-	22,779	22,5ØØ	2Ø,442	2,Ø58	63,ØØ6
BBSK1WOO1 IN-HOUSE CO#1 EX FAN #15									
BBSKØ1IWØØ1-ØØ1-Ø4 MASONRY CO#1	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø	21
TOTAL	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø	21
CONTRACT TOTAL	6,1ØØ	5,13Ø	5,422	292-	22,779	22,5ØØ	2Ø,442	2,Ø58	63,Ø27

TABLE 2.5 Contract Cash Flow Report

Work Division Cash Flow Report deals with the cash flow analysis of each work division of in-house work items only. Contract cash flow report gives information on both the in-house as well as subcontracted items and provides a separate subtotal for each of them. This sum provides the cash flow for the whole project.

Project Cash Flow Report-(V5)

This is the last of three cash flow reports as illustrated in Table 2.6. There is a separate report for each project constructed concurrently by the company. It provides cash flow status of each project at WBS summary level 2.

Working of Cash Flow Reports

So far presented three cash flow reports monitor costs for WBS levels 5, 4 and 2. The cost performance is analyzed at the highest level first and the cause of trouble is tracked down to lower levels. Hence, Project Cash Flow Report is taken up first. The details of the in-house work, and the mechanical and fire protection subcontracts are illustrated in Table 2.6.

Progress billing of in-house work for the current period is $6,018. The disbursement in this period is $5,130 whereas actual expenditure is $5,422. There is a deficit of $292 in the current period. However on cumulative-to-date there is a surplus of $2,058. Since, cumulatively the contractor's cash inflow exceeds his outflow of cash, the minor deficit for the current period is admissible.

For the mechanical subcontract, the progress billing (the actual progress) by the subcontractor in the current period is $4,750 whereas the company has received $8,280 from the owner. Since the subcontractor may also get the information on amount paid by the owner, he is paid $5,000 which is more than what he is claimed.

REPORTING COMPANY: BETTERBUILT

PROJECT NAME: ST. KEVIN'S SCHOOL EXTENSION
PROJECT COSTING CODE: BBSK

ACCOUNTING DATE: 31May 82
PROJECT DURATION: 11MAR-Ø4DEC, 1982

PROJECT CASH FLOW REPORT
(BY CONTRACTS)

CONTRACT	CURRENT PERIOD COSTS				CUMULATIVE TO DATE COSTS				
COSTING CODE, DESCRIPTION	PROGRESS BILLING	ACTUAL DISBURS	ACTUAL EXPENDTR.	SURPLUS/ DEFICIT	PROGRESS BILLING	ACTUAL DISBURS.	ACTUAL EXPENDTR	SURPLUS/ DEFICIT	EXPECTED EXPENDTR
BBSKØ1IW IN-HOUSE WORK	6,Ø18	5,13Ø	5,422	292-	22,779	22,5ØØ	2Ø,442	2,Ø58	63,Ø27
BBSK12MC MECHANICAL	4,75Ø	8,28Ø	5,ØØØ	3,28Ø	14,3ØØ	28,Ø8Ø	15,ØØØ	13,Ø8Ø	58,Ø2Ø
BBSK15SP FIRE PROTECTION	Ø	Ø	Ø	Ø	Ø	Ø	Ø	Ø	43,ØØØ
PROJECT TOTAL	1Ø,768	13,41Ø	1Ø,422	2,988	37,Ø79	5Ø,58Ø	35,442	15,138	164,Ø47

TABLE 2.6 Project Cash Flow Report

Work on fire protection is not yet started; therefore, only the expected expenditures indicated which is the same as the original estimate.

The amount received for the example project as a whole has a surplus of $15,138 on cumulative basis and $2,988 in the current period.

Contract Cash Flow Report, illustrated in Table 2.5, is analyzed next. For the sake of brevity, this report gives the figures for only one work division, the in-house work, and other work divisions are omitted. It is observed that the performance of BBSK01IW000 In-house Work Original Contract is below expectation with a deficit of $292 in the current period, though its cumulative figure has a surplus of $2,058 and work for the CO #1 has not started. Hence breakdown of the original contract's only work division BBSK01IW000-03 is further analyzed.

It is observed in Table 2.4, presented Work Division Cash Flow Report that the concrete formwork work classification is below expectations with a deficit of $1,760 on cumulative basis and $586 surplus in the current period. Concrete footings and walls work classification, however, shows $3,818 and $294 surplus during the same period. Nevertheless, concrete formwork still causes some concern, and the reason(s) can be studied with the help of Progress Claims Reports.

Whenever there is a resource-rate change prior to a current accounting period, and also, whenever start dates of current accounting periods for weekly and monthly report groups differ, then reports of these two different report groups contained corresponding cumulative-to-date actual costs also differ. Deviation is usually small and caused by linear resource distribution within each accounting period. For example, cumulative-to-date cost for the concrete formwork work package appears as $9,867 in Table 2.3 and $9,860 in Table 2.4. As it will be seen in Chapter 4, the $7 difference is due to the April 01 labour rate increase, and respective current accounting periods start dates which are May 24 and May 01.

Progress Claims Reports

During the course of construction, owner's architect/engineer periodically assesses the progress of work done, and upon his recommendation payment is made to the contractor after withholding retention money. It is quite possible that there is a difference between the actual progress achieved and the progress claims adjusted. If the latter is considerably less than the former, cash inflow is appreciably affected. Hence a constant watch on progress payment claimed and received is necessary. SCCT suggests two progress claim reports one each at level 3 and level 2 of WBS. Further discussion on them follows.

Contract Progress Claim Status Report-(V6)

This report presents the progress claim status of all work divisions and their work classifications within a contract. The report, illustrated in Table 2.7, provides the comparison of actual progress achieved and the claims received by the contractor. The total at the end of each work classification group gives the summary information at work division level. These work division totals are further summed up to obtain the summary information at contract level. There is a separate Contract Progress Claim Report for each contract in a project.

Project Progress Claim Status Report-(V7)

Project Progress Claim Status Report illustrated in Table 2.8 is nothing but a summary level report of Contract Progress Claim Status Report. It gives a summary level break up of each original contract/change order in a project. There is a separate report for each project constructed by the company.

REPORTING COMPANY: BETTERBUILT

PROJECT NAME: ST. KEVIN'S SCHOOL EXTENSION

ACCOUNTING DATE: 31MAY 82
PROJECT DURATION: 11MAR-Ø4DEC, 1982

CONTRACT PROGRESS CLAIMS STATUS REPORT

CONTRACT OR C.O. DESCRIPTION: IN-HOUSE WORK ORIGINAL CONTRACT CONTRACT OR C.O. COSTING CODE: BBSKØ1IWØØØ

WORK DIVISION COSTING CODE WORK DIVISION DESCRIPTION WORK CLASSIFICATION COSTING CODE WORK CLASSIFICATION DESCRIPTION	CONTRACT AMOUNT	APPROVED CLAIMS TO THIS PERIOD				PROGRESS TO DATE		
		%Ø COMPLETE	APPROVED CLAIMS	ACTUAL DISBURS.	HOLD BACK	%Ø COMPLETE	CUMULATIVE CLAIMS	AMOUNT PAYABLE
BBSKØ1IWØØØ-Ø3 CONCRETE								
BBSKØ1IWØØØ-Ø31ØØ CONCRETE FORMWORK	48,817	184	9,ØØØ	8,1ØØ	9ØØ	248	12,1ØØ	4,ØØØ
BBSKØ1IWØØØ-Ø33Ø1 CONCRETE FOOTINGS AND WALLS	13,16Ø	1,216	16,ØØØ	14,4ØØ	1,6ØØ	811	1Ø,679	3,721
BBSKØ1IWØØØ-Ø33Ø2 CONCRETE FLOOR SLABS	36,1Ø7	Ø	Ø	Ø	Ø	Ø	Ø	Ø
TOTAL	98,Ø84	255	25,ØØØ	22,5ØØ	2,5ØØ	232	22,779	279
CONTRACT OR CHANGE ORDER TOTAL	98,Ø84	255	25,ØØØ	22,5ØØ	2,5ØØ	232	22,779	279

TABLE 2.7 Contract Progress Claim Status Report

REPORTING COMPANY: BETTERBUILT

PROJECT NAME: ST KEVIN'S SCHOOL EXTENSION
PROJECT NUMBER: BBSK

ACCOUNTING DATE: 31MAY 82
PROJECT DURATION: 11MAR-04DEC, 1982

PROJECT PROGRESS CLAIMS STATUS REPORT

CONTRACT COSTING CODE CONTRACT DESCRIPTION CONTRACT OR C.O. COSTING CODE CONTRACT OR C.O. DESCRIPTION	CONTRACT AMOUNT	APPROVED CLAIMS TO THIS PERIOD %Ø COMPLETE	 APPROVED CLAIMS	 ACTUAL DISBURS.	 HOLD BACK	PROGRESS TO DATE %Ø COMPLETE	 CUMULAT. CLAIMS	 AMOUNT PAYABLE
BBSKØ1IW								
IN-HOUSE WORK								
BBSKØ1IWØØØ								
IN-HOUSE WORK ORIGINAL CONTRACT	98,Ø84	255	25,ØØØ	22,5ØØ	2,5ØØ	232	22,779	279
BBSKØ1IWØØ1								
IN-HOUSE WORK CO#1 EX. FAN #15	23	Ø	Ø	Ø	Ø	Ø	Ø	Ø
TOTAL	98,1Ø7	255	25,ØØØ	22,5ØØ	2,5ØØ	232	22,779	279
BBSK12MC								
MECHANICAL								
BBSK12MCØØØ								
MECHANICAL ORIGINAL CONTRACT	69,368	45Ø	31,2ØØ	28,ØØØ	3,12Ø	2Ø6	14,3ØØ	13,78Ø-
BBSK12MCØØ1								
MECHANICAL CO#1	1,452	Ø	Ø	Ø	Ø	Ø	Ø	Ø
TOTAL	7Ø,82Ø	441	31,2ØØ	28,ØØØ	3,12Ø	2Ø2	14,3ØØ	13,78Ø-
BBSK15SP								
FIRE PROTECTION								
BBSK15SPØØØ								
FIRE PROTECTION ORIGINAL CONTRACT	43,ØØØ	Ø	—	Ø	Ø	Ø	Ø	Ø
TOTAL	43,ØØØ	Ø	Ø	Ø	Ø	Ø	Ø	Ø
CONTRACT OR CHANGE ORDER TOTAL	211,927	265	56,2ØØ	5Ø,58Ø	5,62Ø	175	37,Ø79	13,5Ø1-

TABLE 2.8 Project Progress Claims Status Report

Working of Progress Claims Reports

Table 2.7 indicates that the progress to this date in the work classification BBSK01IW000-03100 is 24.8%, the contract amount $48,817, and the actual amount claimed by the contractor is realistically $12,100 (0.248 x 48,817, or using the forecasted amount of $39,788 from Table 2.3 and the actual incurred expenditure of $9,860 from Table 2.4 9,860 x 48,817 / 39,788). On the other hand, based on the contract amount, the progress is mistakenly 20.2% (9,860 / 48,817). However, only 18.4% progress has been approved by the owner and hence the actual disbursement (approved claims less holdback) is $8,100.

This results with a deficit of $2,790 [(12,100 - 9,000) x 0.90] or $774 [(9,860 - 9,000) x 0.90] to this date. Either way, progress in this particular work classification has been grossly under estimated by the owner's engineer. Hence this fact should be brought to his notice so the progress is appraised properly in the next accounting period.

Table 2.8, on the other hand, indicates that the total amount paid to date is $13,501 (50,580 - 37,079) higher than the cost of actual progress. This is entirely due to the higher amount of billed and approved progress for the BBSK12MC000 Mechanical Contract. This is a common practise in the construction industry on the basis that an owner's architect/engineer team has no access to a contractor's cost control reports to determine the actual progress (progress billing) accurately. Approval of a progress claim is always based on visual assessment of the progress.

A similar study for each non performer is carried out and a consolidated report is made. The facts are taken up in the next coordination meeting with the owner.

In short, the success of cost control reports lies in the analysis of the causes and the timely corrective action. It is true that it can not in any way reduce the cost overruns that have already occurred, but it can help reduce the recurrence of previous mistakes or at least act as an early warning system.

The computer processing of these reports is dealt in detail in Chapter 3.

CHAPTER 3

COMPUTER PROCESSING

For effective cost control and timely feedback, the seven cost control reports discussed in Chapter 2 are required regularly at the end of each accounting period. It will be a cumbersome process to prepare them manually and in addition, their timely availability can not be guaranteed. Hence, computerization is essential. Presently package programs which can be used on main frame, mini or micro computers are available in the market to control construction schedules and costs. A list of notable package programs is given in Appendix E. These programs are either too specific meeting limited needs or too large and complex to control the schedules and costs of mega projects requiring huge investments. Those in the first group are not amenable to modifications or adaptations necessitated by future growth, and large programs are too complex for the need of small and medium sized building contractors. However, some of the large programs can be simplified and made easy to use, while still meeting the users requirements. On the other hand, small and medium sized contractors hesitate to go for computerization and complexity of the package programs adds to their fear. There are few package programs available to meet the needs of small and medium sized contractors.

Hence for computerizing SCCT, there are two options: 1) SCCT can be written in one of the higher level languages or 2) One of the large package programs can be modified to meet the needs. The decision to adopt one of these options depends on the relative economics of each alternative, availability of in-house computers/ time sharing options, flexibility of the package programs for modification to produce the necessary reports etc.

As an example, for the present study, IBM PMS IV is modified to obtain the SCCT reports. PMS IV is chosen because it is available on time sharing options at many computing centers and it is one of the package programs having wide range of capabilities. It can also be used in network scheduling and resource allocation. However, the proposed technique can also be programmed so it can be used on mini or micro computers. A brief description of PMS IV is given followed by a discussion on how the program is modified to generate SCCT reports.

3.1.0 PMS IV

PMS IV program (IBM 1975) consists of four modules namely 1) Network Processor, 2) Resource Allocation Processor 3) Cost Processor and 4) Report Processor. The function of Network Processor is to evaluate the start and finish times of CPM/PERT/precedence networks. The Resource Allocation Processor allocates resources to various activities based on user-defined priority rules while the Cost Processor computes costs. These three processors can function independently or in conjunction with each other. The required reports for each of these processors are prepared by Report Processor taking the relevant data from files stored in the respective processors.

The Report Processor can generate a total of 55 standard reports out of which 16 pertain to network processing, 13 to resource allocation processing and 26 to cost processing. Apart from these 55 standard reports, unlimited user defined reports can be generated in one of the following ways:

1) The standard reports can be modified which ranges from reorganizing the structure to condensing the content.

2) Entirely new reports can be prepared by making use of report processor language.

The latter option is adopted in this report because it is found that the required reports can not be obtained by reorienting any standard report and that developing a new program is found easier than modifying a standard report. The method of obtaining the required reports is explained in the following.

3.2.0 Procedure for Modifying PMS IV

Programs for each report are written in a PMS specified high level language known as RP language and listed in Appendix F. To compile these programs, Report Processor library, PMS.RPMAC (IBM 1975) is used. This data set is a large macro. Every RP language statement is an invocation of this macro with a parameter string. The RPMAC compiles the invocation into the appropriate assembler language statements. In other words, each RP language program is first processed by RPMAC followed by assembly language compiler of the operating system. The SCCT reports have been named as follows:

1) Weekly Quantity and Cost Report	V1
2) Cost Analysis Report	V2
3) Work Division Cash Flow Report	V3
4) Contract Cash Flow Report	V4
5) Project Cash Flow Report	V5
6) Contract Progress Claim Status Report	V6
7) Project Progress Claim Status Report	V7

3.3.0 Output of the Program

Following is the output of the program.

1) Listing of entire cost identification and data cards, with flagged illegal characters if any.

2) Calendar for the entire span of the project indicating holidays.

3) Cost control reports as requested.

4) Listing of Cost and Report control cards. and

5) Listing of output messages (including the tabulation of all unmatched rates).

The method of obtaining these reports and the necessary system control cards are indicated in the example program discussed in Chapter 4.

CHAPTER 4

EXAMPLE

Simplified Cost Control Technique was presented in Chapter 2 and a method of computerizing it was discussed in Chapter 3. This chapter presents an example to demonstrate how SCCT can be used by small and medium sized building contractors. A real life project is chosen as an example, however its location and the contractor's identity are disguised and the cost figures are modified. In addition, most of the subcontracted and in-house cost packages which are repetitive in nature are not included in the interest of brevity. A description of the project is followed by a discussion on implementation of the SCCT.

4.1.0 Extension of St. Kevin's School

Better Built, a medium sized construction company, specializing in building construction has adopted SCCT for cost control. There are 15 line staff, 4 supervisory staff and 1 executive employed by Better Built. The company is engaged in constructing three projects simultaneously, and Extension to St. Kevin's School is one of them. An 'L' shaped, two stories high extension is designed to accommodate eighteen elementary and two kindergarten class rooms, a 144 square meter library, and a 613 square meter gymnasium. The scheduled start and end dates of the example project are March 11 and December 4, 1982 respectively. A discussion on the WBS, rate table and bar charts for this example project follows:

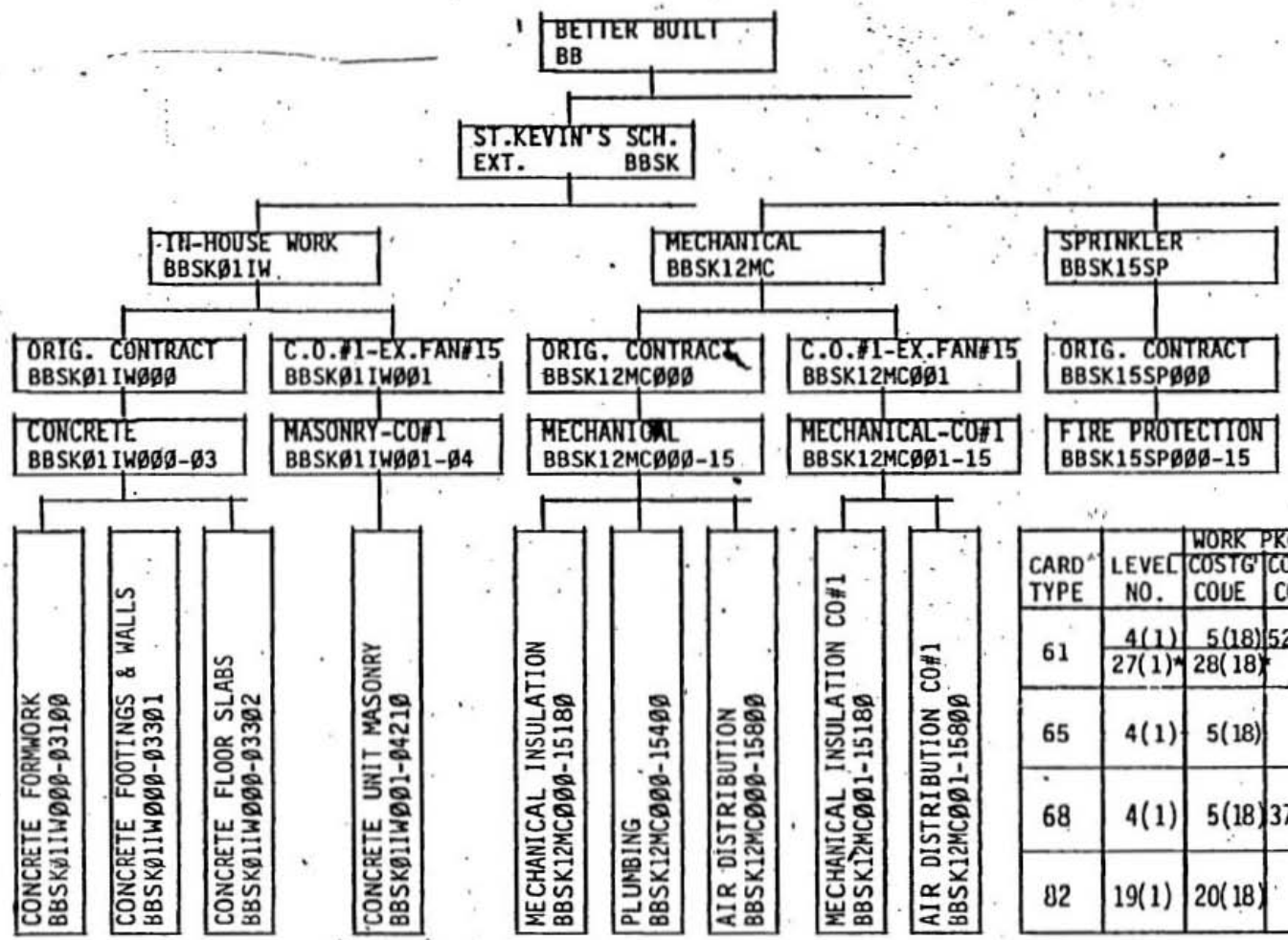
4.1.1 Work Breakdown Structure

The WBS for the example project is illustrated in Figure 4.1. Level one deals exclusively with all reports prepared at company level while individual projects are handled at Level 2. Since there are three concurrent projects, Better Built has three subdivisions at level 2, although for the sake of clarity only the example project is indicated in the table. Level 3 comprises of subcontracted and in-house items. Each subcontract whether big or small is a separate package while all in-house work is represented by one single package. Each package at Level 3 is subdivided at Level 4 into original contract and change orders. As discussed in Chapter 2, Level 5 and Level 6 breakdowns conform to UCI format. Costing codes for the top three WBS levels are assigned using the first letters of the work package names. The added numerical characters to the third level costing codes are for an orderly tabulation of the subcontracts. Assignment of the three numerical characters to the fourth level costing codes are to allow the entry of up to 99 change orders for each subcontractor.

4.1.2 Rate Table

Better Built has a standard rate table consisting of unit costs for all commonly employed resources by the company. This standard rate table is updated from time to time. The rate table for the example project, illustrated in Table 4.1, is derived from the company rate table after making the necessary adjustment for the location of the project, time of construction etc. The rates of only few resources are indicated in this table and the complete list is given in the input data listing presented at the end of this chapter. The following clarification will help understand this table better:

1) Abbreviations have been used to describe the resources because the computer program allows a maximum of eight characters for description.



CARD TYPE	LEVEL NO.	WORK PKG. COSTG CODE	WORK PKG. COSTG CODE
61	4(1)	5(18)	52(18)**
	27(1)*	28(18)*	
65	4(1)	5(18)	
68	4(1)	5(18)	37(36)
82	19(1)	20(18)	

* Summary cost package, level no. & costing code - if there is one.
** Contract description (level 3 costing code description).
(--) Starting column numbers and maximum available space on cost definition and Data Cards for WBS work packages content.

FIGURE 4.1 St. Kevin's School Extension WBS

BETTER BUILT

PROJECT NAME: ST. KEVIN'S SCHOOL EXTENSION DATE: 16FEB1982
PREPARED BY: MVK YEAR: 1982

RATE TABLE

WBS LEVEL NO. : 6
WORK CLASSIFICATION DESCRIPTION: CONCRETE FOOTINGS AND WALLS
WORK CLASSIFICATION COSTING CODE:BBSKØ1IWØØØ-Ø33Ø1

ACCOUNTING PERIOD	FOREMAN	RESOURCE DESCRIPT	UNIT DESCRIPT CODE	UNIT	COST TYPE	RATES	
						UNIT ($)	BURDEN
8ØØØ1	CONC.FMN CONCRETE FOREMAN)	CONCRT-1 CONCRETE	U(m^3)	108	B	36	-
8ØØØ1	CONC.FMN	CONCRT-1	U(m^3)	60;36	A	36	-
8ØØØ1	CONC.FMN	CONCRT-1	U(m^3)	24	E	36	-
8ØØØ1	CONC.FMN	LABOUR	H	378	B	9.25	22%
8ØØØ1	CONC.FMN	LABOUR	H	200;10	A	9.25	22%
8ØØØ2	CONC.FMN	LABOUR	H	200;10	A	9.75	22%
8ØØØ1	CONC.FMN	LABOUR	H	60	E	9.5	22%

UPDATED BY: MVK UPDATE DATE: 28MAY 82

TABLE 4.1 St. Kevin's School Extension Rate Table

2) Description of concrete is abbreviated as 'CONCRT-1' to allow the reassignment of this resource with a modified rate for a different work package.

3) Two groups of actual rates have been provided for labour. The first group of rates is applicable only until the start of the second period while the second group is applicable from the start of the second period. In this case period 2 is included only to designate a rate change.

Overhead and profit (OP) rates are not considered in these rate tables for they can be included separately. In this example, the OP rates are applied to all the lowest work packages. The assigned OP rates are 18% and 4% for in-house and subcontracted items respectively. A holdback of 10% has been assumed for the progress claims approved by the owner.

4.1.3 Bar Charts

Bar charts prepared for the in-house and subcontract packages are presented in Figures 4.2 and 4.3 respectively. The calendar generated by the program for preparing these bar charts is presented in figure 4.4. The level indicated in the bar charts conforms to that of the WBS. A detailed description of the bar charts was given in Section 2.1.3.

4.1.4 Cost Control Reports

There are seven cost control reports as discussed in Chapter 2. Weekly Quantity and Cost Control, and Cost Analysis Reports are prepared every week. The project duration is 9 months. The remaining reports are prepared on the last day of every month. The reports prepared on May 31, 1982, are given in Tables 2.2 to 2.8. The input data listing for obtaining these reports using PMS IV, is briefly explained below.

BETTER BUILT

PROJECT NAME: ST. KEVIN'S SCHOOL EXTENSION
PREPARED BY .: M.V. KANTARCIOGLU

DATE: 15FEB1982
YEAR: 1982

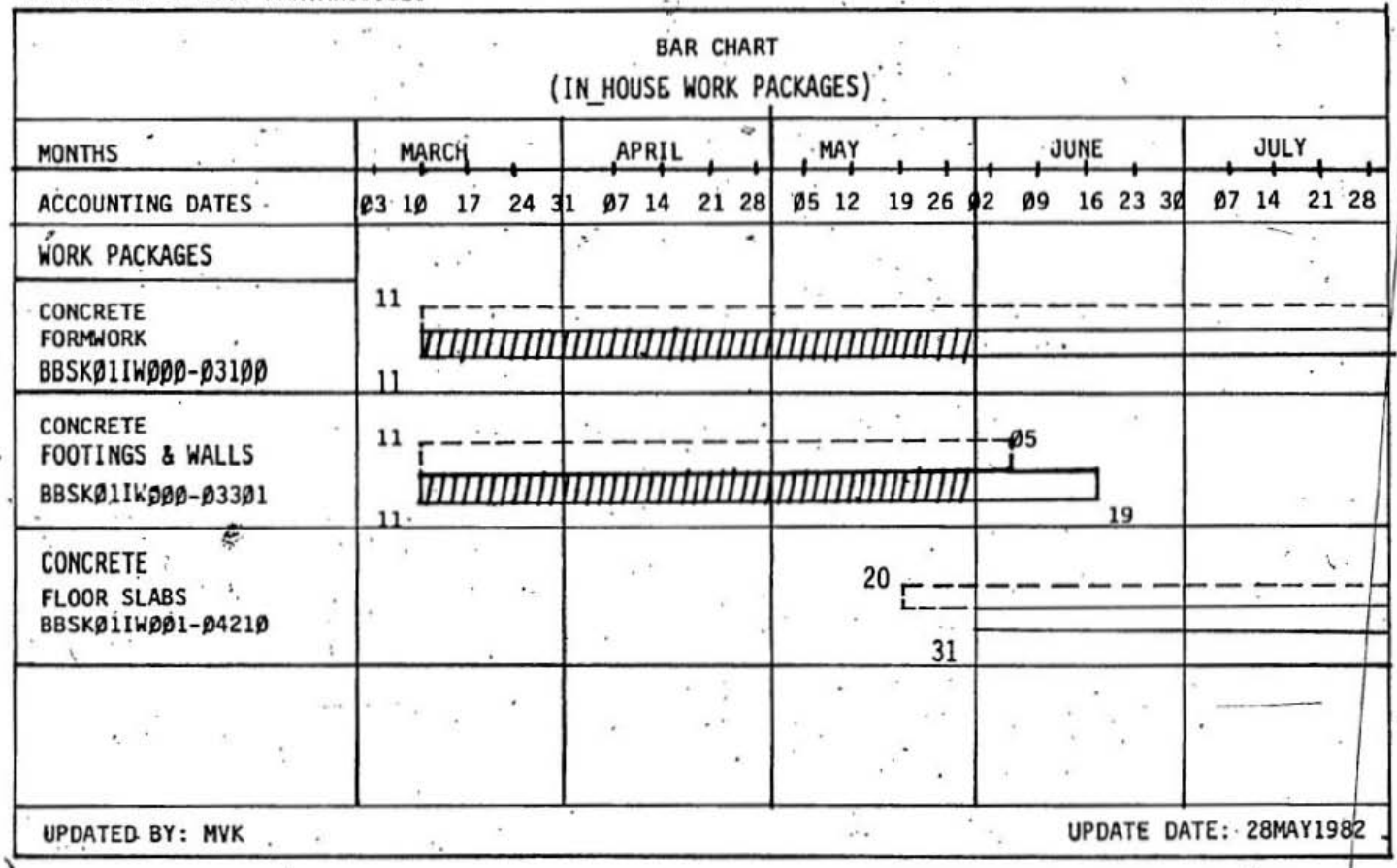


FIGURE 4.2 Bar Chart for the St Kevin's School Extension In-House Work Packages

BETTER BUILT.

PROJECT NAME: ST. KEVIN'S SCHOOL EXTENSION
PREPARED BY : MVK

DATE: 10FEB1982
YEAR: 1982

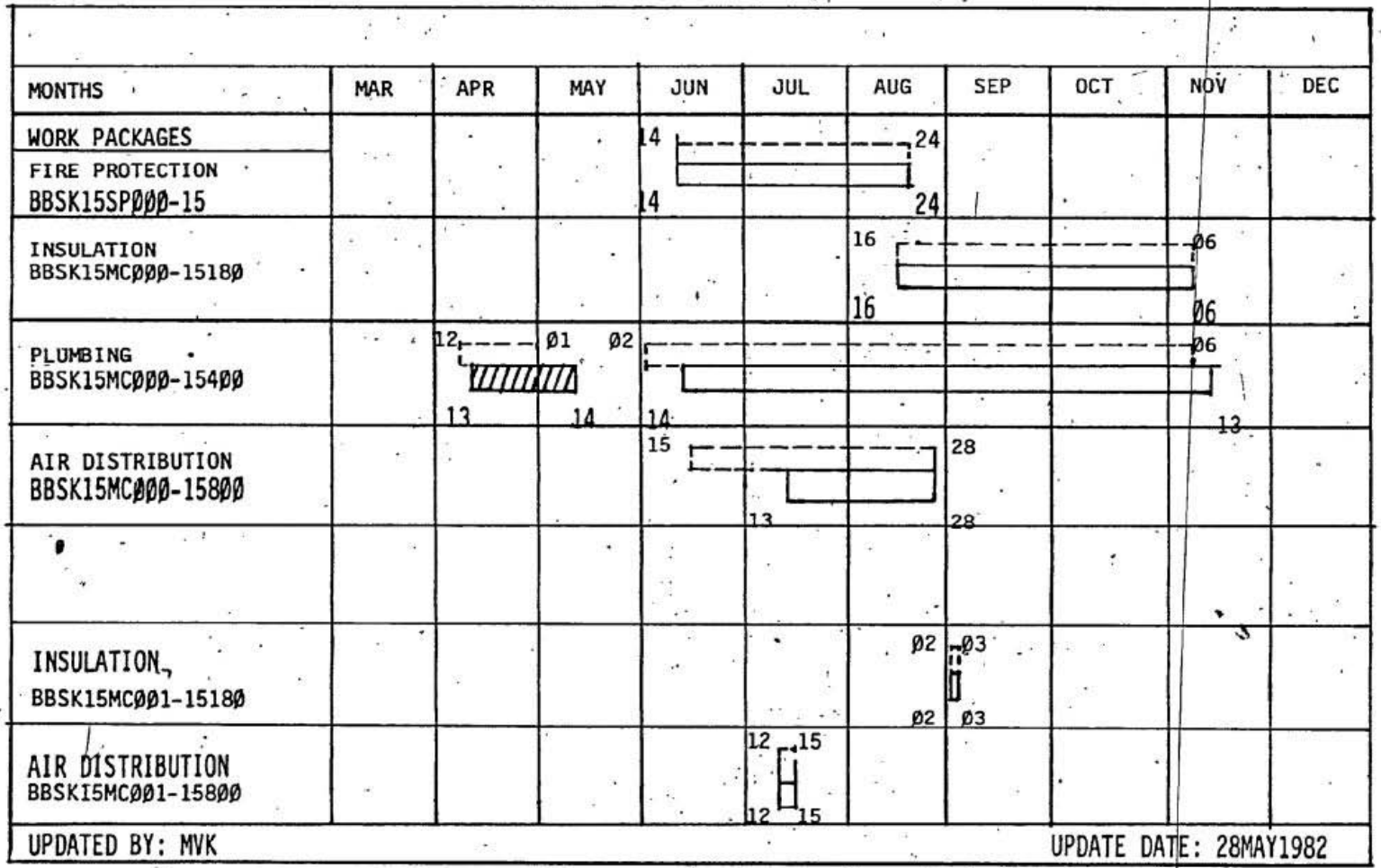


FIGURE 4.3 Bar Chart for the St. Kevin's School Extension Subcontracted Work Packages

START 1980 SCALE FACTOR (1)= 08

SPAN 01 YEARS SCALE FACTOR (2)= 010

MONTH	YEAR	WORK DAYS	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
JAN	80	0000	H	*	*	*			*	*	*	*	*			*	*	*	*	*			*	*	*	*	*	*	*	*	*	*
FEB	80	0022	*			*	*	*	*	*			*	*	*	*	*			*	*	*	*	*	*		*	*	*	*		
MAR	80	0043			*	*	*	*	*			*	*	*	*	*			H	*	*	*	*			*	*	*	*	*		*
APR	80	0063	*	*	*	H			*	*	*	*	*			*	*	*	*	*			H	*	*	*	*			*	*	*	
MAY	80	0083	*	*			*	*	*	*	*			*	*	*	*	*			H	*	*	*	*			*	*	*	*	*
JUN	80	0104		*	*	*	*	*			*	*	*	*	*				*	*	*	*	*			H	*	*	*	*		H	
JUL	80	0123	*	*	*	*			*	*	*	*	*			H	*	*	*	*			*	*	*	*	*			*	*	*	*
AUG	80	0145	*			*	*	*	*	*			*	*	*	*	*			*	*	*	*	*			*	*	*	*	*		
SEP	80	0166	H	*	*	*	*			*	*	*	*	*			*	*	*	*	*				*	*	*	*	*			*	*	
OCT	80	0187	*	*	*			*	*	*	*	*			H	*	*	*	*			*	*	*	*	*	*			*	*	*	*	*
NOV	80	0209			*	*	*	*	*			*	H	*	*	*			*	*	*	*	*			*	*	*	*	*			
DEC	80	0228	*	*	*	*	*			*	*	*	*	*			*	*	*	*	*				*	*	*	H	H			*	*	*

FIGURE 4.4 Calendar

4.2.0 Input Data Listings

The computer processing of seven cost control reports requires two sets of input data: one for the two weekly reports, and another for the five monthly reports. The listings of these two input data sets for the example project are presented in appendices G and H.

CHAPTER 5

CONCLUSIONS

This project report has presented a simple cost control technique which can be easily adopted by small and medium sized building contractors. The construction cost is monitored by analysis of seven periodic reports which are prepared at the end of each accounting period. The level of details in these reports are predetermined by the company's WBS of the specific project under consideration. The various unit costs are obtained by suitably updating the standard rate table of the company. The seven reports comprise of 1) Weekly Quantity and Cost Report. 2) Cost Analysis Report 3) three Cash Flow Reports and 4) two Progress Claim Status Reports. The costs are controlled by keeping resource costs updated. analyzing variances. and monitoring progress as well as amounts receivable and payable.

The four most important concerns of a small and medium sized building contractor in controlling project costs are: total project cost. cost of in-house work. progress payments and cash flow. SCCT addresses all four concisely but comprehensively. It specificaly answers the need of a building contractor and generates no superfluous information.

SCCT computer program based on PMS IV is for the main frame computer. Similar computer programs can be developed either for mini or micro computers. Some additional benefits of this technique are summarized in the following and a discussion of its limitation is given at the end.

5.1.0 Aid in Bid Preparation

This technique proposes a standard rate table from which the unit costs are obtained for cost control purposes. The same table by applying suitable location and escalation factors can be used to estimate cost of new projects for bidding purposes. This standard rate table must be updated periodically so it is always ready for use.

5.2.0 Guidelines for Planning Future Projects

This technique calls for frequent computation of variance and the analysis of reasons for the deviation. Hence it makes contractors' management personnel cost conscious. The feedback they receive from the present project will aid them plan new projects better.

5.3.0 Early Warning System

The technique proposed can not do anything for the cost overrun, if it has already occurred. However, it helps reduce their recurrence. Moreover, it prepares in each accounting period, the figures on the extent of deviation of forecast from the estimate, a true indicator of the overall performance. If it is alarmingly large, the contractor can take remedial steps to bring it under control. If the deviation is owner caused, the contractor can take it up the matter with the owner and try to negotiate a new price. Since this information is available early in the project cycle, it helps him procure additional funds, if necessary, from the financial institutions, to meet the deficit, if any.

5.4.0 Limitation of SCCT

SCCT is exclusively meant for small and medium sized building contractors only. Hence, this technique can not be expected to be used for large complex projects containing unit price or cost-plus subcontract(s).

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APPENDIX A

PROJECT

& Const. Co. Ltd.

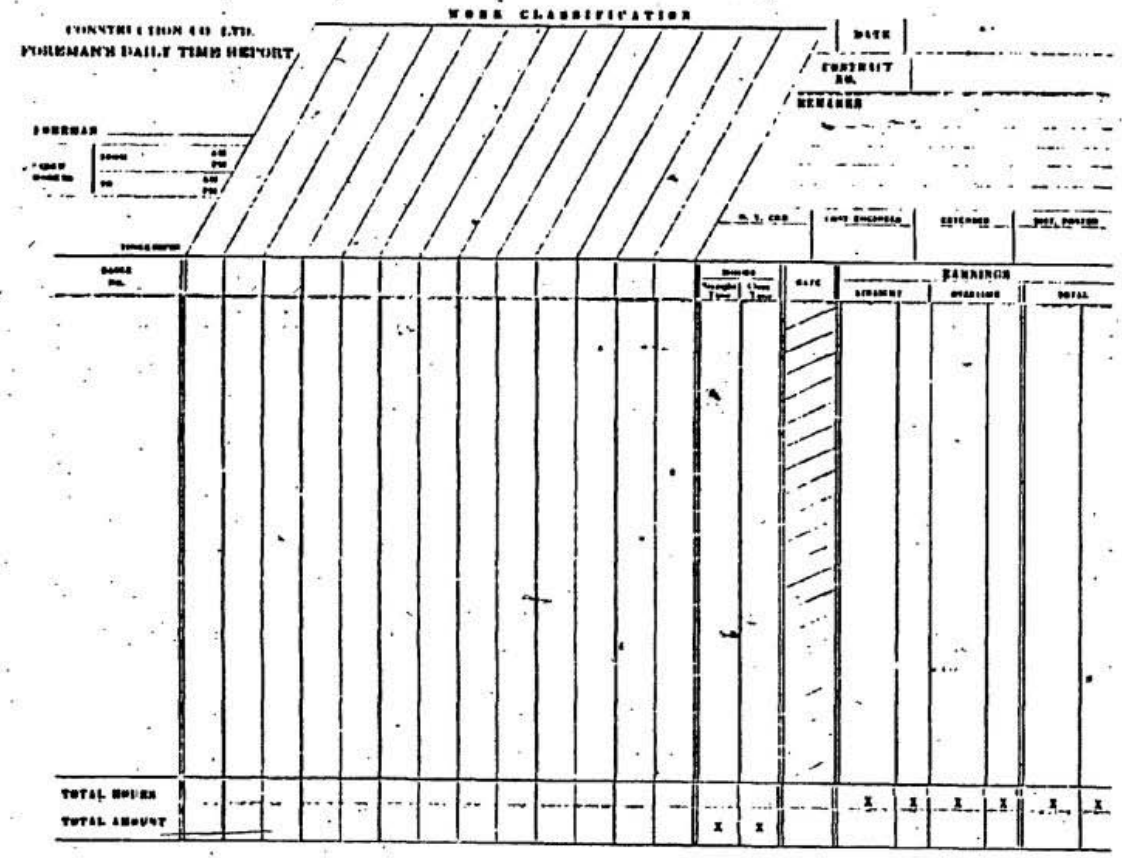
BUILDING ESTIMATE

Sheet ... of ...

Date ... ...

CODE		QUANTITY	UNIT	UNIT PRICE			TOTAL MAT.	TOTAL LAB	TOTAL RENT.	TOTAL
				MAT.	LAB.	RENT.				

APPENDIX B


WORK CLASSIFICATION
CONSTRUCTION CO. LTD.
FOREMAN'S DAILY TIME REPORT
DATE
CONTRACT NO.
REMARKS
FOREMAN
EARNINGS
TOTAL HOURS
TOTAL AMOUNT

APPENDIX C

CONSTRUCTION LTD.
WEEKLY LABOR COST REPORT

Job No. _____
Plot _____
Location _____

Report No. _____
Week Ending _____

Acct No.	DESCRIPTION OF WORK	THIS WEEK							TOTAL TO DATE							ESTIMATED			% Comp	WORKING ESTIMATE
		Quan.	No.	Man Hrs	F.	H.	L.	Cost	Quan.	No.	Man Hrs	F.	H.	L.	Cost	Quan.	No.	Man Hrs		

APPENDIX D

UCI (UNIFORM CONSTRUCTION INDEX) FORMAT

00 Conditions of the Contract

00000-00099 unassigned

01 General Requirements

01020 Allowances
01100 Alternatives
01200 Project Meetings
01300 Submittals
01400 Quality Controls
01500 Temporary Facilities and Control
01600 Materials and Equipment
01700 Project Closeout

02 Sitework

02000 Alternatives
02010 Subsurface Exploration
02011 Borings
02012 Core Drilling
02013 Standard Penetration Tests
02014 Seismic Explosion
02100 Clearing
02101 Structure Moving
02102 Clearing and Grubbing
02103 Tree-Pruning
02104 Shrub and Tree Location
02110 Demolition
02200 Earthwork
02210 Site Clearing
02212 Embankment
02220 Excavating and Backfilling
02221 Trenching
02222 Structure Excavation
02223 Roadway Excavation
02224 Pipe Boaring and Jacking
02227 Waste Material Disposal
02230 Soil Compaction Control
02240 Soil Stabilization
02250 Soil Treatment
02251 Termite Control
02252 Vegetation Control
02300 Pile Foundation
02350 Caisssons
02351 Drilled Caissons
02352 Excavated Caissons
02400 Shoring
02420 Underpinning
02500 Site Drainage
02550 Site Utilities
02600 Paving and Surfacing
02610 Paving
02620 Curbs and Cutters
02630 Walks
02640 Synthetic Surfacing
02700 Site Improvements
02710 Fences and Gates
02720 Road and Parking Appurtenances
02730 Playing Fields
02750 Irrigation Systems
02760 Site Furnishings
02800 Landscaping
02810 Soil Preparation
02820 Lawns

02830 Trees, Shrubs, and Ground Cover
02851 Trackwork
02900 Marine Work
02920 Boat Facilities Structures
02931 Fenders
02933 Groins
02940 Dredging
02960 Tunnel Excavation
02980 Support Systems

02850 Railroad Work
02852 Ballasting
02910 Docks
02930 Protective Marine
02932 Seawalls
02934 Jetty
02950 Tunneling
02970 Tunnel Grouting

03 Concrete

03000 Alternatives
03150 Expansion & Construction Joints
03210 Steel Bar and Welded Wire Fabric Reinforcing
03300 Cast-in-Place Concrete
03310 Concrete
03321 Insulating Concrete
03330 Heavy Weight Concrete
03350 Specially Finished Concrete
03352 Bushhammered Concrete
03354 Heavy Duty Concrete Floor Finishes
03360 Specially Placed Concrete
03400 Precast Concrete
03411 Tilt-up Wall Panels
03430 Precast Prestressed Concrete
03510 Gypsum Concrete

03100 Concrete Formwork
03200 Concrete Reinforcement
03230 Stressing Tendons
03305 Concrete Curing
03320 Lightweight Concrete
03322 Light Weight Structural Concrete
03340 Prestressed Concrete
03351 Exposed Aggregate Concrete
03353 Blasted Concrete
03355 Grooved Surface Concrete
03370 Grout
03410 Precast Concrete Panels
03420 Precast Structural Concrete
03500 Cementitious Decks
03520 Cementitious Wood Fibre Deck

04 Masonry

04000 Alternatives
04150 Masonry Accessories
04170 Anchors and Tie Systems
04200 Unit Masonry

04100 Mortar
04160 Joint Reinforcement
04180 Control Joints
04210 Brick Masonry

04220 Concrete Unit Masonry
04230 Reinforced Unit Masonry
04240 Clay Backing Tile
04245 Clay Facing Tile
04250 Ceramic Veneer
04270 Glass Unit Masonry
04280 Gypsum Unit Masonry
04400 Stone
04410 Rough Stone
04420 Cut Stone
04422 Marble
04430 Simulated Masonry
04435 Cast Stone
04440 Flagstone
04450 Natural Stone Veneer
04500 Masonry Restoration & Cleaning
04510 Masonry Cleaning
04550 Refractories

05 Metals

05000 Alternatives
05100 Structural Metal Framing
05120 Structural Steel
05130 Structural Aluminium
05200 Metal Joists
05300 Metal Decking
05400 Light Metal Framing
05500 Metal Fabrication
05510 Metal Stairs
05520 Handrails and Railings
05521 Pipe and Tube Railings
05530 Grating
05540 Casting
05700 Ornamental Metal
05710 Ornamental Stairs
05720 Ornamental Handrails and Railings
05730 Ornamental Sheet Metal
05800 Expansion Control

06 Wood and Plastics

06000 Alternatives
06100 Rough Carpentary
06110 Framing and Sheathing Framing
06111 Light Wooden Structures
06112 Preassembled Components
06113 Sheathing
06114 Diaphragms
06130 Heavy Timber Construction
06131 Timber Trusses
06132 Mill-Framed Structures
06133 Pole Construction
06150 Trusses
06170 Prefabricated Structural Units
06182 Glue-Laminated Decking
06190 Wood Trusses
06200 Finish Carpentary
06220 Millwork
06240 Laminated Plastic
06300 Wood Treatment
06400 Architectural Work
06410 Cabinet Work
06411 Wood Cabinets : Unfinished
06420 Paneling
06421 Architectural Hardwood Plywood Paneling
06422 Softwood Plying Paneling
06430 Stairwork

06431 Wood Stair and Railing
06600 Plastic Fabrications
06500 Prefabricated Structural Plastics

07 Thermal & Moisture Protection

07000 Alternatives
07100 Waterproofing
07110 Membrane Waterproofing
07120 Fluid Applied Water Proofing
07121 Liquid Waterproofing
07130 Bentonite Waterproofing
07140 Metal Oxide Waterproofing
07150 Dampproofing
07160 Bituminous Dampproofing
07170 Silicone Dampproofing
07190 Vapor Barriers/Reterdants
07200 Insulation
07210 Building Insulation
07211 Loose Fill Insulation
07212 Rigid Insulation
07213 Fibrous and Reflective Insulation
07214 Foamed-in-Place Insulation
07215 Sprayed-On Insulation
07230 High and Low Temperature Inulation
07240 Roof and Deck Insulation
07250 Perimeter and Under-Slab Insulation
07300 Shingles and Roofing Tiles
07310 Shingles
07320 Roofing Tiles
07400 Preformed Roofing & Siding
07410 Preformed Wall & Roof Panels
07411 Preformed Metal Metal Siding
07420 Composite Building Panels
07440 Preformed Plastic Panels
07460 Cladding/Siding
07461 Wood Siding
07462 Composition Siding
07463 Asbestos-Cement Siding
07464 Plastic Siding
07500 Membrane Roofing
07510 Built-up Bitumnious Roofing
07520 Prepared Roll Roofing
07530 Elastic Sheet Roofing
07540 Fluid Applied Roofing
07570 Traffic Topping
07600 Flashing & Sheet Metal
07610 Sheet Metal Roofing
07620 Flashing and Trim
07630 Roofing Specialties
07631 Gutters and Downspouts
07660 Gravel Stops
07700 Flashing
07800 Roof Accessories
07810 Skylights
07811 Plastic Skylights
07812 Metal-Framed Skylights
07830 Hatches
07840 Gravity Ventilators
07850 Prefabricated Curbs

07860 Prefabricated Expansion Joints
07900 **Sealants**
07950 Gaskets

<u>08 Doors & Windows</u>

08000 Alternatives
08100 **Metal Doors & Frames**
08110 Hollow Metal Work
08111 Stock Hollow Metal Work
08112 Custom Hollow Metal Work
08120 Aluminium Doors & Frames
08130 Stainless Steel Doors and Frames
08140 Bronze Doors & Frames
08200 Wood and Plastic Doors
08310 Sliding Metal Fire Doors
08320 Metal-Clad Doors
08330 Coiling Doors
08350 Folding Doors
08355 Flexible Doors
08360 Overhead Doors
08370 Sliding Glass Doors
08375 Safety Doors
08380 Sound Reterdants Doors
08390 Screen and Storm Doors
08400 Entrance & Storefronts
08450 Revolving Doors
08500 Metal Windows
08510 Steel Windows
08520 Aluminium Windows
08530 Stainless Steel Windows
08540 Bronze Windows
08600 Wood & Plastic Windows
08610 Wood Windows
08620 Plastic Windows
08650 Special Windows
08700 Hardware & Specialties
08710 Finish Hardware
08720 Operators
08721 Automatic Door Equipment
08725 Window Operators
08730 **Weatherstripping & Seals**
08740 Thresholds
08800 Glazing
08810 Glass
08811 Plate Glass
08812 Sheet Glass
08813 Tempered Glass
08814 Wired Glass
08815 Rough & Figured Glass
08820 Processed Glass
08821 Coated Glass
08822 Laminated Glass
08823 Insulating Glass
08830 Mirror Glass
08840 Glazing Plastics
08850 Glazing Accessories Accessories
08900 Window Walls / Curtain Walls

<u>09 Finishes</u>

09000 Alternatives
09100 Lathe & Plaster
09110 Furring & Lathing
09150 Gypsum Plaster
09167 Gypsum Plaster
09180 Cement Plaster

09190 Acoustical Plaster
09280 Accesories
09310 Ceramic Tile
09330 Quarry Tile
09350 Glass Mosaics
09370 Metal Tile
09410 Portland Cement Terazzo
09500 Acoustical Treatment
09511 Acoustical Panels
09520 Acoustical Wall Treatment
09540 Ceiling Suspension Systems
09560 Wood Strip Flooring
09580 Plywood Block Flooring
09600 Wood Block Industrial Flooring
09651 Cementitious Underlayment
09670 Fluid Applied Resilient Flooring
09681 Carpet Cushion
09683 Bonded Cushion Carpet
09690 Carpet Tile
09720 Epoxy-Marble-Chip Flooring
09731 Conductive Elastomeric Liquid Flooring
09741 Armored Floors
09760 Floor Treatment
09810 Abrasion Resistent Coatings
09830 Elastomeric Coatings
09841 Sprayed Fireproofing
09900 Painting
09951 Vinyl-Coated Fabric Wall Covering
09953 Cork Wall Covering
09955 Wall Fabrics
09970 Prefinished Panels

09250 Gypsum Wallboard
09300 Tile
09320 Ceramic Mosaics
09340 Marble Tile
09360 Plastic Tile
09400 Terrazzo
09430 Conductive Terrazzo
09510 Acoustical Ceilings
09512 Acoustical Tiles
09530 Acoustical Insulation and Barriers
09550 Wood Flooring
09590 Resilient Wood Floor System
09650 Resilient Flooring
09660 Resilient Tile Flooring
09680 Carpeting
09682 Carpet
09684 Custom Carpet
09700 Special Flooring
09730 Elastomeric Liquid
09740 Heavy-Duty Concrete Toppings
09750 Brick Flooring
09800 Special Coatings
09820 Cementitious Coatings
09840 Fire-Resistent Coatings
09850 Aggregate Wall Coatings
09950 Wall Covering
09952 Vinyl Wall Covering
09954 Wallpaper
09960 Flexible Wood Sheets
09990 Adhesives

10 Specialties

10000 Alternatives
10100 Chalkboard and Trackboards

10150 Compartments and Cubicles
10161 Laminated Plastic Toilet Partitions
10163 Stone Partitions

10200 Louvers and Vents
10260 Wall and Corner Guards
10280 Specialty Modules
10300 Fireplaces
10310 Fireplace Accessories
10400 Identifying Devices

10411 Directories
10440 Signs

10500 Lockers
10531 Walkway Covers
10550 Postal Specialties
10552 Mail Boxes
10601 Mesh Partitions
10616 Movable Gypsum Partitions
10623 Accordion Folding Partitions
10670 Storage Shelving

10750 Telephone Enclosures

10900 Warddrobe Specialties

11 Equipment

11000 Alternative

11051 Vacuum Cleaning System
11100 Bank Vault Equipment
11170 Checkroom Equipment
11200 Ecclesiastical Equipment
11400 Food Service Equipment
11410 Bar Units
11430 Dishwashing Equipment
11440 Food Preparation Machines
11460 Food Serving Units
11480 Vending Equipment
11550 Industrial Equipment
11630 Laundary Equipment

10160 Toilet and Shower Partitions
10162 Metal Toilet Partitons
10170 Shower and Dressing Compartments
10240 Grills and Screens
10270 Access Flooring

10290 Pest Control
10301 Prefabricated Fireplaces
10350 Flagpoles

10410 Directories and Bulletin Boards
10420 Plaques
10450 Pedestrian Control Devices
10530 Protective Covers
10532 Car Shelters
10551 Mail Chutes
10600 Partitions
10610 Demountable Partitions
10620 Folding Partitions

10650 Scales

10700 Sun Control Devices Devices(Exterior)
10800 Toilet & Bath Accessories

11050 Built-in Maintenance Equipment
11052 Powered Window Washing
11150 Commercial Equipment
11180 Darkroom Equipment
11300 Educational Equipment

11401 Food Service Equipment : Custom Fabricated
11420 Cooking Units
11435 Garbage Disposers
11450 Food Preparation Tables
11470 Refrigerated Cases
11500 Athletic Equipment
11600 Laboratory Equipment
11650 Library Equipment

11700 Medical Equipment
11830 Musical Equipment
11860 Waste Handling Equipment
11862 Waste Compactors
11864 Pulping Machines & Systems
11871 Dock Levelers
11873 Portable Ramps, Bridges and Platforms
11875 Dock Bumpers
11900 Residential Equipment
11990 Registration Equipment
11800 Mortuary Equipment
11850 Parking Equipment
11861 Packaged Incinerators
11863 Bins
11870 Loading Dock Equipment
11872 Leveling Platforms
11874 Seals and Shelters
11880 Detention Equipment
11970 Theater & Stage Equipment

12 Furnishings

12000 Alternatives
12110 Murals
12300 Cabinets and Storage
12550 Fabrics
12670 Rugs & Mats
12710 Auditorium Seating
12735 Telescoping Bleachers
12100 Artwork
12120 Photo Murals
12500 Window Treatment
12600 Furniture
12700 Seating
12730 Stadium Seating
12800 Furnishing Accessories

13 Special Construction

13000 Alternatives
13050 Integrated Assemblies
13250 Clean Room
13400 Incinerators
13450 Insulated Room
13550 Observatory
13700 Special Purpose Rooms & Buildings
13770 Sound and Vibration Control
13850 Swimming Pools
13010 Air Supported Structures
13100 Audiometric Room
13350 Hyperfabric Room
13440 Instrumentation
13540 Nuclear Reactors
13600 Prefabricated Buildings
13750 Radiation Protection
13800 Vaults

14 Conveying Systems

14000 Alternatives
14200 Elevators
14202 Elevators Operation
14300 Hoists & Cranes
14430 Platforms & Stage Lifts
14550 Conveyors & Chutes
14600 Moving Stairs & Walks
14100 Dumbwaiters
14201 Elevators Hoisting Equipment
14203 Elevators Cars and Entrences
14400 Lifts
14500 Material Handling Systems
14570 Turntables
14610 Escalators

14700 Pneumatic Tube Systems

14800 Powered Scaffolding

15 Mechanical

15000 Alternatives
15010 General Provisions
15050 Basic Material & Methods
15060 Pipe & Fittings
15075 Hose
15080 Piping Specialties
15100 Valves & Cocks (Manuals)
15120 Control Valves
15140 Pumps
15160 Vibration Isolation & Expansion Compensation
15170 Meters & Gauges
15175 Tanks
15180 Insulation
15200 Water Supply & Treatment
15220 Pumps & Piping
15230 Booster Pumping: Equipment
15240 Water Reservoirs & Tanks
15250 Water Treatment
15270 Distribution & Metering Systems
15300 Waste Water & Disposal Treatment
15310 Sewage Ejectors
15320 Grease Interceptors
15330 Basins and Manholes
15340 Sewerage
15350 Lift Stations
15360 Septic Tank Systems
15380 Sewage Treatment
15400 Plumbing
15420 Equipment
15440 Special Systems Accessories
15450 Plumbing Fixtures
15451 Special Fixtures & Trim
15455 Water Coolers
15456 Washfountains
15470 Pool Equipment
15500 Fire Protection
15510 Sprinkler Equipment
15520 CO Extinguishing Equipment
15530 Standpipe and Fire Hose Equipment
15540 Pressurized Extinguishers and Fire Blankets
15550 Fire Extinguisher Cabinets
15560 Hood and Duct Fire Protection
15600 Power or Heat Generation
15610 Fuel Handling Equipment
15611 Oil Storage Tanks, Controls, and Piping
15612 Bottled Gas Tanks, Control, and Piping
15613 Oil Piping
15614 Gas Piping
15615 Stokers and Conveyors
15616 Ash Removal System
15617 Breechings
15618 Exhaust Equipment
15619 Draft Control Equipment
15630 Boilers
15640 Boiler Feedwater Equipment
15650 Refrigeration
15658 Refrigerant Piping System
15660 Compressors
15670 Condensing Units
15680 Chillers

15690 Evaporators
15698 Commercial Ice Making Equipment
15699 Refrigeration Accessories
15700 Liquid Heat Transfer
15710 Hot Water Specialties
15720 Stem Specialties
15730 Heat Exchangers
15740 Terminal Units
15760 Packaged Heat Pumps
15770 Packaged Heating and Cooling
15780 Humidity Control
15800 Air Distribution
15810 Furnaces
15820 Fans
15835 Air Curtains
15840 Ductwork
15850 Special Ductwork Systems
15860 Duct Accessories
15870 Outlets
15880 Air Treatment Equipment
15890 Sound Attenuators
15900 Controls & Instrumentation
15910 Control Piping, Tubing and Wiring
15920 Control Panels
15930 Primary Control Devices
15950 Sequential Controls
15960 Recording Devices
15970 Alarm Devices
15980 Special Process Controls

16 Electrical

16000 Alternatives
16010 General Provisions
16100 Basic Material & Methods
16110 Raceways
16120 Conductors
16130 Outlet Boxes
16133 Cabinets
16134 Panelboards
16140 Switches and Receptacles
16150 Motors
16160 Motor Starters
16170 Disconnects, (Motor and Circuit)
16180 Overcurrent Protective Devices
16190 Supporting Devices
16199 Electronic Devices
16200 Power Generation
16210 Generator
16220 Engine
16230 Cooling Equipment
16240 Exhaust Equipment
16250 Starting Equipment
16260 Automatic Transfer Equipment
16300 Power Transmission
16310 Substation
16320 Switchgear
16330 Transformer
16340 Vaults
16350 Manholes
16360 Rectifiers
16370 Converters
16380 Capacitors
16400 Service and distribution
16410 Electric Service
16411 Underground Service
16420 Service Entrance
16421 Emergency Service
16430 Service Disconnect
16440 Metering
16450 Grounding
16460 Transformers

16470 Distribution Switchboards
16480 Feeder Circuit
16490 Converters
16491 Rectifiers
16500 Lighting
16510 Interior Lighting Fixtures
16515 Signal Lighting
16530 Exterior Lighting Fixtures
16531 Stadium Lighting
16532 Roadway Lighting
16550 Accessories
16551 Lamps
16552 Ballasts and Accessories
16570 Poles and Standards
16600 Special Systems
16610 Lightning Protection
16620 Emergency Light & Power
16640 Cathodic Protection
16700 Communications
16710 Radio Transmission
16720 Alarm & Detection Equipment
16740 Clock and Program Equipment
16750 Telephone & Telegraph
16760 Intercommunication Equipment
16770 Public Address Equipment
16780 Television Systems
16850 Heating and Cooling
16858 Snow Melting Cable and Materials
16889 Heating Cable
16860 Electric Heating Coil
16865 Electric Board
16870 Packaged Room Air Conditioners
16880 Radiant Heaters
16890 Electric Heater (Prop Fan & Heaters)
16900 Controls & Instrumentation)
16910 Recording and Indicating Devices
16920 Motor Control Centers
16930 Lighting Control Equipment
16940 Electrical Interlock
16950 Control of Electrical Heating
16960 Limit Switches

APPENDIX E

Cost Control Package Programs

Package Name	Vendor
1) ASA Project Management System	Andrew Sipos Associates
2) APECS/COSTRAK	ADP Network Services
3) Plus Twenty	Cheltonian Inc.
4) INTERNET 80s	Computation Research & Devp. Ltd.
5) CA-Quicktrol	Computer Associates International
6) MICROPERT	Computerline Ltd.
7) CONSTRUCT	Construction Information System
8) Project Management	Datamatics Management Services
9) PERT 6	Dynamic Solution Inc.
10) CRAM/PACE	ESI
11) G/C CUE	Gilbert/Commonwealth
12) PMCS	HIS
13) SRMS	Interactive Logic Inc.
14) CIPREC	IBM
15) PAC I	International Systems Inc.
16) PAC II	International Systems. Inc.
17) PAC III	International Systems Inc.
18) PAC MACRO	International Systems Inc.
19) PROMINI/PRIMINI	K+H Computer Systems
20) CPMS	MDC Systems Corp.
21) CPMS/3000	MDC Systems Corp.
22) ARTMIS	Meteir Management Systems. Inc.
23) N 5500	Nichols Company. Inc.
24) Readinet or 4SITE	Point 4 Data Corp.
25) CMIS	Profitool. Inc.
26) COST	Project Management International. Inc.
27) Project Cost Processor (PCP)	Project Software & Development. Inc.
28) Project Cost Model (PCM)	Project Software Limited
29) PROCOST	PROMACON/TRANSIOG
30) MicroPERT	Shippard Software Company
31 MISTER	Shirley Software System
32) OPTIMA 1100	Sperry Univac
33) Vision Cost/ Resource Module	SYSTONETICS Inc.
34) Track 50/	T & B Computing. Inc.

Intact 50	
35) MPM	Talqun Corporation
36) CO$TIME	Trimaq Systems
37) Ultrashedule	Uttra Control Inc.
38) VEPCO - PICS	Vergenia Electric Power Company
39) Quik Project Control Systems	Energy Tek Software

APPENDIX F

COST REPORT PROGRAMS

Cost Report V1

```
          START
          PRINT  NOGEN
REPORTV1  RP     ENTER
          RP     REPORTVA
          RP     REPORTVB
          RP     REPORTVC
          RP     REPORTVD
          RP     LEAVE
          END

          START
          PRINT  NOGEN
REPORTVA  RP     ENTER
          RP     SORTA,('ACPTFILE','ORDFILE',X9LCN,XPERP,XRESC,XACPER)
          RP     LEAVE
          END

          START
          PRINT  NOGEN
REPORTVB  RP     ENTER
          RP     CLEARTAB,('C','M','V','W')
          RP     CLEAR,(XEOF)
*
          RP     OPENF,(DCBIN,'ORDFILE','I',XSIZR,XBLK)
          RP     OPENF,(DCBOUT,'WORKFILE','O',78,XBLK)
          RP     READ,(DCBIN)
          RP     EOF,(A10)
A1        RP     COSTM,(15,'H','D')
          RP     READ,(DCBIN)
          RP     EOF,(A2)
          RP     CHANGE,(A2,XRESC,XPERP,X9LCN)
          RP     COMPAREL,(XACPER,XASOFP,A1)
          RP     NOCHANGE,(A1,XACPER)
A2        RP     TOTAL,(8,XMA9,XMB9,XCA9,XCB9,XME9,XCE9)
          RP     COMPAREL,(XASOFP,XYACPER,A5,A3,A4)
A3        RP     FORM,(35,XMA9,39,XMB9,43,XCA9,49,XMA8,53,XMB8,57,XCA8)
          RP     ADD,(ZERO,ZERO,1)
A4        RP     CLEAR,(XMA7,XMB7,XCA7)
          RP     STORE,(XMA7,XMA8)
          RP     STORE,(XMB7,XMB8)
          RP     STORE,(XCA7,XCA8)
A5        RP     CLEAR,(XMA9,XMB9,XCA9,XCB9,XME9,XCE9)
          RP     EOF,(A6)
```

```
         RP    NOCHANGE,(A1,XRESC,XPERF,X9LCN)
A6       RP    FORM,(63,XME8,67,XCE8,71,XMB8,75,XCB8)
         RP    COMPAREL,(XYACPER,XASOFP,A7,A9)
         RP    COMPAREL,(ZERO,1,A7,A9)
A7       RP    FORM,(35,XMA9,39,XMB9,43,XCA9,49,XMA7,53,XMB7,57,XCA7)
A9       RP    FORM,(1,XY9LCN,19,XYPERF,27,XYRESC)
         RP    WRITE,(DCBOUT)
         RP    CLEAR,(ZERO)
         RP    CLEARTAB,('C','M')
         RP    EOF,(A10)
         RP    NOCHANGE,(A1,XPERF,X9LCN)
         RP    NOCHANGE,(A1,X9LCN)
         RP    GOTO,(A1)
A10      RP    CLOSEF,(DCBIN,DCBOUT)
         RP    CLEARTAB,('N','V','W')
         RP    LEAVE
I        DC    C'I'
ZERO     DC    F'0'
SAVE     DC    F'0'
DCBIN    DC    F'0'
MAXVAL   DC    F'30'
DCBOUT   DC    F'0'
         END

         START
         PRINT NOGEN
REPORTVC RP    ENTER
         RP    ADD,(FLD,XLEVC,XLEVC)
         RP    STORE,(SAVE,XSIZR)
         RP    STORE,(XSIZR,78)
         RP    DWT,(X2,1,18,'A')
         RP    DWT,(X3,19,8,'A')
         RP    DWT,(X4,27,8,'A')
         RP    SORTA,('WORKFILE','WORKFILE',X2,1,FLD,X3,X4)
         RP    STORE,(XSIZR,SAVE)
         RP    STORE,(XFLG2,1)
         RP    LEAVE
FLD      DC    F'0'
SAVE     DC    F'0'
         END

         START
         PRINT NOGEN
REPORTVD RP    ENTER
         RP    CLEAR,(XEOF,XCONT,XPAGE,X9LCN,XY9LCN,XPERF,XYPERF,      *
               XLINE,XRESC,XYRESC)
         RP    DWT,(X1,1,79,'A')
         RP    DWT,(X2,1,18,'A')        X9LCN
         RP    DWT,(X3,19,8,'A')        PERFORMING DEPT.
         RP    DWT,(X4,27,8,'A')        RESOURCE CODE
*                                  ASOP PERIOD INCR. HOURS OR COSTS
         RP    DWT,(X20,35,4,'C')       MA
         RP    DWT,(X21,39,4,'C')       MB
```

```
         RP    DWT,(X22,43,4,'C')       CA
*                              ASOF PERIOD CUMULATIVE HOURS OR COSTS
         RP    DWT,(X23,49,4,'C')       MA
         RP    DWT,(X24,53,4,'C')       MB
         RP    DWT,(X25,57,4,'C')       CA
*                              TOTAL HOURS OR COSTS
         RP    DWT,(X26,63,4,'C')       ME
         RP    DWT,(X27,67,4,'C')       CE
         RP    DWT,(X28,71,4,'C')       MB
         RP    DWT,(X29,75,4,'C')       CB
         RP    DWT,(X10,131,103,'A')    CHARGE DESC.RECORD
         RP    DWT,(X11,131,18,'A')     CONTRACT DESC.
         RP    DWT,(X12,179,36,'A')     SUMMARY CHARGE NO.DESC.
         RP    DWT,(X13,215,18,'A')     SUMMARY CHARGE NO.
         RP    STORE,(SAVE,XSIZR)
         RP    STORE,(XSIZR,78)
         RP    ADD,(FLD,XLEVC,XLEVC)
         RP    SUB,(MAXVAL,XMAXL,30)
         RP    OPENP,(DCBIN,'WORKFILE','I',78,XBLK)
         RP    STORE,(DCBOUT,XODCB)
L1       RP    READP,(DCBIN,X2)
         RP    EOP,(L17)
L2       RP    CLEARTAB,('C','M')
         RP    STORE,(X9LCN,X2,1,FLD)
         RP    DESCC,(X9LCN,X10)
         RP    COMPAREL,(XCONT,X11,L3,H1)
L3       RP    STORE,(XCONT,X11)
*
*        OUTPUT PAGE AND COLUMN HEADINGS
*
H1       RP    BLANK,(XOUT)
         RP    SPACE,('3')
         RP    ADD,(XPAGE,XPAGE,1)
         RP    FORMC,(115,'PAGE NO  :',125,XPAGE)
         RP    WRITE,(DCBOUT)
         RP    FORM,(115,'RUN DATE:',125,XRUND)
         RP    WRITE,(DCBOUT)
         RP    FORMC,(47,'REPORTING COMPANY:',67,XRPTORG)
         RP    SPACE,('1')
         RP    WRITE,(DCBOUT)
         RP    FORM,(4,'PROJECT NAME',17,':',19,XTITLE,                *
               96,'ACCOUNTING DATE',112,':',114,XASOFD)
         RP    SPACE,('2')
         RP    WRITE,(DCBOUT)
         RP    FORM,(4,'CONTRACT NAME',17,':',19,X11,                  *
               96,'PROJECT DURATION:',114,XSPAN)
         RP    WRITE,(DCBOUT)
         RP    FORM,(4,DASH128)
         RP    WRITE,(DCBOUT)
         RP    FORM,(49,'WEEKLY QUANTITY AND COST REPORT')
         RP    SPACE,('1')
         RP    WRITE,(DCBOUT)
         RP    FORM,(4,DASH128)
```

```
RP      SPACE,('1')
RP      WRITE,(DCBOUT)
RP      FORM,(4,'WORK CLASSIFICATION DESCRIPTION:',                    *
        80,'WORK CLASSIFICATION COSTING CODE:',37,X12,114,X13)
RP      WRITE,(DCBOUT)
RP      FORM,(4,DASH128)
RP      WRITE,(DCBOUT)
RP      FORM,(14,'I',24,'I',35,'CURRENT PERIOD',60,'I',69,             *
        'CUMULATIVE TO DATE',96,'I',109,'TO COMPLETE')
RP      WRITE,(DCBOUT)
RP      FORM,(4,'PERFORMING',14,'I',16,'RESOURCE',24,DASH108,24,*
        'I',60,'I',96,'I')
RP      WRITE,(DCBOUT)
RP      FORM,(24,'I',25,'ESTIMATE',33,'I',42,'I',48,'ACTUAL',          *
        60,'I',61,'ESTIMATE',69,'I',78,'I',84,'ACTUAL',96,'I',         *
        100,'ESTIMATE',114,'I',119,'FORECAST',14,'I')
RP      WRITE,(DCBOUT)
RP      FORM,(4,'DEPT',16,'CODE')
RP      FORM,(14,'I',24,DASH9,36,'VALUE',42,DASH27,78,DASH54)
RP      FORM,(24,'I',33,'I',42,'I',60,'I',69,'I',71,'VALUE',           *
        78,'I',96,'I',114,'I')
RP      WRITE,(DCBOUT)
RP      FORM,(26,'HOURS',44,'HOURS',53,'COST',62,'HOURS',              *
        80,'HOURS',89,'COST',98,'HOURS',107,'COST',116,'HOURS')
RP      FORM,(14,'I',24,'I',33,'I',42,'I',51,'I',60,'I',69,'I',        *
        78,'I',87,'I',96,'I',105,'I',114,'I',123,'I',125,'COST')
RP      WRITE,(DCBOUT)
RP      FORM,(4,DASH128)
RP      FORM,(24,'I',33,'I',42,'I',51,'I',60,'I',69,'I',               *
        78,'I',87,'I',96,'I',105,'I',114,'I',123,'I')
RP      WRITE,(DCBOUT)
RP      STORE,(XLINE,0)
*
*       OUTPUT RESOURCE CODE LINE
*
L4      RP      COMPAREA,(MAXVAL,XLINE,H1,H1)
RP      COMPAREL,(XY3,X3,L6,L7,L6)
L6      RP      FORM,(24,'I',33,'I',42,'I',51,'I',60,'I',69,'I',78,'I',*
        87,'I',96,'I',105,'I',114,'I',123,'I')
RP      WRITE,(DCBOUT)
RP      ADD,(XLINE,XLINE,1)
L7      RP      STORE,(XMA9,X20)
RP      STORE,(XMB9,X21)
RP      STORE,(XCA9,X22)
RP      STORE,(XMA8,X23)
RP      STORE,(XMB8,X24)
RP      STORE,(XCA8,X25)
RP      STORE,(XME7,X26)
RP      STORE,(XCE7,X27)
RP      STORE,(XMB7,X28)
RP      STORE,(XCB7,X29)
RP      TOTAL,(6,XMA9,XMB9,XCA9)
RP      FORMC,(25,XMB9,43,XMA9,53,XCA9,4,X3,16,X4)
```

```
         RP    TOTAL,(5,XMA8,XMB8,XCA8)
         RP    FORMC,(61,XMB8,79,XMA8,89,XCA8,97,XMB7,107,XCB7)
         RP    TOTAL,(4,XMB7,XCB7,XME7,XCE7)
         RP    STORE,(XMA7,XMA8)
         RP    STORE,(XCA7,XCA8)
         RP    COMPUTE,(7,'B')
         RP    FORMC,(71,XVALC,115,XLREM,125,XLREC)
         RP    MPY,(XCR7,HUND,XVALC)
         RP    DIV,(XCO7,XCR7,XCA7)
         RP    MPY,(XCR6,XCO7,XCA9)
         RP    DIV,(XCO6,XCR6,HUND)
         RP    FORMC,(34,XCO6)
         RP    FORM,(24,'I',33,'I',42,'I',51,'I',60,'I',69,'I',78,'I', *
               87,'I',96,'I',105,'I',114,'I',123,'I')
         RP    WRITE,(DCBOUT)
         RP    CLEAR,(XMA9,XMB9,XCA9,XMA8,XMB8,XCA8,XMB7,XME7,XCB7,    *
               XCE7,XVALC,XLREM,XLREC,XCR7,XCO7,XCR6,XCO6,XMA7)
         RP    ADD,(XLINE,XLINE,1)
L11      RP    READF,(DCBIN,X2)
         RP    EOF,(L14)
         RP    STORE,(XY9LCN,X2,1,FLD)
         RP    CHANGE,(L14,X9LCN)
         RP    NOCHANGE,(L4,X3)
         RP    NOCHANGE,(L4,X9LCN)
*
*        OUTPUT TOTAL LINE
*
L14      RP    FORM,(4,DASH128)
         RP    FORM,(24,'I',33,'I',42,'I',51,'I',60,'I',69,'I',78,'I', *
               87,'I',96,'I',105,'I',114,'I',123,'I')
         RP    WRITE,(DCBOUT)
         RP    FORM,(24,'I',33,'I',42,'I',51,'I',60,'I',69,'I',78,'I', *
               87,'I',96,'I',105,'I',114,'I',123,'I')
         RP    WRITE,(DCBOUT)
         RP    FORMC,(8'TOTAL',25.XMB6,43.XMA6.53.XCA6)
         RP    FORMC,(61,XMB5,79,XMA5,89,XCA5,97,XMB4,107,XCB4)
         RP    STORE,(XMA4,XMA5)
         RP    STORE,(XCA4,XCA5)
         RP    COMPUTE,(4,'B')
         RP    FORMC,(71,XVALC,115,XLREM,125,XLREC)
         RP    MPY,(XCR4,HUND,XVALC)
         RP    DIV,(XCO4,XCR4,XCA4)
         RP    MPY,(XCR3,XCO4,XCA6)
         RP    DIV,(XCO3,XCR3,HUND)
         RP    FORMC,(34,XCO3)
         RP    FORM,(24,'I',33,'I',42,'I',51,'I',60,'I',69,'I',78,'I', *
               87,'I',96,'I',105,'I',114,'I',123,'I')
         RP    WRITE,(DCBOUT)
         RP    FORM,(4,DASH128)
         RP    WRITE,(DCBOUT)
         RP    CLEARTAB,('C','M')
         RP    EOF,(L17)
         RP    GOTO,(L2)
```

```
*
*       END OF REPORT
*
L17     RP    SPACE,('3')
        RP    STORE,(XSIZR,SAVE)
        RP    WRITE,(DCBOUT)
        RP    WRITE,(DCBOUT)
        RP    CLEARTAB,('W','N','V','C','M')
        RP    CLEAR,(XEOF,XPAGE,XLINE)
        RP    BLANK,(XOUT)
        RP    CLOSEF,(DCBIN)
        RP    LEAVE
I       DC    C'I'
HUND    DC    F'100'
FLD     DC    F'0'
DCBIN   DC    F'0'
MAXVAL  DC    F'0'
SAVE    DC    F'0'
DCBOUT  DC    F'0'
DASH9   DS    0CL9
DASH29  DS    0CL29
DASH27  DS    0CL27
DASH36  DS    0CL36
DASH54  DS    0CL54
DASH108 DS    0CL108
DASH128 DS    0CL128
        DC    128C'-'
        END
```

Cost Report V2

```
          START
          PRINT NOGEN
REPORTV2  RP    ENTER
          RP    REPORTVE
          RP    REPORTVF
          RP    REPORTVG
          RP    REPORTVH
          RP    LEAVE
          END

          START
          PRINT NOGEN
REPORTVE  ENTER
          RP    IRAT9,('ACPTFILE','ORDFILE')
          RP    SORTD,('ORDFILE','ORDFILE',X9LCN,XTYPE,XACPER)
          RP    LEAVE
          END

          START
          PRINT NOGEN
REPORTVF  RP    ENTER
          RP    OPENF,(DCBORD,'ORDFILE','I',XSIZR,XBLK)
          RP    OPENF,(DCBSUM,'XCRWRK  ','O',210,XBLK)
          RP    CLEAR,(XEOF)
          RP    CLEARTAB,('M','N','P','X','V','W','C')
          RP    DWT,(X1,1,54,'A')        CHARGE DESC AND CONTRACT NO
          RP    READ,(DCBORD)
          RP    EOF,(SECNDSRT)
CONDENSE  RP    COSTMDT
          RP    COMPAREL,(XOUTLK,TEN,L3,DESC)
L3        RP    READ,(DCBORD)
          RP    EOF,(WRITESUM)
          RP    NOCHANGE,(CONDENSE,X9LCN)
WRITESUM  RP    SUMARISE
*
*         FORMAT AND WRITE SUMMARY RECORD
*
          RP    FORM,(1,XYPATL,2,XY9LCN,20,XMA9,24,XMB9,28,XMC9,32,XME9,*
                40,XMR9,48,XCA9,52,XCB9,60,XCE9,72,XVALC)
*
          RP    GANDA                    GET OVERHEAD COST SUMMARY
*
          RP    FORM,(76,XMA9,80,XMB9,84,XMC9,88,XME9,96,XMR9,          *
                104,XCA9,108,XCB9,116,XCE9,128,XVALC,132,XYCHRG)
          RP    WRITE,(DCBSUM)
CLEAR     RP    CLEARTAB,('C','M')
          RP    EOF,(SECNDSRT)
          RP    GOTO,(CONDENSE)
*
DESC      RP    STORE,(X1,XDEPTL,1,54)
          RP    FORM,(150,X1,204,XRESP)
```

```
          RP    GOTO,(L3)
SECNDSRT  RP    CLOSEF,(DCBSUM,DCBORD)
          RP    RESETDWT
          RP    LEAVE
DCBSUM    DC    F'0'
DCBORD    DC    F'0'
DUMIRAT   DS    OCL27
          DC    9AL3(100000)
TEN       DC    X'0A'
          END

          START
          PRINT NOGEN
REPORTVG  RP    ENTER
L1        RP    DWT,(X2,2,18,'F')          9LCN
          RP    STORE,(SAVE,XSIZR)
          RP    STORE,(XSIZR,210)
          RP    ADD,(FLD,XLEVC,XLEVC)
          RP    SORTA,('XCRWRK   ','XCRWRK   ',X2,1,FLD)
          RP    STORE,(XSIZR,SAVE)
L2        RP    LEAVE
SAVE      DC    F'0'
FLD       DC    F'0'
          END

          START
          PRINT NOGEN
REPORTVH  RP    ENTER
STARTUP   RP    OPENF,(DCBIN,'XCRWRK   ','I',210,XBLK)
          RP    STORE,(DCBOUT,XODCB)
          RP    CLEAR,(XPAGE,XLINE,XEOF,XCONT)
          RP    SUB,(MAXLINE,XMAXL,14)
          RP    ADD,(LEVL,XLEVC,1)
          RP    CLEARTAB,('M','N','P','X','V','W','C')
          RP    DWT,(X1,1,1,'B')           PATL
          RP    DWT,(X2,2,18,'F')          9LCN
          RP    DWT,(X3,20,4,'C')          XMA9   CURRENT PERIOD ACTUAL
          RP    DWT,(X10,48,4,'C')         XCA9   TO DATE ACTUAL
          RP    DWT,(X11,52,4,'C')         XCB9   BCWS  AT COMPLETION
          RP    DWT,(X13,60,4,'C')         XCE9   ESTIMATE AT COMPLETION
          RP    DWT,(X19,20,56,'A')        ALL ABOVE COST FIELDS
          RP    DWT,(X20,48,24,'A')        ABOVE COST ONLY FIELDS
          RP    DWT,(X21,76,56,'A')        COST PLUS G&A TOTALS(AS ABOVE)
          RP    DWT,(X25,132,18,'A')       CHARGE NUMBER
          RP    DWT,(X26,186,18,'A')       CONTRACT NAME
          RP    DWT,(X27,204,6,'A')
          RP    DWT,(X28,150,36,'A')       CHARGE NUMBER DESCRIPTION
          RP    DWT,(X40,1,226,'A')
          RP    STORE,(XLINE,MAXLINE)
*
GET       RP    STORE,(X40,XY40)
          RP    READF,(DCBIN,X2)
          RP    EOF,(FORMAT3)
```

```
         RP    COMPAREA,(LEVL,X1,GET)
         RP    COMPAREA,(XLEVC,X1,FORMAT1)
         RP    STORE,(XY28,X28)
         RP    STORE,(XYCHRG,X25)
         RP    COMPAREA,(XLINE,MAXLINE,FORMAT1)
*
*        OUTPUT PAGE HEADINGS
*
SKIP     RP    SPACE,('3')
         RP    ADD,(XPAGE,XPAGE,1)
         RP    FORMC,(115,'PAGE NO :',125,XPAGE)
         RP    WRITE,(DCBOUT)
         RP    FORM,(115,'RUN DATE:',125,XRUND)
         RP    WRITE,(DCBOUT)
         RP    FORM,(47,'REPORTING COMPANY:',67,XRPTORG)
         RP    SPACE,('1')
         RP    WRITE,(DCBOUT)
         RP    FORM,(4,'PROJECT NAME',17,':',19,XTITLE,                *
               96,'ACCOUNTING DATE',112,':',114,XASOFD)
         RP    SPACE,('2')
         RP    WRITE,(DCBOUT)
         RP    FORMC,(4,'CONTRACT NAME',17,':',19,X26,                 *
               96,'PROJECT DURATION:',114,XSPAN)
         RP    WRITE,(DCBOUT)
         RP    FORMC,(4,DASH128)
         RP    WRITE,(DCBOUT)
         RP    FORMC,(54,'COST ANALYSIS REPORT')
         RP    SPACE,('1')
         RP    WRITE,(DCBOUT)
         RP    FORMC,(4,DASH128)
         RP    SPACE,('1')
         RP    WRITE,(DCBOUT)
         RP    FORMC,(4,'WORK DIVISION DESCRIPTION:',                  *
               86,'WORK DIVISION COSTING CODE:')
         RP    FORMC,(31,XY28,114,XYCHRG)
         RP    WRITE,(DCBOUT)
         RP    FORMC,(4,DASH128)
         RP    WRITE,(DCBOUT)
         RP    FORMC,(12,'WORK CLASSIFICATION',42,'I',                 *
               47,'CURRENT PERIOD COSTS',72,'I',75,'CUMULATIVE TO DATE *
               COSTS',102,'I',107,'AT COMPLETION COSTS')
         RP    WRITE,(DCBOUT)
         RP    FORMC,(4,DASH128,42,'I',72,'I',102,'I')
         RP    WRITE,(DCBOUT)
         RP    FORMC,(4,'COSTING CODE')
         RP    FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',102,'I'*
               ,112,'I',122,'I')
         RP    WRITE,(DCBOUT)
         RP    FORMC,(4,'COSTING CODE DESCRIPTION',42,'I',             *
               44,'VALUE',52,'I',54,'ACTUAL',62,'I',63,'VARIANCE',     *
               72,'I',74,'VALUE',82,'I',84,'ACTUAL',92,'I',            *
               93,'VARIANCE',102,'I',103,'ESTIMATE',112,'I',           *
               113,'FORECAST',122,'I',123,'VARIANCE')
```

```
          RP    WRITE,(DCBOUT)
          RP    FORMC,(4,DASH128,42,'I',52,'I',62,'I',72,'I',82,'I',92,'*
                I',102,'I',112,'I',122,'I')
          RP    WRITE,(DCBOUT)
          RP    STORE,(XLINE,19)
          RP    COMPAREA,(XLEVC,X1,FORMAT1)
          RP    COMPAREL,(XCB1,ZERO,FORMAT3,A1,FORMAT3)
A1        RP    GOTO,(GET)
*
*       OUTPUT COST TOTALS
*
FORMAT1   RP    COMPAREA,(X1,LEVL,FORMAT3)
          RP    COMPAREA,(MAXLINE,XLINE,SKIP,SKIP)
          RP    FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',102,'I'*
                ,112,'I',122,'I')
          RP    WRITE,(DCBOUT)
          RP    FORMC,(4,X25)
          RP    FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',102,'I'*
                ,112,'I',122,'I')
          RP    WRITE,(DCBOUT)
          RP    FORMC,(4,X28)
          RP    BRANCH,(FORMCOST)
*
*       ACCUMULATE TOTAL COST LESS OVERHEAD
*
          RP    BRANCH,(STORETOT)
          RP    TOTAL,(1,XMA3,XCA3,XCB3,XCE3)
*
*       ACCUMULATE TOTAL COST WITH OVERHEAD
*
          RP    STORE,(X19,X21)
          RP    BRANCH,(STORETOT)
          RP    TOTAL,(2,XMA3,XCA3,XCB3,XCE3)
          RP    GOTO,(GET)
*
*       OUTPUT COST TOTAL LINES
*
FORMCOST  RP    FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',102,'I'*
                ,112,'I',122,'I')
          RP    STORE,(XCA9,X10)
          RP    STORE,(XCB9,X11)
          RP    STORE,(XCE9,X13)
          RP    COMPUTE,(9,'C')
          RP    DIFF,(9,'C',XOUT,92)      COST VARIANCE
          RP    FORMC,(74,XVALC,84,X10)
          RP    MPY,(XCB8,HUND,XVALC)
          RP    DIV,(XCE8,XCB8,X10)
          RP    MPY,(XCB7,XCE8,X3)
          RP    CLEAR,(XVALC,XCA9)
          RP    DIV,(XVALC,XCB7,HUND)
          RP    STORE,(XCA9,X3)           ACTUAL
          RP    DIFF,(9,'C',XOUT,62)
          RP    FORMC,(44,XVALC,54,X3)
```

```
         RP    STORE,(XVALC,X11)              ——AT COMPLETION——
         RP    ADD,(XCA9,X10,X13)          ACTUAL+EST=LRE
         RP    DIFF,(9,'C',XDUT,122)       VARIANCE
         RP    FORMC,(104,XVALC,114,XCA9)
         RP    WRITE,(DCBOUT)
         RP    CLEAR,(XVALC,XCB8,XCB7,XCE8,XCE7)
         RP    ADD,(XLINE,XLINE,3)
         RP    RETURN
*
*        MOVE COSTS READY FOR ACCUMULATION
*
STORETOT RP    STORE,(XMA3,X3)
         RP    STORE,(XCA3,X10)
         RP    STORE,(XCB3,X11)
         RP    STORE,(XCE3,X13)
         RP    RETURN
*
*        PROCESS TOTAL COST LESS OVERHEAD AND PROFIT
*
FORMAT3  RP    FORMC,(4,DASH128)
         RP    FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',102,'I'*
               ,112,'I',122,'I')
         RP    WRITE,(DCBOUT)
         RP    STORE,(X19,XMA1,1,24)
         RP    STORE,(X20,XCA1,1,24)
         RP    FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',102,'I'*
               ,112,'I',122,'I')
         RP    WRITE,(DCBOUT)
         RP    FORMC,(6,'TOTAL COST LESS OVERHEAD AND PROFIT')
         RP    BRANCH,(FORMCOST)
         RP    FORMC,(4,DASH128)
         RP    FORMC,(72,'I',82,'I',92,'I',102,'I',112,'I',122,'I')
         RP    WRITE,(DCBOUT)
*
*        PROCESS OVERHEAD COSTS AND PROFIT
*
         RP    SUB,(X3,XMA2,XMA1)
         RP    SUB,(X10,XCA2,XCA1)
         RP    SUB,(X11,XCB2,XCB1)
         RP    SUB,(X13,XCE2,XCE1)
         RP    FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',102,'I'*
               ,112,'I',122,'I')
         RP    WRITE,(DCBOUT)
         RP    FORMC,(6,'OVERHEAD AND PROFIT')
         RP    BRANCH,(FORMCOST)
         RP    FORMC,(4,DASH128)
         RP    FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',102,'I'*
               ,112,'I',122,'I')
         RP    WRITE,(DCBOUT)
*
*        PROCESS COMPLETE TOTALS
*
         RP    STORE,(X19,XMA2,1,24)
```

```
                RP      STORE,(X20,XCA2,1,24)
                RP      FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',102,'I'*
                        ,112,'I',122,'I')
                RP      WRITE,(DCBOUT)
                RP      FORMC,(6,'TOTAL COSTS')
                RP      BRANCH,(FORMCOST)
                RP      FORMC,(4,DASH128)
                RP      FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',102,'I'*
                        ,112,'I',122,'I')
                RP      WRITE,(DCBOUT)
                RP      EOF,(ENDRPT)
                RP      CLEAR,(XMA2,XCA2,XCB2,XCE2,XMA1,XCA1,XCB1,XCE1,XVALC)
                RP      GOTO,(SKIP)
*
*       END OF REPORT
*
ENDRPT          RP      SPACE,('3')
                RP      WRITE,(DCBOUT)
                RP      CLEAR,(XEOF,XLINE,XPAGE)
                RP      CLEARTAB,('N','V','W','M')
                RP      CLOSEF,(DCBIN)
                RP      LEAVE
LEVL            DC      F'0'
ZERO            DC      F'0'
HUND            DC      F'100'
DCBIN           DC      F'0'
DCBOUT          DC      F'0'
MAXLINE         DC      F'0'
DASH128         DS      0CL128
                DC      132C'-'
FLAG            DC      C' '
                END
```

Cost Report V3

```
          START
          PRINT NOGEN
REPORTV3  RP    ENTER
          RP    REPORTVI
          RP    REPORTVJ
          RP    REPORTVK
          RP    REPORTVL
          RP    LEAVE
          END

          START
          PRINT NOGEN
REPORTVI  RP    ENTER
          RP    SORTA,('ACPTFILE','ORDFILE',X9LCN,XACPER)
          RP    LEAVE
          END

          START
          PRINT NOGEN
REPORTVJ  RP    ENTER
          RP    CLEARTAB,('C','V','W')
          RP    CLEAR,(XEOF)
*
          RP    OPENF,(DCBIN,'ORDFILE','I',XSIZR,XBLK)
          RP    OPENF,(DCBOUT,'WORKFILE','O',87,XBLK)
          RP    READ,(DCBIN)
          RP    EOF,(A10)
A1        RP    COSTN,(15,'H','T')
          RP    READ,(DCBIN)
          RP    EOF,(A2)
          RP    CHANGE,(A2,X9LCN)
          RP    COMPAREL,(XACPER,XASOFP,A1)
          RP    NOCHANGE,(A1,XACPER)
A2        RP    TOTAL,(8,XCA9,XCB9,XCE9,XCR9)
          RP    COMPAREL,(XASOFP,XYACPER,A5,A3,A4)
A3        RP    FORM,(37,XCA9,45,XCR9,49,XCA8,57,XCR8)
          RP    ADD,(ZERO,ZERO,1)
A4        RP    CLEAR,(XCA7,XCR7)
          RP    STORE,(XCA7,XCA8)
          RP    STORE,(XCR7,XCR8)
A5        RP    CLEAR,(XCA9,XCB9,XCE9,XCR9)
          RP    EOF,(A6)
          RP    NOCHANGE,(A1,X9LCN)
A6        RP    FORM,(61,XCE8,65,XCB8)
          RP    COMPAREL,(XYACPER,XASOFP,A7,A9)
          RP    COMPAREL,(ZERO,1,A7,A9)
A7        RP    FORM,(37,XCA9,45,XCR9,49,XCA7,57,XCR7)
A9        RP    FORM,(1,XY9LCN,19,XYCHRG)
          RP    WRITE,(DCBOUT)
          RP    CLEAR,(ZERO)
          RP    CLEARTAB,('C')
```

```
         RP    EOF,(A10)
         RP    GOTO,(A1)
A10      RP    CLOSEF,(DCBIN,DCBOUT)
         RP    CLEARTAB,('N','V','W')
         RP    LEAVE
I        DC    C'I'
ZERO     DC    F'0'
SAVE     DC    F'0'
DCBIN    DC    F'0'
MAXVAL   DC    F'30'
DCBOUT   DC    F'0'
         END

         START
         PRINT NOGEN
REPORTVK RP    ENTER
         RP    ADD,(FLD,XLEVC,XLEVC)
         RP    STORE,(SAVE,XSIZR)
         RP    STORE,(XSIZR,87)
         RP    DWT,(X2,1,18,'A')
         RP    DWT,(X3,19,18,'A')
         RP    SORTA,('WORKFILE','WORKFILE',X2,1,FLD,X3)
         RP    STORE,(XSIZR,SAVE)
         RP    STORE,(XFLG2,1)
         RP    LEAVE
FLD      DC    F'0'
SAVE     DC    F'0'
         END

         START
         PRINT NOGEN
REPORTVL RP    ENTER
         RP    CLEAR,(XEOF,XLINE,XPAGE,XCONT,X9LCN,XY9LCN)
         RP    DWT,(X1,1,79,'A')
         RP    DWT,(X2,1,18,'A')
         RP    DWT,(X3,19,18,'A')
*                                ASOF PERIOD COSTS
         RP    DWT,(X20,37,4,'C')      A
         RP    DWT,(X21,45,4,'C')      R
*                                ASOF PERIOD CUMULATIVE COSTS
         RP    DWT,(X22,49,4,'C')      A
         RP    DWT,(X23,57,4,'C')      R
*                                TOTAL COSTS
         RP    DWT,(X24,61,4,'C')      E
         RP    DWT,(X25,65,4,'C')      B
         RP    DWT,(X10,89,103,'A')    CHARGE DESC.RECORD
         RP    DWT,(X11,89,18,'A')     CONTRACT DESCRIPTION
         RP    DWT,(X12,137,36,'A')    SUMMARY CHARGE NO.DESC.
         RP    DWT,(X13,173,18,'A')    SUMMARY CHARGE NO.
         RP    STORE,(SAVE,XSIZR)
         RP    STORE,(XSIZR,87)
         RP    ADD,(FLD,XLEVC,XLEVC)
         RP    SUB,(MAXVAL,XMAXL,30)
```

```
         RP    OPENF,(DCBIN,'WORKFILE','I',87,XBLK)
         RP    STORE,(DCBOUT,XODCB)
L1       RP    READF,(DCBIN,X2)
         RP    EOF,(L14)
L2       RP    CLEARTAB,('C')
         RP    STORE,(X9LCN,X2,1,FLD)
         RP    DESCC,(X9LCN,X10)
         RP    COMPAREL,(XCONT,X11,GETCONT,H1)
GETCONT  RP    STORE,(XCONT,X11)

*
*        OUTPUT PAGE COLUMN HEADINGS
*
H1       RP    BLANK,(XOUT)
         RP    SPACE,('3')
         RP    FORMC,(115,'PAGE NO :',125,XPAGE)
         RP    WRITE,(DCBOUT)
         RP    FORM,(115,'RUN DATE:',125,XRUND)
         RP    WRITE,(DCBOUT)
         RP    FORMC,(47,'REPORTING COMPANY:',67,XRPTORG)
         RP    SPACE,('1')
         RP    WRITE,(DCBOUT)
         RP    FORMC,(4,'PROJECT NAME',17,':',19,XTITLE,                *
               96,'ACCOUNTING DATE',112,' :',114,XASOFD)
         RP    SPACE,('2')
         RP    WRITE,(DCBOUT)
         RP    FORM,(4,'CONTRACT NAME',17,':',19,X11,                   *
               96,'PROJECT DURATION:',114,XSPAN)
         RP    WRITE,(DCBOUT)
         RP    FORM,(4,DASH128)
         RP    WRITE,(DCBOUT)
         RP    FORM,(50,'WORK DIVISIONS CASH FLOW REPORT')
         RP    SPACE,('1')
         RP    WRITE,(DCBOUT)
         RP    FORM,(4,DASH128)
         RP    SPACE,('1')
         RP    WRITE,(DCBOUT)
         RP    FORM,(4,'WORK DIVISION DESCRIPTION:',                    *
               86,'WORK DIVISION COSTING CODE:')
         RP    FORMC,(31,X12,114,X13)
         RP    WRITE,(DCBOUT)
         RP    FORM,(4,DASH128)
         RP    WRITE,(DCBOUT)
         RP    FORM,(13,'WORK CLASSIFICATION',42,'I',52,                *
               'CURRENT PERIOD COSTS',82,'I',                           *
               90,'CUMULATIVE TO DATE COSTS',122,'I')
         RP    WRITE,(DCBOUT)
         RP    FORM,(4,DASH118,42,'I',82,'I',122,'I',123,'EXPECTED')
         RP    WRITE,(DCBOUT)
         RP    FORM,(4,'COSTING CODE',42,'I',43,                        *
               'PROGRESS',52,'I',54,'ACTUAL',62,'I',64,'ACTUAL',72,'I',*
               73,'SURPLUS/',82,'I',83,'PROGRESS',92,'I',94,            *
               'ACTUAL',102,'I',104,'ACTUAL',112,'I',                   *
```

```
          113,'SURPLUS/',122,'I',123,'EXPENDTR.')
     RP   WRITE,(DCBOUT)
     RP   FORM,(4,'COSTING CODE DESCRIPTION')
     RP   FORM,(42,'I',43,'BILLING',52,'I',                              *
          53,'DISBURS.',62,'I',63,'EXPENDTR.',72,'I',73,'DEFICIT',*
          82,'I',83,'BILLING',92,'I',93,'DISBURS.',102,'I',              *
          103,'EXPENDTR.',112,'I',113,'DEFICIT',122,'I')
     RP   WRITE,(DCBOUT)
     RP   FORM,(4,DASH128)
     RP   FORM,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',               *
          102,'I',112,'I',122,'I')
     RP   WRITE,(DCBOUT)
     RP   STORE,(XLINE,0)
*
*    PROCESS WORK FILE
*
L4   RP   COMPAREA,(MAXVAL,XLINE,H1,H1)
     RP   FORM,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',               *
          102,'I',112,'I',122,'I')
     RP   WRITE,(DCBOUT)
     RP   FORM,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',               *
          102,'I',112,'I',122,'I')
     RP   FORMC,(4,X3)
     RP   WRITE,(DCBOUT)
     RP   STORE,(XCA9,X20)
     RP   STORE,(XCR9,X21)
     RP   STORE,(XCA8,X22)
     RP   STORE,(XCR8,X23)
     RP   STORE,(XCE8,X24)
     RP   STORE,(XCB8,X25)
     RP   SUB,(XCC9,XCR9,XCA9)
     RP   TOTAL,(7,XCA9,XCR9,XCC9)
     RP   STORE,(XCHRG,X3)
     RP   DESCC,(XCHRG,XY10)
     RP   FORMC,(4,XY12,54,XCR9,64,XCA9,74,XCC9)
     RP   SUB,(XCC8,XCR8,XCA8)
     RP   TOTAL,(6,XCA8,XCE8,XCC8,XCR8)
     RP   FORMC,(94,XCR8,104,XCA8,114,XCC8,124,XCE8)
     RP   CLEAR,(XCC9,XCR9,XCC8,XCR8)
     RP   COMPUTE,(8,'C')
     RP   CLEAR,(XCA8,XCB8,XCE8)
     RP   MPY,(XCA8,HUND,XVALC)
     RP   DIV,(XCB8,XCA8,X22)
     RP   MPY,(XCE8,XCB8,XCA9)
     RP   DIV,(XCC8,XCE8,HUND)
     RP   STORE,(XCR8,XVALC)
     RP   FORMC,(44,XCC8,84,XCR8)
     RP   TOTAL,(5,XCC8,XCR8)
     RP   FORM,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',               *
          102,'I',112,'I',122,'I')
     RP   WRITE,(DCBOUT)
     RP   CLEAR,(XCHRG,XYCHRG,XCA9,XCR9,XCA8,XCB8,XCC8,XCE8,XCR8)
     RP   ADD,(XLINE,XLINE,3)
```

```
L9      RP    READF,(DCBIN,X2)
        RP    EOF,(L11)
        RP    STORE,(XY9LCN,X2,1,FLD)
        RP    NOCHANGE,(L4,X9LCN)
*
*       OUTPUT TOTAL LINE
*
L11     RP    FORM,(4,DASH128)
        RP    FORM,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',          *
              102,'I',112,'I',122,'I')
        RP    WRITE,(DCBOUT)
        RP    FORM,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',102,      *
              'I',112,'I',122,'I')
        RP    WRITE,(DCBOUT)
        RP    FORMC,(16,'TOTAL',44,XCC5,54,XCR7,64,XCA7,74,XCC7,        *
              84,XCR5,94,XCR6,104,XCA6,114,XCC6,124,XCE6)
        RP    FORM,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',102,      *
              'I',112,'I',122,'I')
        RP    WRITE,(DCBOUT)
        RP    FORM,(4,DASH128)
        RP    WRITE,(DCBOUT)
        RP    EOF,(L14)
        RP    GOTO,(L2)
*
*       END OF REPORT ROUTINE
*
L14     RP    SPACE,('3')
        RP    STORE,(XSIZR,SAVE)
        RP    WRITE,(DCBOUT)
        RP    WRITE,(DCBOUT)
        RP    CLEARTAB,('N','N','V','C')
        RP    CLEAR,(XEOF,XPAGE,XLINE)
        RP    BLANK,(XOUT)
        RP    CLOSEF,(DCBIN)
        RP    LEAVE
SAVE    DC    F'0'
I       DC    C'I'
HUND    DC    F'100'
FLD     DC    F'0'
DCBIN   DC    F'0'
MAXVAL  DC    F'0'
DCBOUT  DC    F'0'
DASH118 DS    OCL118
DASH128 DS    OCL128
        DC    128C'-'
        END
```

Cost Report V4

```
            START
            PRINT NOGEN
REPORTV4    RP    ENTER
            RP    REPORTVE
            RP    REPORTVF
            RP    REPORTVG
            RP    REPORTVM
            RP    LEAVE
            END

            START
            PRINT NOGEN
REPORTVM    RP    ENTER
STARTUP     RP    OPENF,(DCBIN,'XCRWRK  ','I',210,XBLK)
            RP    STORE,(DCBOUT,XODCB)
            RP    CLEAR,(XPAGE,XLINE,XEOF,XCONT)
            RP    SUB,(MAXLINE,XMAXL,8)
            RP    ADD,(LEVA,XLEVC,1)
            RP    ADD,(LEVL,XLEVC,2)
            RP    CLEARTAB,('M','N','P','X','V','W','C')
            RP    DWT,(X1,1,1,'B')          PATL
            RP    DWT,(X2,2,18,'F')         9LCN
            RP    DWT,(X3,20,4,'C')         XMA9   CURRENT PERIOD ACTUAL
            RP    DWT,(X6,32,4,'C')         XME9   CURRENT PERIOD DISBURS.
            RP    DWT,(X8,40,4,'C')         XMR9   TO DATE DISBURS.
            RP    DWT,(X10,48,4,'C')        XCA9   TO DATE ACTUAL
            RP    DWT,(X11,52,4,'C')        XCB9   BCWS AT COMPLETION
            RP    DWT,(X13,60,4,'C')        XCE9   ESTIMATE AT COMPLETION
            RP    DWT,(X18,72,4,'C')        VALUE AT COMPLETION
            RP    DWT,(X19,20,56,'A')       ALL ABOVE COST FIELDS
            RP    DWT,(X20,48,24,'A')       ABOVE COST ONLY FIELDS
            RP    DWT,(X21,76,56,'A')       COST PLUS G&A TOTALS(AS ABOVE)
            RP    DWT,(X25,132,18,'A')      CHARGE NUMBER
            RP    DWT,(X26,186,18,'A')      CONTRACT NAME
            RP    DWT,(X27,204,6,'A')
            RP    DWT,(X28,150,36,'A')      CHARGE NUMBER DESCRIPTION
            RP    DWT,(X40,1,226,'A')
*
            RP    STORE,(XLINE,MAXLINE)
GET         RP    STORE,(X40,XY40)
            RP    READF,(DCBIN,X2)
            RP    EOF,(A6)
            RP    COMPAREA,(LEVL,X1,GET)
            RP    COMPAREA,(XLEVC,X1,FORMAT1)
            RP    STORE,(XY28,X28)
            RP    STORE,(XYCHRG,X25)
            RP    COMPAREA,(XLINE,MAXLINE,FORMAT1)
*
*           OUTPUT PAGE HEADINGS
*
SKIP        RP    SPACE,('3')
```

```
RP    ADD,(XPAGE,XPAGE,1)
RP    FORMC,(115,'PAGE NO :',125,XPAGE)
RP    WRITE,(DCBOUT)
RP    FORMC,(115,'RUN DATE:',125,XRUND)
RP    WRITE,(DCBOUT)
RP    FORMC,(47,'REPORTING COMPANY:',67,XRPTORG)
RP    SPACE,('1')
RP    WRITE,(DCBOUT)
RP    FORMC,(96,'ACCOUNTING DATE',112,':',I14,XASOFD)
RP    SPACE,('2')
RP    WRITE,(DCBOUT)
RP    FORMC,(4,'PROJECT NAME',17,':',19,XTITLE,                    *
      96,'PROJECT DURATION:',114,XSPAN)
RP    WRITE,(DCBOUT)
RP    FORMC,(4,DASH128)
RP    WRITE,(DCBOUT)
RP    FORMC,(54,'CONTRACT CASH FLOW REPORT')
RP    SPACE,('1')
RP    WRITE,(DCBOUT)
RP    FORMC,(4,DASH128)
RP    SPACE,('1')
RP    WRITE,(DCBOUT)
RP    FORMC,(4,'CONTRACT DESCRIPTION:',91,'CONTRACT COSTING CO*
      DE:')
RP    FORMC,(26,XY28,114,XYCHRG)
RP    WRITE,(DCBOUT)
RP    FORMC,(4,DASH128)
RP    WRITE,(DCBOUT)
RP    FORMC,(4,'ORIGINAL CONTRACT OR CHANGE ORDER:',42,'I',52,*
      'CURRENT PERIOD COSTS',82,'I',                               *
      90,'CUMULATIVE TO DATE COSTS',122,'I')
RP    WRITE,(DCBOUT)
RP    FORMC,(4,'COSTING CODE',42,DASH90,42,'I',82,'I',             *
      122,'I',123,'EXPECTED')
RP    WRITE,(DCBOUT)
RP    FORMC,(4,'COSTING CODE DESCRIPTION',42,'I',52,'I',           *
      62,'I',72,'I',82,'I',92,'I',102,'I',112,'I',122,'I')
RP    WRITE,(DCBOUT)
RP    FORMC,(7,'WORK DIVISION COSTING CODE',42,'I',43,             *
      'PROGRESS',52,'I',54,'ACTUAL',62,'I',64,'ACTUAL',72,'I',*
      73,'SURPLUS/',82,'I',83,'PROGRESS',92,'I',94,                *
      'ACTUAL',102,'I',104,'ACTUAL',112,'I',                       *
      113,'SURPLUS/',122,'I',123,'EXPENDTR.')
RP    WRITE,(DCBOUT)
RP    FORMC,(7,'WORK DIVISION COSTING CODE DESCRP.')
RP    FORMC,(42,'I',43,'BILLING',52,'I',                           *
      53,'DISBURS.',62,'I',63,'EXPENDTR.',72,'I',73,'DEFICIT',*
      82,'I',83,'BILLING',92,'I',93,'DISBURS.',102,'I',            *
      103,'EXPENDTR.',112,'I',113,'DEFICIT',122,'I')
RP    WRITE,(DCBOUT)
RP    FORMC,(4,DASH128)
RP    FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',            *
      102,'I',112,'I',122,'I')
```

```
          RP    WRITE,(DCBOUT)
          RP    STORE,(XLINE,21)
          RP    COMPAREA,(XLEVC,X1,FORMAT1)
          RP    COMPAREL,(XCB1,ZERO,FORMAT3,A2,FORMAT3)
A2        RP    GOTO,(GET)
*
*       OUTPUT COST TOTALS
*
FORMAT1   RP    COMPAREA,(X1,LEVA,A6)
          RP    COMPAREA,(MAXLINE,XLINE,SKIP,SKIP)
          RP    FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',      *
                102,'I',112,'I',122,'I')
          RP    WRITE,(DCBOUT)
          RP    COMPAREA,(X1,LEVA,FORMAT2,FORMAT2)
          RP    FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',      *
                102,'I',112,'I',122,'I')
          RP    FORMC,(7,X25)
          RP    WRITE,(DCBOUT)
          RP    ADD,(XLINE,XLINE,2)
          RP    FORMC,(7,X28)
          RP    BRANCH,(FORMCOST)
*
*       ACCUMULATE WORK DIVISIONS COSTS
*
          RP    STORE,(XMA3,X3)
          RP    STORE,(XME3,X6)
          RP    STORE,(XMR3,X8)
          RP    STORE,(XCA3,X10)
          RP    STORE,(XCB3,X11)
          RP    STORE,(XCE3,X13)
          RP    STORE,(XCR3,X18)
          RP    TOTAL,(2,XMA3,XME3,XMR3,XCA3,XCB3,XCE3,XCR3)
          RP    TOTAL,(7,XCE8)
          RP    CLEAR,(XCE8)
          RP    GOTO,(GET)
FORMAT2   RP    COMPAREL,(XCA2,ZERO,A6,A3,A6)
A3        RP    COMPAREL,(XCB2,ZERO,A6,A4,A6)
A4        RP    COMPAREL,(XCE2,ZERO,A6,A5,A6)
A5        RP    COMPAREL,(XCR2,ZERO,A6,A7,A6)
A6        RP    FORMC,(4,'TOTAL',44,XCE7)
          RP    TOTAL,(1,XMA2,XMB2,XME2,XMR2,XCA2,XCB2,XCE2,XCR2)
          RP    TOTAL,(6,XCE7)
          RP    STORE,(X3,XMA2)
          RP    STORE,(X6,XME2)
          RP    STORE,(X8,XMR2)
          RP    STORE,(X10,XCA2)
          RP    STORE,(X11,XCB2)
          RP    STORE,(X13,XCE2)
          RP    STORE,(X18,XCR2)
          RP    STORE,(X19,XMA2,1,24)
          RP    STORE,(X20,XCA2,1,24)
          RP    BRANCH,(FORMTOT)
          RP    CLEAR,(XMA2,XME2,XMR2,XCA2,XCB2,XCE2,XCR2,XCE7)
```

```
          RP    COMPAREA,(X1,LEVA,FORMAT3)
          RP    EOF,(FORMAT3)
          RP    GOTO,(GET)
A7        RR    FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',      *
                102,'I',112,'I',122,'I')
          RP    FORMC,(4,X25)
          RP    WRITE,(DCBOUT)
          RP    FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',      *
                102,'I',112,'I',122,'I')
          RP    FORMC,(4,X28)
          RP    WRITE,(DCBOUT)
          RP    ADD,(XLINE,XLINE,2)
          RP    GOTO,(GET)
*
*         OUTPUT COST TOTAL LINES
*
FORMCOST  RP    STORE,(X19,X21)
          RP    MPY,(XCA9,HUND,X18)
          RP    DIV,(XCA8,XCA9,X10)
          RP    MPY,(XCC8,XCA8,X3)
          RP    DIV,(XCE8,XCC8,HUND)
          RP    FORMC,(44,XCE8)
FORMTOT   RP    FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',      *
                102,'I',112,'I',122,'I')
          RP    FORMC,(54,X5,64,X3,84,X18,94,X8,104,X10,124,X13)
          RP    SUB,(XCA9,X5,X3)
          RP    FORMC,(74,XCA9)
          RP    SUB,(XCA9,X8,X10)
          RP    FORMC,(114,XCA9)
          RP    WRITE,(DCBOUT)
          RP    ADD,(XLINE,XLINE,1)
          RP    RETURN
*
*         PROCESS COMPLETE TOTALS
*
FORMAT3   RP    STORE,(X3,XMA1)
          RP    STORE,(X5,XME1)
          RP    STORE,(X8,XMR1)
          RP    STORE,(X10,XCA1)
          RP    STORE,(X11,XCB1)
          RP    STORE,(X13,XCE1)
          RP    STORE,(X18,XCR1)
          RP    STORE,(X19,XMA1,1,24)
          RP    STORE,(X20,XCA1,1,24)
          RP    FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',      *
                102,'I',112,'I',122,'I')
          RP    WRITE,(DCBOUT)
          RP    FORMC,(4,DASH128)
          RP    FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',      *
                102,'I',112,'I',122,'I')
          RP    WRITE,(DCBOUT)
          RP    FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',      *
                102,'I',112,'I',122,'I')
```

```
         RP    WRITE,(DCBOUT)
         RP    FORMC,(16,'CONTRACT TOTAL',44,XCE6)
         RP    BRANCH,(FORMTOT)
         RP    FORMC,(4,DASH128)
         RP    WRITE,(DCBOUT)
         RP    EOF,(ENDRPT)
         RP    CLEAR,(XMA1,XME1,XMR1,XCA1,XCB1,XCE1,XCR1,XCE6)
         RP    GOTO,(SKIP)
*
*        END OF REPORT
*
ENDRPT   RP    SPACE,('3')
         RP    WRITE,(DCBOUT)
         RP    CLEAR,(XEOF,XPAGE,XLINE)
         RP    CLEARTAB,('M','N','V','W')
         RP    CLOSEF,(DCBIN)
         RP    LEAVE
LEVA     DC    F'0'
LEVL     DC    F'0'
ZERO     DC    F'0'
HUND     DC    F'100'
DCBIN    DC    F'0'
DCBOUT   DC    F'0'
MAXLINE  DC    F'0'
DASH90   DS    0CL90
DASH128  DS    0CL128
         DC    128C'-'
FLAG     DC    C' '
         END
```

Cost Report V5

```
          START
          PRINT NOGEN
REPORTV5  RP    ENTER
          RP    REPORTVE
          RP    REPORTVP
          RP    REPORTVG
          RP    REPORTVN
          END

          START
          PRINT NOGEN
REPORTVN  RP    ENTER
STARTUP   RP    OPENF,(DCBIN,'XCRWRK  ','I',210,XBLK)
          RP    STORE,(DCBOUT,XODCB)
          RP    CLEAR,(XPAGE,XLINE,XEOF,XCONT)
          RP    SUB,(MAXLINE,XMAXL,8)
          RP    ADD,(LEVA,XLEVC,1)
          RP    ADD,(LEVB,XLEVC,2)
          RP    ADD,(LEVC,XLEVC,3)
          RP    CLEARTAB,('M','N','P','X','V','W','C')
          RP    DWT,(X1,1,1,'B')          PATL
          RP    DWT,(X2,2,18,'F')         9LCN
          RP    DWT,(X3,20,4,'C')         XMA9   CURRENT PERIOD ACTUAL
          RP    DWT,(X5,32,4,'C')         XME9   CURRENT PERIOD DISBURS.
          RP    DWT,(X8,40,4,'C')         XMR9   TO DATE DISBURS.
          RP    DWT,(X10,48,4,'C')        XCA9   TO DATE ACTUAL
          RP    DWT,(X11,52,4,'C')        XCB9   BCWS AT COMPLETION
          RP    DWT,(X13,60,4,'C')        XCE9   ESTIMATE AT COMPLETION
          RP    DWT,(X18,72,4,'C')        VALUE AT COMPLETION
          RP    DWT,(X19,20,56,'A')       ALL ABOVE COST FIELDS
          RP    DWT,(X20,48,24,'A')       ABOVE COST ONLY FIELDS
          RP    DWT,(X21,76,56,'A')       COST PLUS G&A TOTALS(AS ABOVE)
          RP    DWT,(X25,132,18,'A')      CHARGE NUMBER
          RP    DWT,(X26,186,18,'A')      CONTRACT NAME
          RP    DWT,(X27,204,6,'A')
          RP    DWT,(X28,150,36,'A')      CHARGE NUMBER DESCRIPTION
          RP    DWT,(X40,1,226,'A')
*
          RP    STORE,(XLINE,MAXLINE)
GET       RP    STORE,(X40,XY40)
          RP    READF,(DCBIN,X2)
          RP    EOF,(B1)
          RP    COMPAREA,(LEVC,X1,GET)
          RP    COMPAREA,(XLEVC,X1,FORMAT1)'
          RP    STORE,(XYCHRG,X25)
          RP    COMPAREA,(XLINE,MAXLINE,FORMAT1)
*
*         OUTPUT PAGE HEADINGS
*
SKIP      RP    SPACE,('3')
          RP    ADD,(XPAGE,XPAGE,1)
```

```
          RP    FORMC,(115,'PAGE NO :',125,XPAGE)
          RP    WRITE,(DCBOUT)
          RP    FORMC,(115,'RUN DATE:',125,XRUND)
          RP    WRITE,(DCBOUT)
          RP    FORMC,(47,'REPORTING COMPANY:',67,XRPTORG)
          RP    SPACE,('1')
          RP    WRITE,(DCBOUT)
          RP    FORMC,(4,'PROJECT NAME',18,':',20,XTITLE,                *
                96,'ACCOUNTING DATE',112,':',114,XASOFD)
          RP    SPACE,('2')
          RP    WRITE,(DCBOUT)
          RP    FORMC,(4,'PROJECT NUMBER:',20,XYCHRG,                    *
                96,'PROJECT DURATION:',114,XSPAN)
          RP    WRITE,(DCBOUT)
          RP    FORMC,(4,DASH128)
          RP    WRITE,(DCBOUT)
          RP    FORMC,(53,'PROJECT CASH FLOW REPORT')
          RP    SPACE,('1')
          RP    WRITE,(DCBOUT)
          RP    FORMC,(59,'(BY CONTRACTS)')
          RP    WRITE,(DCBOUT)
          RP    FORMC,(4,DASH128)
          RP    SPACE,('1')
          RP    WRITE,(DCBOUT)
          RP    FORMC,(18,'CONTRACT',42,'I',52,'CURRENT PERIOD COSTS',   *
                82,'I',90,'CUMULATIVE TO DATE COSTS',122,'I')
          RP    WRITE,(DCBOUT)
          RP    FORMC,(4,DASH118,42,'I',82,'I',122,'I',123,'EXPECTED')
          RP    WRITE,(DCBOUT)
          RP    FORMC,(4,'COSTING CODE',42,'I',43,                       *
                'PROGRESS',52,'I',54,'ACTUAL',62,'I',64,'ACTUAL',72,'I',*
                73,'SURPLUS/',82,'I',83,'PROGRESS',92,'I',94,            *
                'ACTUAL',102,'I',104,'ACTUAL',112,'I',                   *
                113,'SURPLUS/',122,'I',123,'EXPENDTR.')
          RP    WRITE,(DCBOUT)
          RP    FORMC,(4,'COSTING CODE DESCRIPTION')
          RP    FORMC,(42,'I',43,'BILLING',52,'I',                       *
                53,'DISBURS.',62,'I',63,'EXPENDTR.',72,'I',73,'DEFICIT',*
                82,'I',83,'BILLING',92,'I',93,'DISBURS.',102,'I',        *
                103,'EXPENDTR.',112,'I',113,'DEFICIT',122,'I')
          RP    WRITE,(DCBOUT)
          RP    FORMC,(4,DASH128)
          RP    FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',        *
                102,'I',112,'I',122,'I')
          RP    WRITE,(DCBOUT)
          RP    STORE,(XLINE,21)
          RP    COMPAREA,(XLEVC,X1,FORMAT1)
          RP    COMPAREL,(XCB1,ZERO,FORMAT3,A2,FORMAT3)
A2        RP    GOTO,(GET)
*
*         OUTPUT COST TOTALS
*
FORMAT1   RP    COMPAREA,(MAXLINE,XLINE,SKIP,SKIP)
```

```
                RP      COMPAREA,(X1,LEVA,B1)
                RP      STORE,(X19,X21)
                RP      COMPAREA,(LEVA,X1,STORTOT)
                RP      STORE,(XMA3,X3)
                RP      STORE,(XME3,X6)
                RP      STORE,(XMR3,X8)
                RP      STORE,(XCA3,X10)
                RP      STORE,(XCB3,X11)
                RP      STORE,(XCE3,X13)
                RP      STORE,(XCR3,X18)
                RP      COMPAREA,(LET,X1,A4)
                RP      GOTO,(B1)
A3              RP      COMPAREL,(XMA2,XMA4,C1,C1)
                RP      SUB,(XMA5,XMA2,XMA4)
                RP      SUB,(XCA5,XCA2,XCA4)
                RP      SUB,(XCB5,XCB2,XCB4)
                RP      SUB,(XCE5,XCE2,XCE4)
                RP      BRANCH,(TOTVAL)
C1              RP      SUMADD,(XMB5,XMB6,XMB8)
                RP      FORMC,(4,XY28,44,XMB5)
                RP      TOTAL,(1,XMB5)
                RP      CLEAR,(XMB8,XMB6,XMA5,XMB5,XCA5,XCB5,XCE5,XMA4,XCA4,    *
                        XCB4,XCE4)
                RP      STORE,(X3,XMA2)
                RP      STORE,(X6,XME2)
                RP      STORE,(X8,XMR2)
                RP      STORE,(X10,XCA2)
                RP      STORE,(X11,XCB2)
                RP      STORE,(X13,XCE2)
                RP      STORE,(X18,XCR2)
                RP      BRANCH,(FORMCOST)
                RP      CLEAR,(XMA2,XME2,XMR2,XCA2,XCB2,XCE2,XCR2,XY28,LET,XMB3)
                RP      EOF,(FORMAT3)
                RP      COMPAREA,(X1,LEVA,FORMAT3)
A4              RP      FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',       *
                        102,'I',112,'I',122,'I')
                RP      WRITE,(DCBOUT)
                RP      FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',       *
                        102,'I',112,'I',122,'I')
                RP      FORMC,(4,X25)
                RP      WRITE,(DCBOUT)
                RP      STORE,(LET,X1)
                RP      STORE,(XY28,X28)
                RP      TOTAL,(2,XMA3,XME3,XMR3,XCA3,XCB3,XCE3,XCR3)
                RP      CLEAR,(XMA3,XME3,XMR3,XCA3,XCB3,XCE3,XCR3)
                RP      TOTAL,(1,XMA2,XME2,XMR2,XCA2,XCB2,XCE2,XCR2)
                RP      GOTO,(GET)
*
*       OUTPUT COST TOTAL LINES
*
FORMCOST RP     FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',       *
                        102,'I',112,'I',122,'I')
                RP      FORMC,(54,X6,64,X3,84,X18,94,X8,104,X10,124,X13)
```

```
                RP      SUB,(XCA9,X6,X3)
                RP      FORMC,(74,XCA9)
                RP      SUB,(XCA9,X8,X10)
                RP      FORMC,(114,XCA9)
                RP      WRITE,(DCBOUT)
                RP      ADD,(XLINE,XLINE,3)
                RP      RETURN
*
*       CURRENT PERIOD VALUE TOTALS
*
STORTOT         RP      STORE,(XMA8,X3)
                RP      STORE,(XCA8,X10)
                RP      STORE,(XCB8,X11)
                RP      STORE,(XCE8,X13)
                RP      COMPAREA,(LEVB,X1,B3)
                RP      COMPAREA,(BET,X1,B2)
B1              RP      COMPAREL,(XMA6,XMA7,C2,C2)
                RP      SUB,(XMA5,XMA6,XMA7)
                RP      SUB,(XCA5,XCA6,XCA7)
                RP      SUB,(XCB5,XCB6,XCB7)
                RP      SUB,(XCE5,XCE6,XCE7)
                RP      BRANCH,(TOTVAL)
C2              RP      SUMADD,(XMB6,XMB7,XMB8)
                RP      CLEAR,(BET,XMB8,XMA7,XMB7,XCA7,XCB7,XCE7,XMA6,XCA6,XCB6,*
                        XCE6,XMA5,XCA5,XCB5,XCE5)
                RP      COMPAREA,(X1,LEVA,A3,A3)
                RP      EOF,(A3)
B2              RP      TOTAL,(6,XMA8,XCA8,XCB8,XCE8)
                RP      TOTAL,(4,XMA8,XCA8,XCB8,XCE8)
                RP      CLEAR,(XMA8,XCA8,XCB8,XCE8)
                RP      STORE,(BET,X1)
                RP      GOTO,(GET)
*
B3              RP      BRANCH,(CALCVAL)
                RP      TOTAL,(7,XMA8,XCA8,XCB8,XCE8,XMB8)
                RP      CLEAR,(XMA8,XCA8,XCB8,XCE8,XMB8)
                RP      GOTO,(GET)
*
TOTVAL          RP      COMPUTE,(5,'C')
                RP      STORE,(X18,XVALC)
                RP      STORE,(X3,XMA5)
                RP      STORE,(X10,XCA5)
CALCVAL         RP      MPY,(XCA9,HUND,X18)
                RP      DIV,(XCB9,XCA9,X10)
                RP      MPY,(XCC9,XCB9,X3)
                RP      DIV,(XMB8,XCC9,HUND)
                RP      RETURN
*
*       PROCESS COMPLETE TOTALS
*
FORMAT3         RP      FORMC,(4,DASH128)
                RP      FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',       *
                        102,'I',112,'I',122,'I')
```

```
                RP    WRITE,(DCBOUT)
                RP    FORMC,(42,'I',52,'I',62,'I',72,'I',82,'I',92,'I',      *
                      102,'I',112,'I',122,'I')
                RP    WRITE,(DCBOUT)
                RP    FORMC,(16,'PROJECT TOTAL',+1,XMB1)
                RP    STORE,(X3,XMA1)
                RP    STORE,(X5,XME1)
                RP    STORE,(X8,XMR1)
                RP    STORE,(X10,XCA1)
                RP    STORE,(X11,XCB1)
                RP    STORE,(X13,XCE1)
                RP    STORE,(X18,XCR1)
                RP    BRANCH,(FORMCOST)
                RP    FORMC,(4,DASH128)
                RP    WRITE,(DCBOUT)
                RP    EOF,(ENDRPT)
                RP    CLEAR,(XMA1,XMB1,XME1,XMR1,XCA1,XCB1,XCE1,XCR1)
                RP    GOTO,(SKIP)
*
*               END OF REPORT
*
ENDRPT          RP    SPACE,('3')
                RP    WRITE,(DCBOUT)
                RP    CLEAR,(XEOF,XPAGE,XLINE)
                RP    CLEARTAB,('M','N','V','W')
                RP    CLOSEF,(DCBIN)
                RP    LEAVE
SET             DC    F'0'
LET             DC    F'0'
LEVA            DC    F'0'
LEVB            DC    F'0'
LEVC            DC    F'0'
ZERO            DC    F'0'
HUND            DC    F'100'
DCBIN           DC    F'0'
DCBOUT          DC    F'0'
MAXLINE         DC    F'0'
DASH90          DS    OCL90
DASH118         DS    OCL118
DASH128         DS    OCL128
                DC    128C'-'
FLAG            DC    C' '
                END
```

Cost Report V6

```
          START
          PRINT NOGEN
REPORTV6  RP    ENTER
          RP    REPORTVE
          RP    REPORTVF
          RP    REPORTVG
          RP    REPORTVO
          RP    LEAVE
          END

          START
          PRINT NOGEN
REPORTVO  RP    ENTER
STARTUP   RP    OPENF,(DCBIN,'XCRWRK  ','I',210,XBLK)
          RP    STORE,(DCBOUT,XDDCB)
          RP    CLEAR,(XPAGE,XLINE,XEOF,XCONT)
          RP    SUB,(MAXLINE,XMAXL,8)
          RP    ADD,(LEVA,XLEVC,1)
          RP    ADD,(LEVL,XLEVC,2)
          RP    CLEARTAB,('M','N','P','X','V','W','C')
          RP    DWT,(X1,1,1,'B')          PATL
          RP    DWT,(X2,2,18,'F')         9LCN
          RP    DWT,(X3,20,4,'C')         XMA9   CURRENT PERIOD ACTUAL
          RP    DWT,(X4,24,4,'C')         XME9   TO DATE APPROVED CLAIMS
          RP    DWT,(X8,40,4,'C')         XMR9   TO DATE DISBURS.
          RP    DWT,(X10,48,4,'C')        XCA9   TO DATE ACTUAL
          RP    DWT,(X11,52,4,'C')        XCB9   BCWS AT COMPLETION
          RP    DWT,(X18,72,4,'C')        VALUE AT COMPLETION
          RP    DWT,(X19,20,56,'A')       ALL ABOVE COST FIELDS
          RP    DWT,(X20,48,24,'A')       ABOVE COST ONLY FIELDS
          RP    DWT,(X21,76,56,'A')       COST PLUS G&A TOTALS(AS ABOVE)
          RP    DWT,(X25,132,18,'A')      CHARGE NUMBER
          RP    DWT,(X26,186,18,'A')      CONTRACT NAME
          RP    DWT,(X27,204,6,'A')
          RP    DWT,(X28,150,36,'A')      CHARGE NUMBER DESCRIPTION
          RP    DWT,(X40,1,226,'A')
          RP    STORE,(XLINE,MAXLINE)
*
GET       RP    STORE,(X40,XY40)
          RP    READF,(DCBIN,X2)
          RP    EOF,(A6)
          RP    COMPAREA,(LEVL,X1,GET)
          RP    COMPAREA,(XLEVC,X1,FORMAT1)
          RP    STORE,(XY28,X28)
          RP    STORE,(XYCHRG,X25)
          RP    COMPAREA,(XLINE,MAXLINE,FORMAT1)
*
*         OUTPUT PAGE HEADINGS
*
SKIP      RP    SPACE,('3')
          RP    ADD,(XPAGE,XPAGE,1)
```

```
RP      FORMC,(115,'PAGE NO :',125,XPAGE)
RP      WRITE,(DCBOUT)
RP      FORMC,(115,'RUN DATE:',125,XRUND)
RP      WRITE,(DCBOUT)
RP      FORMC,(47,'REPORTING COMPANY:',67,XRPTORG)
RP      SPACE,('1')
RP      WRITE,(DCBOUT)
RP      FORMC,(96,'ACCOUNTING DATE',112,':',114,XASOPD)
RP      SPACE,('2')
RP      WRITE,(DCBOUT)
RP      FORMC,(4,'PROJECT NAME',17,':',19,XTITLE,                    *
        96,'PROJECT DURATION:',114,XSPAN)
RP      WRITE,(DCBOUT)
RP      FORMC,(4,DASH128)
RP      WRITE,(DCBOUT)
RP      FORMC,(49,'CONTRACT PROGRESS CLAIMS STATUS REPORT')
RP      SPACE,('1')
RP      WRITE,(DCBOUT)
RP      FORMC,(4,DASH128)
RP      SPACE,('1')
RP      WRITE,(DCBOUT)
RP      FORMC,(4,'CONTRACT OR C.O. DESCRIPTION:',34,XY28,            *
        82,'CONTRACT OR C.O. COSTING CODE:',113,XYCHRG)
RP      WRITE,(DCBOUT)
RP      FORMC,(4,DASH128)
RP      WRITE,(DCBOUT)
RP      FORMC,(4,'WORK DIVISION COSTING CODE',52,'I',62,'I',         *
        67,'APPROVED CLAIMS TO THIS PERIOD',102,'I',109,             *
        'PROGRESS TO DATE')
RP      WRITE,(DCBOUT)
RP      FORMC,(4,'WORK DIVISION COSTING CODE DESCRIPTION',           *
        52,'I',53,'CONTRACT',62,'I',63,DASH69,102,'I')
RP      WRITE,(DCBOUT)
RP      FORMC,(7,'WORK CLASSIFICATION COSTING CODE',*
        52,'I',53,'AMOUNT',62,'I',66,'$0.',72,'I',73,'APPROVED',*
        82,'I',84,'ACTUAL',92,'I',95,'HOLD',102,'I',106,'$0.',       *
        112,'I',113,'CUMULATI-',122,'I',124,'AMOUNT')
RP      WRITE,(DCBOUT)
RP      FORMC,(7,'WORK CLASSIFICATION COSTING CODE DESCRIPTION',*
        83,'DISBURS.',92,'I',95,'BACK',102,'I',103,'COMPLETE',       *
        112,'I',113,'VE CLAIMS',122,'I',124,'PAYABLE')
RP      WRITE,(DCBOUT)
RP      FORMC,(4,DASH128)
RP      FORMC,(52,'I',62,'I',72,'I',82,'I',92,'I',102,'I',           *
        112,'I',122,'I')
RP      WRITE,(DCBOUT)
RP      STORE,(XLINE,21)
RP      COMPAREA,(XLEVC,X1,FORMAT1)
RP      COMPAREL,(XCB1,ZERO,FORMAT3,A2,FORMAT3)
A2      RP      GOTO,(GET)
*
*       OUTPUT COST TOTALS
*
```

```
FORMAT1  RP    COMPAREA,(X1,LEVA,A6)
         RP    COMPAREA,(MAXLINE,XLINE,SKIP,SKIP)
         RP    COMPAREA,(X1,LEVA,FORMAT2,FORMAT2)
         RP    FORMC,(52,'I',62,'I',72,'I',82,'I',92,'I',102,'I',      *
               112,'I',122,'I')
         RP    WRITE,(DCBOUT)
         RP    FORMC,(52,'I',62,'I',72,'I',82,'I',92,'I',102,'I',      *
               112,'I',122,'I')
         RP    FORMC,(7,X25)
         RP    WRITE,(DCBOUT)
         RP    FORMC,(7,X28)
         RP    STORE,(XME4,X8)
         RP    STORE,(X19,X21)
         RP    STORE,(X4,XME4)
         RP    BRANCH,(FORMTOT)
         RP    GOTO,(GET)
*
*        WORK DIVISIONS COST TOTALS
*
FORMAT2  RP    STORE,(XME4,X8)
         RP    STORE,(X19,X21)
         RP    STORE,(XMA4,X3)
         RP    STORE,(XMR4,X8)
         RP    STORE,(XCA4,X10)
         RP    STORE,(XCB4,X11)
         RP    STORE,(XCR4,X18)
         RP    COMPAREA,(LET,X1,A7)
A6       RP    FORMC,(4,'TOTAL')
         RP    STORE,(X3,XMA3)
         RP    STORE,(X4,XME3)
         RP    STORE,(X8,XMR3)
         RP    STORE,(X10,XCA3)
         RP    STORE,(X11,XCB3)
         RP    STORE,(X18,XCR3)
         RP    BRANCH,(FORMTOT)
         RP    CLEAR,(LET,XMA3,XME3,XMR3,XCA3,XCB3,XCR3)
         RP    EOF,(FORMAT3)
         RP    COMPAREA,(X1,LEVA,FORMAT3)
A7       RP    FORMC,(52,'I',62,'I',72,'I',82,'I',92,'I',102,'I',      *
               112,'I',122,'I')
         RP    WRITE,(DCBOUT)
         RP    FORMC,(52,'I',62,'I',72,'I',82,'I',92,'I',102,'I',      *
               112,'I',122,'I')
         RP    FORMC,(4,X25)
         RP    WRITE,(DCBOUT)
         RP    FORMC,(52,'I',62,'I',72,'I',82,'I',92,'I',102,'I',      *
               112,'I',122,'I')
         RP    FORMC,(4,X28)
         RP    WRITE,(DCBOUT)
         RP    STORE,(LET,X1)
         RP    TOTAL,(3,XMA4,XMR4,XCA4,XCB4,XCR4,XME4)
         RP    CLEAR,(XMA4,XME4,XMR4,XCA4,XCB4,XCR4)
         RP    TOTAL,(1,XMA3,XME3,XMR3,XCA3,XCB3,XCR3)
```

```
         RP    GOTO,(GET)
*
*        OUTPUT COST TOTAL LINES
*
FORMTOT  RP    FORMC,(52,'I',62,'I',66,'O.',72,'I',82,'I',92,'I',      -*
               102,'I',112,'I',122,'I')
         RP    FORMC,(54,X11,74,X4,84,X8,114,X18)
         RP    SUB,(XCB9,X4,X8)
         RP    SUB,(XCC9,X18,X8)
         RP    FORMC,(94,XCB9,124,XCC9)
         RP    MPY,(XCB9,X4,THOUS)
         RP    DIV,(XCC9,XCB9,X11)
         RP    FORMC,(64,XCC9)
         RP    MPY,(XCB9,X18,THOUS)
         RP    DIV,(XCC9,XCB9,X11)
         RP    FORMC,(104,XCC9)
         RP    WRITE,(DCBOUT)
         RP    ADD,(XLINE,XLINE,3)
         RP    RETURN
*
*        PROCESS COMPLETE TOTALS
*
FORMAT3  RP    FORMC,(4,DASH128)
         RP    FORMC,(52,'I',62,'I',72,'I',82,'I',92,'I',102,'I',      *
               112,'I',122,'I')
         RP    WRITE,(DCBOUT)
         RP    FORMC,(52,'I',62,'I',72,'I',82,'I',92,'I',102,'I',      *
               112,'I',122,'I')
         RP    WRITE,(DCBOUT)
         RP    FORMC,(12,'CONTRACT OR CHANGE ORDER TOTAL')
         RP    STORE,(X3,XMA1)
         RP    STORE,(X4,XME1)
         RP    STORE,(X8,XMR1)
         RP    STORE,(X10,XCA1)
         RP    STORE,(X11,XCB1)
         RP    STORE,(X18,XCR1)
         RP    BRANCH,(FORMTOT)
         RP    FORMC,(4,DASH128)
         RP    WRITE,(DCBOUT)
         RP    EOF,(ENDRPT)
         RP    CLEAR,(XMA1,XMR1,XCA1,XCB1,XCR1,XCA7,XME1)
         RP    GOTO,(SKIP)
*
*              END OF REPORT ROUTINE
*
ENDRPT   RP    SPACE,('3')
         RP    WRITE,(DCBOUT)
         RP    CLEAR,(XEOF,XPAGE,XLINE)
         RP    CLEARTAB,('M','N','V','W')
         RP    CLOSEF,(DCBIN)
         RP    LEAVE
LEVA     DC    F'0'
LEVL     DC    F'0'
```

```
LET       DC    F'0'
ZERO      DC    F'0'
THOUS     DC    F'1000'
DCBIN     DC    F'0'
DCBOUT    DC    F'0'
MAXLINE   DC    F'0'
DASH69    DS    0CL69
DASH128   DS    0CL128
          DC    128C'-'
FLAG      DC    C' '
          END
```

Cost Report V7

```
          START
          PRINT NOGEN
REPORTV7  RP    ENTER
          RP    REPORTVE
          RP    REPORTVP
          RP    REPORTVG
          RP    REPORTVP
          RP    LEAVE
          END

          START
          PRINT NOGEN
REPORTVP  RP    ENTER
STARTUP   RP    OPENF,(DCBIN,'XCRWRK  ','I',210,XBLK)
          RP    STORE,(DCBOUT,XODCB)
          RP    CLEAR,(XPAGE,XLINE,XEOF,XCONT)
          RP    SUB,(MAXLINE,XMAXL,8)
          RP    ADD,(LEVA,XLEVC,1)
          RP    ADD,(LEVL,XLEVC,2)
          RP    CLEARTAB,('M','N','P','X','V','W','C')
          RP    DWT,(X1,1,1,'B')          PATL
          RP    DWT,(X2,2,18,'F')         9LCN
          RP    DWT,(X3,20,4,'C')         XMA9   CURRENT PERIOD ACTUAL
          RP    DWT,(X4,24,4,'C')         XME9   TO DATE APPROVED CLAIMS
          RP    DWT,(X8,40,4,'C')         XMR9   TO DATE DISBURS.
          RP    DWT,(X10,48,4,'C')        XCA9   TO DATE ACTUAL
          RP    DWT,(X11,52,4,'C')        XCB9   BCWS AT COMPLETION
          RP    DWT,(X18,72,4,'C')        VALUE AT COMPLETION
          RP    DWT,(X19,20,56,'A')       ALL ABOVE COST FIELDS
          RP    DWT,(X20,48,24,'A')       ABOVE COST ONLY FIELDS
          RP    DWT,(X21,76,56,'A')       COST PLUS G&A TOTALS(AS ABOVE)
          RP    DWT,(X25,132,18,'A')      CHARGE NUMBER
          RP    DWT,(X26,186,18,'A')      CONTRACT NAME
          RP    DWT,(X27,204,6,'A')
          RP    DWT,(X28,150,36,'A')      CHARGE NUMBER DESCRIPTION
          RP    DWT,(X40,1,226,'A')
          RP    STORE,(XLINE,MAXLINE)
*
GET       RP    STORE,(X40,XY40)
          RP    READF,(DCBIN,X2)
          RP    EOF,(A6)
          RP    COMPAREA,(LEVL,X1,GET)
          RP    COMPAREA,(XLEVC,X1,FORMAT1)
          RP    STORE,(XY28,X28)
          RP    STORE,(XYCHRG,X25)
          RP    COMPAREA,(XLINE,MAXLINE,FORMAT1)
*
*         OUTPUT PAGE HEADINGS
*
SKIP      RP    SPACE,('3')
          RP    ADD,(XPAGE,XPAGE,1)
```

```
        RP    FORMC,(115,'PAGE NO :',125,XPAGE)
        RP    WRITE,(DCBOUT)
        RP    FORMC,(115,'RUN DATE:',125,XRUND)
        RP    WRITE,(DCBOUT)
        RP    FORMC,(47,'REPORTING COMPANY:',67,XRPTORG)
        RP    SPACE,('1')
        RP    WRITE,(DCBOUT)
        RP    FORMC,(4,'PROJECT NAME',18,':',20,XY28)
        RP    FORMC,(96,'ACCOUNTING DATE',112,':',114,XASOFD)
        RP    SPACE,('2')
        RP    WRITE,(DCBOUT)
        RP    FORMC,(4,'PROJECT NUMBER:',20,XYCHRG,                    *
              96,'PROJECT DURATION:',114,XSPAN)
        RP    WRITE,(DCBOUT)
        RP    FORMC,(4,DASH128)
        RP    WRITE,(DCBOUT)
        RP    FORMC,(45,'PROJECT PROGRESS CLAIMS STATUS REPORT')
        RP    SPACE,('1')
        RP    WRITE,(DCBOUT)
        RP    FORMC,(4,DASH128)
        RP    SPACE,('1')
        RP    WRITE,(DCBOUT)
        RP    FORMC,(4,'CONTRACT COSTING CODE',52,'I',62,'I',          *
              67,'APPROVED CLAIMS TO THIS PERIOD',102,'I',109,         *
              'PROGRESS TO DATE')
        RP    WRITE,(DCBOUT)
        RP    FORMC,(4,'CONTRACT COSTING CODE DESCRIPTION',            *
              52,'I',53,'CONTRACT',62,'I',63,DASH69,102,'I')
        RP    WRITE,(DCBOUT)
        RP    FORMC,(7,'CONTRACT OR CHANGE ORDER COSTING CODE',        *
              52,'I',53,'AMOUNT',62,'I',66,'%O.',72,'I',73,'APPROVED',*
              82,'I',84,'ACTUAL',92,'I',95,'HOLD',102,'I',106,'%O.',  *
              112,'I',113,'CUMULATI-',122,'I',124,'AMOUNT')
        RP    WRITE,(DCBOUT)
        RP    FORMC,(7,'CONTRACT OR CHANGE ORDER COSTING CODE DESC.',  *
              52,'I',62,'I',63,'COMPLETE',72,'I',74,'CLAIMS',82,'I',   *
              83,'DISBURS.',92,'I',95,'BACK',102,'I',103,'COMPLETE',   *
              112,'I',113,'VE CLAIMS',122,'I',124,'PAYABLE')
        RP    WRITE,(DCBOUT)
        RP    FORMC,(4,DASH128)
        RP    FORMC,(52,'I',62,'I',72,'I',82,'I',92,'I',102,'I',       *
              112,'I',122,'I')
        RP    WRITE,(DCBOUT)
        RP    STORE,(XLINE,21)
        RP    COMPAREA,(XLEVC,X1,FORMAT1)
        RP    COMPAREL,(XCB1,ZERO,FORMAT3,A2,FORMAT3)
A2      RP    GOTO,(GET)
*
*       OUTPUT COST TOTALS
*
FORMAT1 RP    COMPAREA,(X1,LEVA,A6)
        RP    COMPAREA,(MAXLINE,XLINE,SKIP,SKIP)
        RP    COMPAREA,(X1,LEVA,FORMAT2,FORMAT2)
```

```
         RP    FORMC,(52,'I',62,'I',72,'I',82,'I',92,'I',102,'I',      *
               112,'I',122,'I')
         RP    WRITE,(DCBOUT)
         RP    FORMC,(52,'I',62,'I',72,'I',82,'I',92,'I',102,'I',      *
               112,'I',122,'I')
         RP    FORMC,(7,X25)
         RP    WRITE,(DCBOUT)
         RP    FORMC,(7,X28)
         RP    STORE,(XME4,X8)
         RP    STORE,(X19,X21)
         RP    STORE,(X4,XME4)
         RP    BRANCH,(FORMTOT)
         RP    GOTO,(GET)
*
*        ACCUMULATE WORK DIVISIONS COSTS
*
FORMAT2  RP    STORE,(XME4,X8)
         RP    STORE,(X19,X21)
         RP    STORE,(XMA4,X3)
         RP    STORE,(XMR4,X8)
         RP    STORE,(XCA4,X10)
         RP    STORE,(XCB4,X11)
         RP    STORE,(XCR4,X18)
         RP    COMPAREA,(LET,X1,A7)
A6       RP    FORMC,(4,'TOTAL')
         RP    STORE,(X3,XMA3)
         RP    STORE,(X4,XME3)
         RP    STORE,(X8,XMR3)
         RP    STORE,(X10,XCA3)
         RP    STORE,(X11,XCB3)
         RP    STORE,(X18,XCR3)
         RP    BRANCH,(FORMTOT)
         RP    CLEAR,(LET,XMA3,XME3,XMR3,XCA3,XCB3,XCR3)
         RP    EOF,(FORMAT3)
         RP    COMPAREA,(X1,LEVA,FORMAT3)
A7       RP    FORMC,(52,'I',62,'I',72,'I',82,'I',92,'I',102,'I',      *
               112,'I',122,'I')
         RP    WRITE,(DCBOUT)
         RP    FORMC,(52,'I',62,'I',72,'I',82,'I',92,'I',102,'I',      *
               112,'I',122,'I')
         RP    FORMC,(4,X25)
         RP    WRITE,(DCBOUT)
         RP    FORMC,(52,'I',62,'I',72,'I',82,'I',92,'I',102,'I',      *
               112,'I',122,'I')
         RP    FORMC,(4,X28)
         RP    WRITE,(DCBOUT)
         RP    STORE,(LET,X1)
         RP    TOTAL,(3,XMA4,XMR4,XCA4,XCB4,XCR4,XME4)
         RP    CLEAR,(XMA4,XME4,XMR4,XCA4,XCB4,XCR4)
         RP    TOTAL,(1,XMA3,XME3,XMR3,XCA3,XCB3,XCR3)
         RP    GOTO,(GET)
*
*        OUTPUT COST TOTAL LINES
```

```
*
FORMCOST RP     STORE,(X19,X21)
FORMTOT  RP     FORMC,(52,'I',62,'I',72,'I',82,'I',92,'I',102,'I',      *
                112,'I',122,'I')
         RP     FORMC,(54,X11,74,X4,84,X8,114,X18)
         RP     SUB,(XCB9,X4,X8)
         RP     SUB,(XCC9,X18,X8)
         RP     FORMC,(94,XCB9,124,XCC9)
         RP     MPY,(XCB9,X4,THOUS)
         RP     DIV,(XCC9,XCB9,X11)
         RP     FORMC,(64,XCC9)
         RP     MPY,(XCB9,X18,THOUS)
         RP     DIV,(XCC9,XCB9,X11)
         RP     FORMC,(104,XCC9)
         RP     WRITE,(DCBOUT)
         RP     ADD,(XLINE,XLINE,3)
         RP     RETURN
*
*        PROCESS COMPLETE TOTALS
*
FORMAT3  RP     FORMC,(4,DASH128)
         RP     FORMC,(52,'I',62,'I',72,'I',82,'I',92,'I',102,'I',      *
                112,'I',122,'I')
         RP     WRITE,(DCBOUT)
         RP     FORMC,(52,'I',62,'I',72,'I',82,'I',92,'I',102,'I',      *
                112,'I',122,'I')
         RP     WRITE,(DCBOUT)
         RP     FORMC,(16,'PROJECT TOTALS',74,XCA7)
         RP     STORE,(X3,XMA1)
         RP     STORE,(X4,XME1)
         RP     STORE,(X8,XMR1)
         RP     STORE,(X10,XCA1)
         RP     STORE,(X11,XCB1)
         RP     STORE,(X18,XCR1)
         RP     BRANCH,(FORMTOT)
         RP     FORMC,(4,DASH128)
         RP     WRITE,(DCBOUT)
         RP     EOF,(ENDRPT)
         RP     CLEAR,(XMA1,XMR1,XCA1,XCB1,XCR1,XCA7,XME1)
         RP     GOTO,(SKIP)
*
*               END OF REPORT ROUTINE
*
ENDRPT   RP     SPACE,('3')
         RP     WRITE,(DCBOUT)
         RP     CLEAR,(XEOF,XPAGE,XLINE)
         RP     CLEARTAB,('N','N','V','N')
         RP     CLOSEF,(DCBIN)
         RP     LEAVE
LEVA     DC     F'0'
LEVL     DC     F'0'
ZERO     DC     F'0'
THOUS    DC     F'1000'
```

```
LET       DC    F'0'
DCBIN     DC    F'0'
DCBOUT    DC    F'0'
MAXLINE   DC    F'0'
DASH69    DS    OCL69
DASH128   DS    OCL128
          DC    128C'-'
FLAG      DC    C' '
          END
```

APPENDIX G

INPUT DATA LISTING

(For Cost Reports V1 and V2)

```
//E301531VK JOB (3015,3VKC,2,2),VKHBI,CLASS=C,REGION=192K,
//    MSGLEVEL=(0,0)
//*LOGONID E301531
//*PASSWORD E301531
//    EXEC  PMS02,COND=(0,LT),PARM.CONTRL=' 1 11 22   10  1    ',
//     REGION.CSTRPT=192K
//EDITC.SYSIN DD *
50 ST.KEVIN SCHL  180808005      50305142443597376     0105122039556575 76
55 00820108010**                                                        H
55 0182  0101JAN 0115MAR 0105APR 0126APR 0124MAY 0128JUN 0105JUL
55 0282  0112JUL 0130AUG 0106SEP 0111OCT 0111NOV 0824DEC
60 820101 03MAR82001     01APR82002     24MAY82003     31MAY82004
60 820102 17NOV82005
61 1BB
61 2BBSK                  1BB                    ST KEVIN'S SCHOOL
61 3BBSK01IW              2BBSK                  IN-HOUSE WORK
61 4BBSK01IW000           3BBSK01IW              IN-HOUSE WORK
61 4BBSK01IW001           3BBSK01IW              I.W.CO#1 EX.FAN#15
61 5BBSK01IW000-03        4BBSK01IW000           IN-HOUSE WORK
61 5BBSK01IW001-04        4BBSK01IW001           IN-HOUSE WORK CO#1
61 6BBSK01IW000-03100     5BBSK01IW000-03        IN-HOUSE WORK
61 6BBSK01IW000-03301     5BBSK01IW000-03        IN-HOUSE WORK
61 6BBSK01IW000-03302     5BBSK01IW000-03        IN-HOUSE WORK
61 6BBSK01IW001-04210     5BBSK01IW001-04        IN-HOUSE WORK CO#1
65  6BBSK01IW000-03100 B82001118000
65  6BBSK01IW000-03100 A82001100000
65  6BBSK01IW000-03100 E82001100000
65  6BBSK01IW000-03100 R82001090000
65  6BBSK01IW000-03301 B82001118000
65  6BBSK01IW000-03301 A82001100000
65  6BBSK01IW000-03301 E82001100000
65  6BBSK01IW000-03301 R82001090000
65  6BBSK01IW000-03302 B82001118000
65  6BBSK01IW000-03302 E82001100000
65  6BBSK01IW001-04210 B82001110000
65  6BBSK01IW001-04210 E82001100000
66  B   CONC.PMNUMBER  82001    375
66  A   CONC.PMNUMBER  82001    395
66  E   CONC.PMNUMBER  82001    395
66  B   CONC.PMMB.N.WRE 82001   425
66  A   CONC.PMMB.N.WRE 82001   425
66  B   CONC.PMNLABOUR  82001   9250*022000
```

```
66  A  CONC.FMNLABOUR  82001   9250*02200082002   9750*022000
66  E  CONC.FMNLABOUR  82001   9500*022000
66  B  CONC.FMNCARPANTR82001*    12*022000
66  A  CONC.FMNCARPANTR82001*    12*022000
66  E  CONC.FMNCARPANTR82001*    12*022000
66  B  CONC.FMNCONCRT-182001*    36
66  A  CONC.FMNCONCRT-182001*    36
66  E  CONC.FMNCONCRT-182001*    36
66  B  CONC.FMNCONCRT-282001*    37
66  A  CONC.FMNCONCRT-282001*    36
66  E  CONC.FMNCONCRT-282001*    36
66  B  MASN.FMNLABOUR  82001   8500*022000
66  E  MASN.FMNLABOUR  82001   8800*022000
68 2BBSK                          ST KEVIN'S SCHOOL EXTENSION
68 3BBSKO1IW                      IN-HOUSE WORK
68 4BBSKO1IW000                   IN HOUSE WORK ORIGINAL CONTRACT
68 4BBSKO1IW001                   IN-HOUSE WORK CO#1 EX.FAN#15
68 5BBSKO1IW000-03                CONCRETE
68 5BBSKO1IW001-04                MASONRY CO#1
68 6BBSKO1IW000-03100             CONCRETE FORMWORK
68 6BBSKO1IW000-03301             CONCRETE FOOTINGS AND WALLS
68 6BBSKO1IW000 03302             CONCRETE FLOOR SLABS
68 6BBSKO1IW001-04210             CONCRETE UNIT MASONRY
82  12MAR8226JUL826BBSKO1IW000-03100  CONC.FMNLUMBER  BU   32000
82  12MAR8224MAY826BBSKO1IW000-03100  CONC.FMNLUMBER  AU    6100
82  24MAY8231MAY826BBSKO1IW000-03100  CONC.FMNLUMBER  AU     900
82  31MAY8217JUL826BBSKO1IW000-03100  CONC.FMNLUMBER  EU   20000
82  11MAR8211MAR826BBSKO1IW000-03100  CONC.FMNB.N.WRE BU    1700
82  11MAR8211MAR826BBSKO1IW000-03100  CONC.FMNB.N.WRE AU    1700
82  11MAR8224JUL826BBSKO1IW000-03100  CONC.FMNLABOUR  BH     852
82  12MAR8224MAY826BBSKO1IW000-03100  CONC.FMNLABOUR  AH     140
82  24MAY8231MAY826BBSKO1IW000-03100  CONC.FMNLABOUR  AH      24
82  31MAY8230JUL826BBSKO1IW000-03100  CONC.FMNLABOUR  EH     700
82  11MAR8230JUL826BBSKO1IW000-03100  CONC.FMNCARPANTRBH    1300
82  11MAR8224MAY826BBSKO1IW000-03100  CONC.FMNCARPANTRAH     245
82  24MAY3231MAY826BBSKO1IW000-03100  CONC.FMNCARPANTRAH      59
82  31MAY8228AUG826BBSKO1IW000-03100  CONC.FMNCARPANTREH     950
82  15MAR8205JUN826BBSKO1IW000-03301  CONC.FMNCONCRT-1BU     108
82  18MAR8224MAY826BBSKO1IW000-03301  CONC.FMNCONCRT-1AU      72
82  24MAY8231MAY826BBSKO1IW000-03301  CONC-FMNCONCRT-1AU      24
82  31MAY8214JUN826BBSKO1IW000-03301  CONC.FMNCONCRT-1EU      24
82  11MAR8205JUN826BBSKO1IW000-03301  CONC.FMNPLANT   BD    3000
82  17MAR8218MAR826BBSKO1IW000-03301  CONC.FMNPLANT   AD    1200
82  11MAR8224MAY826BBSKO1IW000-03301  CONC.FMNPLANT   AD    2375
82  24MAY8231MAY826BBSKO1IW000-03301  CONC.FMNPLANT   AD      25
82  31MAY8204DEC826BBSKO1IW000-03301  CONC.FMNPLANT   ED     900
82  10MAR8208JUN826BBSKO1IW000-03301  CONC.FMNLABOUR  BH     378
82  17MAR8224MAY826BBSKO1IW000-03301  CONC.FMNLABOUR  AH     250
82  24MAY8231MAY826BBSKO1IW000-03301  CONC.FMNLABOUR  AH      50
82  31MAY8219JUN826BBSKO1IW000-03301  CONC.FMNLABOUR  EH      60
82  20MAY8215AUG826BBSKO1IW000-03302  CONC.FMNCONCRT-2BU     400
82  31MAY8222AUG826BBSKO1IW000-03302  CONC.FMNCONCRT-2EU     400
82  20MAY8215AUG826BBSKO1IW000-03302  CONC.FMNLABOUR  BH    1400
```

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82  31MAY8223AUG826BBSK01IW000-03302  CONC.FMNLABOUR  EH    1400
82  13JUL8214JUL826BBSK01IW001-04210  MASN.FMNLABOUR  BH       2
82  13JUL8214JUL826BBSK01IW001-04210  MASN.FMNLABOUR  EH       2
/*
//ORDERC.SYSOUT DD DUMMY,SYSOUT=
//CONTRL.DDOUT DD DUMMY,SYSOUT=
//CONTRL.SYSOUT DD DUMMY,SYSOUT=
//CONTRL.SYSIN DD *
ASOF    31MAY82
RATES   100      *000001    000000    100000
/*
//CSTRPT.STEPLIB DD DSN=P3000500.PMS.RPLIB,DISP=SHR
//    DD DSN=P3010100.PMSMODS,DISP=SHR
//CSTRPT.SYSOUT DD DUMMY,SYSOUT=
//CSTRPT.SYSIN DD *
*TTTST KEVIN,S SCHOOL EXTENTION
*DATA    0000001   11MAR-04DEC,1982    BETTERBUILT
*CHRG    5
*COSTREQ       V2
*CHRG    6
*COSTREQ       V1
/*
//
```

APPENDIX H

INPUT DATA LISTING

(For Cost Reports V3 to V7)

```
//E30153VK JOB (3015,3VKC,2,2),VEHE,CLASS=C,REGION=192K,
//   MSGLEVEL=(0,0)
//*LOGONID E301531
//*PASSWORD E301531
//    EXEC  PMSO2,COND=(0,LT),PARM.CONTRL=' 1 11 22    10  1
//     REGION.CSTRPT=192K
//EDITC.SYSIN DD *
50 ST.KEVIN SCHL  180808005       503051424435973 76     0105122039556575 76
55 0082O108010**                                                          H
55 0182   0101JAN 0115MAR 0105APR 0126APR 0124MAY 0128JUN 0105JUL
55 0282   0112JUL 0130AUG 0106SEP 0111OCT 0111NOV 0824DEC
60 820101 03MAR82001     01APR82002     01MAY82003     31MAY82004
60 820102 17NOV82005
61 1BB
61 2BBSK                  1BB                       ST KEVIN'S SCHOOL
61 3BBSKO1IW              2BBSK                     IN-HOUSE WORK
61 3BBSK15SP              2BBSK                     SPRINKLER
61 3BBSK12MC              2BBSK                     MECANICAL
61 4BBSKO1IW000           3BBSK01IW                 IN-HOUSE WORK
61 4BBSKO1IW001           3BBSK01IW                 I.W.CO#1 EX.FAN#15
61 4BBSK15SP000           3BBSK15SP                 SPRINKLER
61 4BBSK12MC000           3BBSK12MC                 MECHANICAL
61 4BBSK12MC001           3BBSK12MC                 MCH.CO#1 EX.FAN#15
61 5BBSKO1IW000-03        4BBSK01IW000              IN-HOUSE WORK
61 5BBSKO1IW001-04        4BBSK01IW001              IN-HOUSE WORK CO#1
61 5BBSK15SP000-15        4BBSK15SP000              SPRINKLER
61 5BBSK12MC000-15        4BBSK12MC000              MECHANICAL
61 5BBSK12MC001-15        4BBSK12MC001              MECHANICAL CO#1
61 6BBSKO1IW000-03100     5BBSK01IW000-03           IN-HOUSE WORK
61 6BBSKO1IW000-03301     5BBSK01IW000-03           IN-HOUSE WORK
61 6BBSKO1IW000-03302     5BBSK01IW000-03           IN-HOUSE WORK
61 6BBSKO1IW001-04210     5BBSK01IW001-04           IN-HOUSE WORK CO#1
61 6BBSK12MC000-15180     5BBSK12MC000-15           MECHANICAL
61 6BBSK12MC000-15400     5BBSK12MC000-15           MECHANICAL
61 6BBSK12MC000-15800     5BBSK12MC000-15           MECHANICAL
61 6BBSK12MC001-15180     5BBSK12MC001-15           MECHANICAL CO#1
61 6BBSK12MC001-15800     5BBSK12MC001-15           MECHANICAL CO#1
61 6BBSK15SP000-15***     5BBSK15SP000-15           SPRINKLER
65  6BBSKO1IW000-03100 B82001118000
65  6BBSKO1IW000-03100 A82001100000
65  6BBSKO1IW000-03100 E82001100000
65  6BBSKO1IW000-03100 R82001090000
```

```
65  6BBSK01IW000-03301 B82001118000
65  6BBSK01IW000-03301 A82001100000
65  6BBSK01IW000-03301 E82001100000
65  6BBSK01IW000-03301 R82001090000
65  6BBSK01IW000-03302 B82001118000
65  6BBSK01IW000-03302 E82001100000
65  6BBSK01IW001-04210 B82001110000
65  6BBSK01IW001-04210 E82001100000
65  5BBSK15SP000-15*** B88201104000
65  5BBSK15SP000-15*** E82001100000
65  6BBSK12MC000-15180 B82001104000
65  6BBSK12MC000-15180 E82001100000
65  6BBSK12MC000-15400 B82001104000
65  6BBSK12MC000-15400 A82001100000
65  6BBSK12MC000-15400 E82001100000
65  6BBSK12MC000-15400 R82001090000
65  6BBSK12MC000-15800 B82001104000
65  6BBSK12MC000-15800 E82001100000
65  6BBSK12MC001-15180 B82001110000
65  6BBSK12MC001-15180 E82001100000
65  6BBSK12MC001-15800 B82001110000
65  6BBSK12MC001-15800 E82001100000
66  B   CONC.FMNLUMBER  82001    375
66  A   CONC.FMNLUMBER  82001    395
66  E   CONC.FMNLUMBER  82001    395
66  B   CONC.FMNB.N.WRE 82001    425
66  A   CONC.FMNB.N.WRE 82001    425
66  B   CONC.FMNLABOUR  82001   9250*022000
66  A   CONC.FMNLABOUR  82001   9250*02200082002   9750*022000
66  E   CONC.FMNLABOUR  82001   9500*022000
66  B   CONC.FMNCARPANTR82001*    12*022000
66  A   CONC.FMNCARPANTR82001*    12*022000
66  E   CONC.FMNCARPANTR82001*    12*022000
66  B   CONC.FMNCONCRT-182001*    36
66  A   CONC.FMNCONCRT-182001*    36
66  E   CONC.FMNCONCRT-182001*    36
66  B   CONC.FMNCONCRT-282001*    37
66  A   CONC.FMNCONCRT-282001*    36
66  E   CONC.FMNCONCRT-282001*    36
66  B   MASN.FMNLABOUR  82001   8500*022000
66  E   MASN.FMNLABOUR  82001   8800*022000,
68 2BBSK                        ST KEVIN'S SCHOOL EXTENSION
68 3BBSK01IW                    IN-HOUSE WORK
68 3BBSK15SP                    FIRE PROTECTION
68 3BBSK12MC                    MECHANICAL
68 4BBSK01IW000                 IN-HOUSE WORK ORIGINAL CONTRACT
68 4BBSK01IW001                 IN-HOUSE WORK CO#1 EX.FAN#15
68 4BBSK15SP000                 FIRE PROTECTION ORIGINAL CONTRACT
68 4BBSK12MC000                 MECHANICAL ORIGINAL CONTRACT
68 4BBSK12MC001                 MECHANICAL CO#1
68 5BBSK01IW000-03              CONCRETE
68 5BBSK01IW001-04              MASONRY CO#1
68 5BBSK15SP000-15              FIRE PROTECTION
```

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68 5BBSK12MC000-15                    MECHANICAL
68 5BBSK12MC001-15                    MECHANICAL CO#1
68 6BBSK01IW000-03100                 CONCRETE FORMWORK
68 6BBSK01IW000-03301                 CONCRETE FOOTINGS AND WALLS
68 6BBSK01IW000-03302                 CONCRETE FLOOR SLABS
68 6BBSK12MC000-15180                 MECHANICAL INSULATION
68 6BBSK12MC000-15400                 PLUMBING
68 6BBSK12MC000-15800                 AIR DISTRIBUTION
68 6BBSK01IW001-04210                 CONCRETE UNIT MASONRY
68 6BBSK12MC001-15180                 MECHANICAL INSULATION C.O.#1
68 6BBSK12MC001-15800                 AIR DISTRIBUTION C.O.#1
82  12MAR8226JUL826BBSK01IW000-03100  CONC.FMNLUMBER  BU   32000
82  12MAR8201MAY826BBSK01IW000-03100  CONC.FMNLUMBER  AU    5000
82  01MAY8231MAY826BBSK01IW000-03100  CONC.FMNLUMBER  AU    2000
82  31MAY8217JUL826BBSK01IW000-03100  CONC.FMNLUMBER  EU   20000
82  11MAR8211MAR826BBSK01IW000-03100  CONC.FMNB.N.WRE BU    1700
82  11MAR8211MAR826BBSK01IW000-03100  CONC.FMNB.N.WRE AU    1700
82  11MAR8224JUL826BBSK01IW000-03100  CONC.FMNLABOUR  BH     852
82  12MAR8201MAY826BBSK01IW000-03100  CONC.FMNLABOUR  AH     120
82  01MAY8231MAY826BBSK01IW000-03100  CONC.FMNLABOUR  AH      44
82  31MAY8230JUL826BBSK01IW000-03100  CONC.FMNLABOUR  EH     700
82  11MAR8230JUL826BBSK01IW000-03100  CONC.FMNCARPANTRBH    1300
82  11MAR8201MAY826BBSK01IW000-03100  CONC.FMNCARPANTRAH     200
82  01MAY3231MAY826BBSK01IW000-03100  CONC.FMNCARPANTRAH     104
82  31MAY8228AUG826BBSK01IW000-03100  CONC.FMNCARPANTREH     950
82  11MAR8201MAY826BBSK01IW000-03100                 RD    6500
82  01MAY8231MAY826BBSK01IW000-03100                 RD    2500
82  15MAR8205JUN826BBSK01IW000-03301  CONC.FMNCONCRT-1BU     108
82  18MAR8201MAY826BBSK01IW000-03301  CONC.FMNCONCRT-1AU      60
82  01MAY8231MAY826BBSK01IW000-03301  CONC-FMNCONCRT-1AU      36
82  31MAY8214JUN826BBSK01IW000-03301  CONC.FMNCONCRT-1EU      24
82  11MAR8205JUN826BBSK01IW000-03301  CONC.FMNPLANT   BD    3000
82  17MAR8218MAR826BBSK01IW000-03301  CONC.FMNPLANT   AD    1200
82  11MAR8201MAY826BBSK01IW000-03301  CONC.FMNPLANT   AD    2300
82  01MAY8231MAY826BBSK01IW000-03301  CONC.FMNPLANT   AD     100
82  31MAY8204DEC826BBSK01IW000-03301  CONC.FMNPLANT   ED     900
82  18MAR8208JUN826BBSK01IW000-03301  CONC.FMNLABOUR  BH     378
82  17MAR8201MAY826BBSK01IW000-03301  CONC.FMNLABOUR  AH     200
82  01MAY8231MAY826BBSK01IW000-03301  CONC.FMNLABOUR  AH     100
82  31MAY8219JUN826BBSK01IW000-03301  CONC.FMNLABOUR  EH      60
82  11MAR8201MAY826BBSK01IW000-03301                 RD   12800
82  01MAY8231MAY826BBSK01IW000-03301                 RD    3200
82  20MAY8215AUG826BBSK01IW000-03302  CONC.FMNCONCRT-2BU     400
82  31MAY8222AUG826BBSK01IW000-03302  CONC.FMNCONCRT-2EU     400
82  20MAY8215AUG826BBSK01IW000-03302  CONC.FMNLABOUR  BH    1400
82  31MAY8223AUG826BBSK01IW000-03302  CONC.FMNLABOUR  EH    1400
82  14JUN8224AUG826BBSK15SP000-15***                 BD   43000
82  14JUN8224AUG826BBSK15SP000-15***                 ED   43000
82  16AUG8206NOV826BBSK12MC000-15180                 BD    5200
82  16AUG8206NOV826BBSK12MC000-15180                 ED    5200
82  12APR8201MAY826BBSK12MC000-15400                 BD   15000
82  02JUN8206NOV826BBSK12MC000-15440                 BD   40000
82  14JUN8213NOV826BBSK12MC000-15400                 ED   45000
```

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82  13APR82O1MAY826BBSK12MC000-15400                    AD   10000
82  O1MAY8214MAY826BBSK12MC000-15400                    AD    5000
82  O1APR82O1MAY826BBSK12MC000-15400                    RD   22000
82  O1MAY8231MAY826BBSK12MC000-15400                    RD    9200
82  15JUN8228AUG826BBSK12MC000-15800                    BD    6500
82  13JUL8228AUG826BBSK12MC000-15800                    ED    6500
82  13JUL8214JUL826BBSKO1IW001-O4210  MASN.PMNLABOUR    BH       2
82  13JUL8214JUL826BBSKO1IW001-O4210  MASN.PMNLABOUR    EH       2
82  O2SEP82O3SEP826BBSK12MC001-15180                    BD     120
82  O2SEP82O3SEP826BBSK12MC001-15180                    ED     120
82  12JUL8215JUL826BBSK12MC001-15800                    BD    1200
82  12JUL8215JUL826BBSK12MC001-15800                    ED    1200
/*
//ORDERC.SYSOUT DD DUMMY,SYSOUT=
//CONTRL.DDOUT DD DUMMY,SYSOUT=
//CONTRL.SYSOUT DD DUMMY,SYSOUT=
//CONTRL.SYSIN DD *
ASOF     31MAY82
RATES    100       *000001    000000    100000
/*
//CSTRPT.STEPLIB DD DSN=F3000500.PMS.RPLIB,DISP=SHR
//   DD DSN=F3010100.PMSMODS,DISP=SHR
//CSTRPT.SYSOUT DD DUMMY,SYSOUT=
//CSTRPT.SYSIN DD *
*TTTST KEVIN,S SCHOOL EXTENTION
*DATA    0000001    11MAR-04DEC,1982    BETTERBUILT
*CHRG    2
*COSTREQ         V5V7
*CHRG    4
*COSTREQ         V4V6
*CHRG    5
*COSTREQ         V3
/*
//
```