Current Techniques in the Internal Auditing of Construction Contracts for Public Utilities

Vernon M. Buttles
CURRENT TECHNIQUES IN THE
INTERNAL AUDITING OF CONSTRUCTION
CONTRACTS FOR PUBLIC UTILITIES

by
Vernon M. Buttles

A Thesis
Submitted to the
Faculty of The Graduate College
in partial fulfillment
of the
Degree of Master of Business Administration

Western Michigan University
Kalamazoo, Michigan
April 1971
ACKNOWLEDGEMENTS

During the course of research and writing this thesis, many people have furnished research material, advice, criticism, and encouragement. My heartfelt thanks go to them; particularly, Professor Fred Everett, who has kindly, patiently, and knowledgeably taught me accounting and auditing since my undergraduate days, and also led me to a successful completion of this paper; Doctor John Burke, who has steadfastly counseled me in my degree programs since my undergraduate days; Robert E. Harr, Consumers Power Director of Internal Audit, who affably furnished a large portion of the research material to support this paper; Carl R. Randolph, Consumers Power Company's Plant Accounting Department Supervisor (my friend and former supervisor), who has benevolently and kindly prodded me to undertake and complete both my undergraduate and graduate degree programs; and last but not least, my wife, Laura, who has graciously endured my absence and lack of companionship these many years during the completion of my educational program.

Also for the record, particularly in view of the adverse criticism that abounds in today's society of educational endeavor, I would like to state that not
once in all my many years, which go back to 1946 at
Western Michigan University, have the faculty and members
of this University ever failed to be other than efficient,
knowledgeable and straight-forward in their teachings, as
well as being favorable, helpful, and benevolent toward
me.

Vernon M. Buttles
BUTTLES, Vernon M., 1928-
CURRENT TECHNIQUES IN THE INTERNAL AUDITING
OF CONSTRUCTION CONTRACTS FOR PUBLIC UTILITIES.

Western Michigan University, M.B.A., 1971
Accounting

University Microfilms, A XEROX Company, Ann Arbor, Michigan
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>PAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>The Purpose</td>
<td>2</td>
</tr>
<tr>
<td>Public Utilities</td>
<td>3</td>
</tr>
<tr>
<td>Growth in the Gas and Electric Utility Industry</td>
<td>7</td>
</tr>
<tr>
<td>Influence of Regulatory Agencies</td>
<td>9</td>
</tr>
<tr>
<td>Public Utility Associations</td>
<td>14</td>
</tr>
<tr>
<td>Construction Contracts</td>
<td>15</td>
</tr>
<tr>
<td>Internal Auditing</td>
<td>17</td>
</tr>
<tr>
<td>II INTERNAL AUDITING OF CONSTRUCTION CONTRACTS IN GENERAL</td>
<td>26</td>
</tr>
<tr>
<td>Internal Control and Audit Research</td>
<td>26</td>
</tr>
<tr>
<td>Cost Control</td>
<td>27</td>
</tr>
<tr>
<td>Participation in Contract Planning and Negotiation</td>
<td>32</td>
</tr>
<tr>
<td>Operational Auditing</td>
<td>42</td>
</tr>
<tr>
<td>III INTERNAL AUDITING OF LUMP-SUM CONSTRUCTION CONTRACTS</td>
<td>56</td>
</tr>
<tr>
<td>Type and Use of Lump-Sum Construction Contracts</td>
<td>57</td>
</tr>
<tr>
<td>Control of Lump-Sum Construction Contracts</td>
<td>63</td>
</tr>
<tr>
<td>Change Orders for Extra Work</td>
<td>72</td>
</tr>
</tbody>
</table>

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
<table>
<thead>
<tr>
<th>CHAPTER</th>
<th>INTERNAL AUDITING OF UNIT PRICE CONSTRUCTION CONTRACTS</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV</td>
<td>Type and Use of Unit Price Construction Contracts</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>Control of the Unit Price Invoice</td>
<td>82</td>
</tr>
<tr>
<td></td>
<td>Control of the Unit Variable</td>
<td>85</td>
</tr>
<tr>
<td>V</td>
<td>INTERNAL AUDITING OF COST-PLUS CONSTRUCTION CONTRACTS</td>
<td>93</td>
</tr>
<tr>
<td></td>
<td>Type of Cost-Plus Contract</td>
<td>94</td>
</tr>
<tr>
<td></td>
<td>Control of the Varying Factors of Cost</td>
<td>109</td>
</tr>
<tr>
<td>VI</td>
<td>CONCLUSION</td>
<td>217</td>
</tr>
<tr>
<td></td>
<td>BIBLIOGRAPHY</td>
<td>219</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

The level of expenditures for new and replacement facilities in the public utility industry has been increasing at an accelerated rate in the last few years. This increase has been necessary to supply the needed energy to meet the growing demand. The new and replacement facilities needed to supply these energies are, generally, engineered and constructed for the public utilities by outside contractors. These facilities represent a continuing and increasing high rate of monetary outlay.

It is in the best interests of all public utility managements to be assured that the monies spent for new and replacement facilities is in accord with the various contractual agreements made by the public utilities with the outside contractors. The responsibility for testing and confirming this assurance has been placed in the hands of the internal auditing departments or other departments performing the same functions in the public utilities.

The internal auditing of these construction contracts in the public utility industry is a specialized
field. The development and growth in this area should be paralleling the growth of the new and replacement facilities in that the state of the art for internal auditing principles and practices should be dynamic and grow with all the current changes.

The Purpose

The purpose of this paper is to present and comment on the various types of construction contracts for public utilities as well as the provisions that are contained or should be contained therein while considering this contractual relationship to the internal auditor in his role in the planning, negotiating, and operational auditing of the contract.

This is accomplished by examining the make-up of the various types and uses of the construction contracts, the controls and procedures provided in the construction contracts, the problems and pitfalls caused by the contractor's reactions to specific contractual provisions, the controls and internal auditing required to verify and/or counteract the contractor's actions, and the use of this aforementioned knowledge to plan and negotiate clearly defined construction contracts for cost savings now and in the future.

Before pursuing the internal auditing of construction
contracts, a general background look at public utilities, their growth, regulatory agencies, public utility associations, construction contracts, and internal auditing in general is in order to properly develop the stage on which internal auditing must engage itself in the role of monitoring construction contracts.

Public Utilities

A public utility is a service firm, company, corporation, government body, or cooperative that produces and furnishes services to all. E.L. Kohler defines a public utility as "a corporation supplying to the consuming public services commonly regarded as necessities of life."^1

By necessity, the facilities or plant investments required to provide services are considerably larger than that required of most other types of businesses. E. Vennard and R. M. Winsborough^2 report that in 1957 the electric light and power industry had a $105,535 investment per employee and the gas utilities had a $73,520 investment per employee. The petroleum industry with

---


$119,286 investment per employee was the only industry reported higher than the public utilities. The other industries reported ranged from a $4,515 to a $30,933 investment per employee.

The Canadian government's Department of National Revenue reports that Canadian electric utilities and gas utilities take 6.3 and 5.0 years respectively for gross revenue to equal plant investment compared to 3.87, 3.56, 1.03, 0.71, and 0.28 years for the telephone, railroads, common carrier, manufacturing, and retail trade industries, respectively. This compares to 3.6 and 2.8 years for United States electric and gas utilities and from 0.4 to 1.0 years for other United States industries according to the Edison Electric Institute. The higher Canadian ratios reflect the higher investment costs in hydroelectric units.

These public utilities not only require larger investments than do other industries, but most of the investments are made up of fixed or long-term assets.

---


consisting of land, plants, and equipment. In fact, J. R. Foster and B. S. Rodey, Jr. reveal that over 90 percent of utility investments are of the above-mentioned fixed type compared to 50 to 65 percent for other industries.

Electric light and power, gas, telephone, steam heating, railroads, water, the transportation groups, and grain elevators are some of the services provided by public utilities. E. L. Kohler has listed "... railroads and other common carriers; electric light, gas, power, telegraph, telephone, and water companies" as examples of public utility services.

The public utilities such as the electric utility industry is composed of cooperatively-owned, investor-owned, and government-owned electric utilities. In 1968, the Edison Electric Institute reported that the investor-owned utilities had a 220,163 megawatt generating capacity compared to a 70,202 megawatt generating capacity for both government and cooperative-owned utilities.


6 Kohler, Eric L., op. cit., p. 405.

Some utilities are combination public utilities inasmuch as they furnish more than one service. Those combination public utilities having the largest amount of plant investment are the combination gas and electric companies. It is for this reason that this paper will restrict itself to the internal auditing of construction contracts in only the gas and electric public utility industry.

In the electric utility field it is the electric generating plant that produces the energy furnished by the utility. Electric generating plants, being one of the major investment costs, are usually of the hydro- electric, nuclear, or fossil-fuel type. It is for this type of investment that the internal auditing of construction contracts requires continual vigilance. Construction expenditures for electric production facilities were reported by the Edison Electric Institute to be $3,823,000,000 in 1969 as compared to $1,731,000,000 and $2,363,000,000 for electric transmission and electric distribution facilities, respectively.

Gas transmission and distribution facilities make up $1,569,000,000 and $945,000,000 respectively, out of a total $2,998,000,000 forecasted construction

---

8Edison Electric Institute, op. cit., p. 7.
expenditures by the American Gas Association for the gas utility industry. These facilities consist of pipelines, compressor and regulator stations, etc.

With construction expenditures of these magnitudes, it is not difficult to surmise the many complexities that may arise involving the internal auditing of the construction contracts for these investments.

Growth in the Gas and Electric Utility Industry

Since it has been established that most of the investments of public utilities are in assets of a fixed nature, it can be readily seen that a growth of any kind in the public utility industry can only mean more investment and more and/or larger fixed assets. Since these fixed assets are special purpose, they must be constructed. Therefore, construction growth is measured by annual construction expenditures.

The American Gas Association reports that the 1946-1950 average construction expenditure was $798,900,000

---


compared to $1,618,100,000 in 1958. And, in 1968, the American Gas Association\textsuperscript{11} stated that $2,972,000,000 was expended for the construction of gas facilities and pipelines. They\textsuperscript{12} also report 4,720 miles of pipeline and 334,395 compressor horsepower installed in 1958 as compared to their\textsuperscript{13} report of 5,543 miles of pipeline and 875,810 compressor horsepower installed in 1968. This indicates larger and more numerous compressor stations with larger and longer pipelines with transmission at higher pressures.

The Edison Electric Institute\textsuperscript{14} reports that in 1958 the construction expenditures were $3,764,000,000 for a generating capacity of 142,413 megawatts. For 1968, the Institute\textsuperscript{15} reported construction expenditures in the amount of $7,168,000,000 for a generating capacity


\textsuperscript{15}Edison Electric Institute, \textit{Statistical Year Book of the Electric Industry for 1968}, op. cit., pp. 5 and 59.
of 220,163 megawatts. In 1958, the generating units were capable of producing up to approximately 300 megawatts. In 1968, a generating unit capable of producing 800 megawatts was not uncommon. So it can be seen that the generating plants are not only larger, but also that there are more of them.

It is also interesting to note that the Edison Electric Institute reports 105 megawatts of installed generating capacity in 1958 as compared to 2,817 megawatts of installed generating capacity in 1968 for nuclear steam generating plants.

These statistics add up to one thing; that there is a tremendous construction growth in the public utility industry. Construction growths of these magnitudes can only lend more weight to the importance for internal auditing of construction contracts.

Influence of Regulatory Agencies

Gas and electric utilities are regulated because, by law, they maintain a monopoly in the geographic area where they furnish services. This regulation is detailed and extremely comprehensive. With the exception of hydroelectric and interstate operations, the gas and

\[16 \text{loc. cit., p. 7.}\]
electric utilities are regulated in many ways by the state power commissions. The hydroelectric and interstate operations are regulated by the Federal Power Commission. In addition, the State Natural Resources Commissions, Corp of Engineers, Coast Guard, Atomic Energy Commission, various city and state governmental authorities, etc., are but a few more of the regulatory agencies that influence the operations, including construction, of the gas and electric utilities.

One of the most important functions of state and federal power commissions is that of price or rate regulation. Rates determine the utility's revenue and are usually founded on a rate of return based on the original cost, replacement cost, or fair value of plant investment.

J. L. Livingstone confirms that:

A main function of regulatory agencies is periodically to determine the rate of return that electric utility companies, in their jurisdiction, should be allowed to earn on their investment. The actual rate of return is computed by dividing the company's net operating revenue by its net utility plant, or rate base as it is often called.

In the valuation of the net utility plant, price adjustments are made by some regulatory agencies. The alternative rate base valuation methods in general use are:

(a) Original Cost—The historical dollar cost utility plant when first put into public service, less depreciation.

(b) Reproduction Cost—The dollar cost at current prices of reproducing the existing (depreciated) plant.
(c) Fair Value—A composite of original cost and reproduction cost, resulting in a value between (a) and (b).

Thus, methods (b) and (c) take into account current prices, while (a) does not. The number of state regulatory agencies currently using each of the rate base valuation methods are: original cost, 29 states; reproduction cost, 1 state; and fair value, 11 states.  

However, governmental regulation just does not stop at rate regulation. The power commissions audit the make-up of the plant costs for their legal authenticity. Section 208 of the Federal Power Act reads as follows:

The Commission may investigate and ascertain the actual legitimate cost of the property of every public utility, the depreciation therein; and when found necessary for rate-making purposes, other facts which bear on the determination of such cost or depreciation, and the fair value of such property.  

Section 6 and other portions of the Natural Gas Act read similarly except that it refers to natural gas companies.

In addition, the power commissions have established uniform accounting systems that gas and electric utilities

---


are required to utilize. The accounting systems provide account classifications with specific instructions on what is allowed to be charged to each particular account. Also, it is required that proper documentation be available to justify each and every entry. Part of the Federal Power Act, Section 301, states:

Every licensee and public utility shall make, keep and preserve for such periods, such accounts, records of cost accounting procedures, correspondence, memoranda, papers, books, and other records as the Commission may by rules and regulations prescribe . . . . The burden of proof to justify every accounting entry questioned by the Commission shall be on the person making, authorizing, or requiring such entry, and the Commission may suspend a charge or credit pending submission of satisfactory proof in support thereof.20

These regulations leave no room for doubt that the public utilities must be about their business in a prudent manner. All costs must be properly accounted for justification, reasonableness, and accuracy.

One of the elements to be recorded at cost in accordance with the Federal Power Commission's Uniform System of Accounts 21 is construction cost. The first component of construction cost is defined as:

---


Contract work includes amounts paid for work performed under contract by other companies, firms, or individuals, costs incident to the award of such contracts, and the inspection of such work. 22

This definition is interpreted to include all contract work whether it is contract work by the general contractor or any subcontractor. Also, since a specific reference is made to include costs associated with the award of contracts, it can be inferred from this and above statements that prudence must be practiced not only in reviewing proposals for contracts, but also in the make-up of the contracts.

Furthermore, the reference to the inspection of such contract work is such that it could encompass any or all and yet not be limited to the following types of inspection:

1. Conformance by contractor to specifications, design criteria, building codes, civil codes, mechanical codes, electrical codes, Atomic Energy Commission regulations, and other agency rules and regulations.

2. Conformance by contractor to provide a proper cost breakdown for work performed in accordance with the system of accounts required for the public utility to obtain an operating license for the facility constructed.

3. Conformance by contractor to the terms and conditions of the contract including prudent costs and proper procedures for effective internal control.

22 Ibid.
From the above, it is obvious that effective internal auditing of construction contracts is essential for the well-being of all public utilities and is a requirement to properly justify and document construction costs.

Public Utility Associations

The gas utilities have, as their trade association representative, the American Gas Association. The corresponding representative for the electric utilities is the Edison Electric Institute.

The purpose of the associations is to serve and assist their utility members individually and collectively so that their members may serve their customers more effectively. To do part of this the associations collect, compile, and distribute statistical data from information furnished by the members and other sources.

In another way, representatives of the member utilities meet together to share their common interest, knowledge, and expertise. Each learns from the other; and, in turn, each is able to place some of these newfound ideas and methods to effective use.

Of particular interest is the joint Internal Auditing Committees of Edison Electric Institute and the American Gas Association. This joint committee has polled their members and, from the information obtained,
formulated the Internal Auditing Procedure Manual. Specific internal auditing procedures for public utility contracts are covered in Section V, Audit Principles and Practices, Group CC, Construction Contracts. Reference to this particular group of the manual will appear from time to time throughout this paper.

Construction Contracts

A contract is, generally, defined as a legal and enforceable promise in the form of an agreement. M. J. Ross defines contracts as "agreements which create legal obligations and are enforceable in a court of law." But, of course, a construction contract is more than just an agreement. The fact that the contract is for construction of something is obvious. The construction contract must contain terms and conditions with respect to an exchange of mutual promises. All of the terms and


24 ibid.

conditions must be agreed by all parties concerned, the specific details of which must be contained in the written contract with executed signatures by both parties who are authorized to execute said contract. M. J. Ross refers to this type of contract as:

An express contract is one in which all of the terms are agreed upon by the parties and are specifically set forth in detail, as in a writing. 26

The construction contract should describe just what the contractor is to furnish, the location of the work, the work to be performed, the starting and completion date, definition of cost, general conditions, specifications and/or references to specifications, and any other special provisions required.

There are three major classifications of construction contracts:

1. Lump-sum construction contracts.
2. Unit price construction contracts.
3. Cost-plus construction contracts.

The various specific terms and conditions of construction contracts will be considered in conjunction with internal auditing later in this paper. For the present, only the general nature of the construction contract need be considered in that its contents,

26 ibid.
whatever they may be, are binding on both parties.

Therefore, it is essential that those who are involved in internal auditing be not only knowledgeable of construction contracts, but also be able to cope with the various contractual terms and conditions as well as being able to institute knowledgeable inputs into the writing of construction contracts. This is required to protect the best interests of the public utility.

Internal Auditing

The maintenance of effective internal control over company operations including construction contracts is a perpetual concern of management in all types of businesses. Many businesses have grown to a point where management cannot, by themselves, maintain effective control; .. "personal observation is no longer possible. .."27 Management is required to look after all aspects of the business, or, in other words--practice effective internal control. The American Institute of Certified Public Accountants take a similar position:

The scope and size of the business entity has increased to the point where its structural organization has become complex and widespread. To control operations effectively, management must depend on the reliability of numerous reports and analyses.

The primary responsibility for safeguarding the assets of concerns and preventing and detecting errors and fraud rests on management. Maintenance of an adequate system of internal control is indispensable to a proper discharge of that responsibility.28

Thus, the term internal control is one often used. It is a very broad term, even if limited to financial and accounting matters. This would incorporate the accounting system and the internal auditing department. Internal auditing thus is a part of the larger scope of operations by which management attempts to make as efficient as possible. One of the major responsibilities of an internal auditing department is to perfect the system of internal control within the company and without the company with respect to construction contracts. The internal auditing department is itself also a part of the internal control system with respect to management, outside accountants, and other interested parties.

Internal auditors are themselves employees of the company being audited. This fact that internal auditors are company men, while having a limitation on the one hand, may be considered an advantage on the other hand. The internal auditors can and do serve management well.

Internal auditing is the right arm of management and, therefore, it is fitting that management direct the internal auditor in such a way which will further efficient corporate operation.

The internal auditor is continuously in contact with all the various phases of company operations. The internal auditor acquires a familiarity with construction contracts and projects, personnel, procedures, plants, products, equipment, and all kinds of operations. This physical and technical background, usually peculiar to that business, particularly public utilities, allows the internal auditor to see and better analyze the workings to which construction contracts, accounting, and other operating data relate.

Therefore, the internal auditor develops a special knowledge of the maximums, normals, and minimums with respect to construction contracts, costs and operating relationships. This allows the internal auditor to analyze more effectively and accurately the reliability of the results from the construction contracts, accounting records, and operations. With this background and an extended analysis, the internal auditor is in a better position to recommend constructive improvements and/or action.

Internal auditing is unusual in nature in that it
involves more than just auditing. Different objectives and responsibilities are reflected. Management support services which lead to management's policy making and more effective contract writing and monitoring are a part of internal auditing. The work of Francis J. Walsh, Jr. for the National Industrial Conference Board states:

Companies whose auditing programs have moved in this direction report that they are now placing greater emphasis on such matters as reviews of compliance with policies and procedures, reviews of operations, and evaluations of personnel. And, the examinations are not limited to the financial and accounting area. 29

Internal auditing, like many other accounting applications, develops in response to the needs for it. Management needs to know if their policies and procedures are properly understood and consistently and accurately carried out. It is one of the functions of internal auditing to perform this follow-up work. Internal auditing also allows management to observe how its policies and procedures are actually working under field conditions. In this way, management is able to appraise their policies and procedures and take the necessary corrective action. Good corporate operation requires continuous analysis to weed out the defects and to make

29 Walsh, Francis J. Jr., op. cit., p. 4.
improvements. There must be continual improvement or efficiency declines. Internal auditing must render these services to management.

Internal auditing has certain characteristics which distinguishes it from the general auditing performed by public accountants. The internal auditor has as his major responsibility—allegiance to the corporate management who has employed him. It is this management who compensates him and promotes him. The internal auditor is under the control of the management which directs corporate policy. Good management will normally give its internal auditing department sufficient independence for effective auditing and operation; and, likewise, allow internal auditing to provide management services for management's action. While there may appear to be a conflict of interests between internal auditing and management services, the two services are very compatible.

The same services are also compatible in the public accounting field as is confirmed by D. R. Carmichael and R. S. Swieringa:

A priori analysis indicates that performance of management services is entirely compatible with professional independence.\(^{30}\)

Like the American Institute of Certified Public Accountants, internal auditors have grouped together in a professional organization called, The Institute of Internal Auditors. This group of internal auditors has and are continuing to develop a practice code which is based on high ethical and professional standards. The present Statement of Responsibilities of the Internal Auditor is set forth as follows:

**Nature of Internal Auditing**

Internal auditing is an independent appraisal activity within an organization for the review of accounting, financial and other operations as a basis for service to management. It is a managerial control, which functions by measuring and evaluating the effectiveness of other controls.

**Objective and Scope of Internal Auditing**

The overall objective of internal auditing is to assist all members of management in the effective discharge of their responsibilities, by furnishing them with objective analyses, appraisals, recommendations and pertinent comments concerning the activities reviewed. The internal auditor therefore should be concerned with any phase of business activity wherein he can be of service to management. The attainment of this overall objective of service to management should involve such activities as:

--Reviewing and appraising the soundness, adequacy and application of accounting, financial and operating controls.

--Ascertaining the extent of compliance with established policies, plans, and procedures.

--Ascertaining the extent to which company assets are accounted for, and safeguarded from losses of all kinds.

--Ascertaining the reliability of accounting and other data developed within the organization.
--Appraising the quality of performance in carrying out assigned responsibilities.

**Authority and Responsibility**

Internal auditing is a staff function rather than a line function. Therefore, the internal auditor does not exercise direct authority over other persons in the organization, whose work he reviews.

The internal auditor should be free to review and appraise policies, plans, procedures, and records; but his review and appraisal does not in any way relieve other persons in the organization of the responsibilities assigned to them.

**Independence**

Independence is essential to the effectiveness of the internal auditing program. This independence has two major aspects:

1. The organizational status of the internal auditor and the support accorded to him by management are major determinants of the range and value of the services which management will obtain from the internal auditing function. The head of the internal auditing department, therefore, should be responsible to an officer of sufficient rank in the organization as will assure a broad scope of activities, and adequate consideration of and effective action on the findings or recommendations made by him.

2. Since complete objectivity is essential to the audit function, internal auditors should not develop and install procedures, prepare records, or engage in any other activity which they normally would be expected to review and appraise. 31

While there are limitations on the above statements due to managerial controls, such a code goes far in  

---

justifying reliance on the work of the internal auditor by corporate directors, stockholders, governmental agencies, and the general public.

The special characteristics and qualifications of the internal auditor has a normal goal to make the construction contract operations of the company more clearly defined, efficient and cost-saving. This involves the internal auditor in the problems and functions of construction contract management and administration. While serving management in the solution of its problems, the internal auditor thinks in terms of management and uses his accounting and auditing analyses as a means of appraising current construction contract policies and for furthering the prevention of construction contract problems.

However, construction contract appraisal and its problem prevention can only be achieved by becoming thoroughly knowledgeable with the many pitfalls of construction contract administration. The knowledgeability of these many pitfalls can be acquired through actual field internal auditing of contractors' invoices and through communications with the various personnel administrating the construction contracts. In other words, it is necessary to become knowledgeable of what contractors do under certain contractual conditions, what internal
control factors exist or are allowed under contractual conditions; and from an appraisal of these factors, determine what steps are necessary to correct the deficiency now and prevent the deficiency from occurring in the future by writing better and clearer defined construction contracts.
CHAPTER II

INTERNAL AUDITING OF CONSTRUCTION
CONTRACTS IN GENERAL

The field of internal auditing on construction contracts for public utilities is still young and growing. This is evidenced by the changes in terminology. In the yesteryears, the terminology referred to auditing, account for, watch for, etc. Today, the terminology not only includes the old, but also refers to internal control, audit research, cost control, participation in contract planning and negotiation, and operational auditing.

Internal Control and Audit Research

D. R. Carmichael\(^1\) reports that, while there is a present lack of field work and reporting standards for expressing an opinion on internal control, there are studies being made in this area. This is significant because internal control plays a large role in the internal auditing of construction contracts. In the audit

research field, the American Institute of Certified Public Accountants has initiated a new audit research program and, according to D. R. Carmichael, the program will include auditing research monographs, papers, and opinions. This is indeed a step forward in the field of auditing.

Cost Control

Cost control is now taking its place along side accounting and administrative control, the three of which make up internal control. The Committee on Auditing Procedure of the American Institute of Certified Public Accountants defines accounting and administrative control as follows:

**Accounting controls** comprise the plan of organization and all methods and procedures that are concerned mainly with, and relate directly to, safeguarding of assets and the reliability of the financial records. They generally include such controls as the systems of authorization and approval, separation of duties concerned with record keeping and accounting reports from those concerned with operations or asset custody, physical control over assets, and internal auditing.

**Administrative controls** comprise the plan of organization and all methods and procedures that are concerned mainly with operational efficiency and adherence to managerial policies and usually relate only indirectly to the financial records. They

---

generally include such controls as statistical analyses, time and motion studies, performance reports, employee training programs, and quality controls.3

Cost controls comprise the plan of organization and all methods and procedures that are concerned mainly with keeping all costs within the parameters of a budget or estimate and/or properly explaining and accounting for all costs that exceed the parameters of a budget or estimate including the discovery, analysis, and corrective action to keep costs reasonable and in line. J. Acabes of Stone and Webster, a contractor, has the following definition of cost control:

Cost Control is defined as the application of procedures to minimize cost in relation to the Budget Estimate prepared for any specific project. The Budget Estimate, together with all documents defining the Scope of Work and approved or finalized in a signed contract with a client, will be the control document for any specific project. Any deviation to the scope of the Budget Estimate must be defined, evaluated and presented to the client for approval as a change in Scope of Work, in order to have effective Cost Control.4


The control of costs takes the form of participation by internal auditors, accountants, engineers, administrators, lawyers, etc., before construction contracts are let, during the negotiation of the construction contracts, and during the operation of the construction contracts to establish, monitor and enforce all the necessary procedures and their parameters to keep projects within their budgets or estimates. A. O. Hinkle states that:

Companies which do not bring their accountants and internal auditors in on the team that plans and executes a cost-plus project are making a serious mistake from an economic standpoint. Also, early participation by other professionals in the field of law, taxes, and insurance is absolutely essential to the best results in planning, negotiating, and executing a cost-plus type construction project.  

Complementing A. O. Hinkle's thoughts, this writer also maintains that this participation should take place with any type of construction contract, whether it be lump-sum, unit price, or cost-plus.

The basis for this overall participation is based on the fact that very few lump-sum or unit price contracts are ever completed without change orders for extra work (which are often cost-plus) and the fact that when

---

cost-plus contracts merge with other lump-sum or unit price contracts or subcontracts, the best interests of the public utility is achieved by inspecting and auditing of all the contracts. The audit of lump-sum contracts under these circumstances is also supported by A. O. Hinkle:

Problems of cost control and audit where contractor and/or subcontractors have cost-plus work going on simultaneously with fixed-price work (including fixed-price change-order adjustments agreed upon). Here there is a significant problem as to identification of men, materials, equipment, and services as they apply to each segment of work—cost basis versus fixed rates, lump sum and fee. Under these circumstances, it is essential to owner’s welfare that right of audit of both types of work be obtained.\(^6\)

With the proper contractual groundwork and procedures provided, the contractor should be expected to obtain authorizations for any item or change which would affect cost. This should include authorizations for any labor dollar and manpower increases, all material requisitions along with quantities and price justification, and all construction equipment including tools and supplies along with quantities and price justification. The authorization procedure should not only include current requirements but also future requirements. This means that the contractor will have to perform diligently and

\(^6\)loc. cit., p. 53.
accurately in estimating and scheduling and communicate regularly with the owner's representative. Teamwork is a must if the system is to work. Further, the usage of all construction components should be accurately accounted for and matched to the estimates for possible variances. Matching should be done frequently to minimize loss and inefficiency.

Changes will occur on almost all projects regardless of the type of contract. The estimates should be amended to compensate for authorized changes. The work and the costs associated therewith for changes should be monitored closely by the owner's auditors. A. O. Hinkle states that:

No matter how carefully a project is planned, some changes caused by oversight or improvements are bound to occur. Such changes usually give rise to requests by the contractor or subcontractor for additional payments over and above that expected in the original job estimate. The accountant and the internal auditor should review such claims for additional costs on the part of the contractor or subcontractor to be certain that they are justified under the circumstances and in light of the contract terms.  

With the rising costs of today's economy, cost control is a must. The internal auditor should play a major role in cost control by participating, not only in

---

7 *loc. cit.*, p. 51.
operational cost control, but in the planning of cost control for the contract and the negotiating of cost control into the contract.

Participation in Contract Planning and Negotiation

In addition to cost control participation, the internal auditor should become involved in the planning of the contract, the selection and qualification of potential bidders, planning of the instruction to bidders including the bid details and terms, and the financial evaluation and estimate of the project. All of this involvement leads to a more effective contract as well as an efficient operational contract. A. O. Hinkle states that:

The accountant's intimate knowledge of operating and financial results on a wide variety of projects, his insight into pertinent factors that should be given consideration in cost estimates, and his objectivity in making realistic evaluations ideally equip him to make a valuable business-judgment contribution to new projects--especially those whose ultimate costs may not be clearly defined and known at the outset.8

Once the plans to go ahead with a project begin to take form, the internal auditor should take part in reviewing the preliminary budget estimate for the project.

8 loc. cit., p. 47.
His prior experience in or by reviewing the costs of previous projects permits a double check on the adequacy of the preliminary estimate as well as establishing the groundwork for further audit and review work on the current project.

At this time the contract preparation should be formulated and reviewed with the intent of preparing a clearly defined contract to submit to the bidders. A contract sample submitted to potential bidders has the effect of notifying the potential contractor of the terms and conditions that the owner desires to be carried and made operational. A. O. Hinkle states that:

Bid solicitation without a clearly defined contract and set of specifications can result in major misunderstandings and excessive effort by those personnel responsible for bid evaluation, as well as premium costs on the project where contractors submit their own contract form or their quotations in a manner that makes direct comparison ineffective.

The internal auditor can, from his experience and from the experience of others by way of the Joint Internal Auditing Committee of the Edison Electric Institute and American Gas Association and others, participate and recommend more effective ways to write a clearly defined contract. The knowledge of the many factors covered in the following chapters are items the internal auditor can

\[9\text{loc. cit., p. 48.}\]
bring into play when making recommendations for a more effective and clearly defined contract. At all times during the planning and negotiation stage of the construction contract, it is important to remember that the primary goal is to achieve adequate control in all areas in order to be assured that the owner is receiving full worth for the monies expended within the budget estimate. Anton Steven made a similar statement that:

An objective to keep in mind in preparing a contract is to provide for controls in order to assure full value received for any expenditure made under the contract and, conversely, to pay the supplier his costs and a reasonable amount of profit. In order to achieve this, avoid ambiguities, and clearly set forth the intent of the parties in regard to cost and controls . . . .

An ideal contract should contain an agreement section, a general conditions section, a description of the job section, a contract price section, and a specification section or a section referring to specifications. Items that should be included in the agreement section are:

1. Parties to the agreement, legal address of the parties, and definition of the parties.
2. Date of the agreement.
3. Scope of the contract.

---

10 Steven, Anton, "Negotiation and Control of Construction Contracts," *The Internal Auditor* (September 1955), p. 43.
4. **Scope of the work.**

5. **Material and services to be furnished by the owner and contractor.**

6. **Terms of payment.**

7. **Starting and completion dates.**

8. **Signatures of the parties.**

Items that should be included in the general conditions section are:

1. **Definitions.**

2. **Authority of owner's and contractor's representatives.**

3. **Provision for subcontractors.**

4. **Provision for separate contracts.**

5. **Provision for assignment of contracts.**

6. **Cooperation with other contractors.**

7. **Contract termination.**

8. **Owner's right to do work.**

9. **Arbitration.**

10. **Intent of plans and specifications.**

11. **Permits.**

12. **Responsibility of the contractor.**

13. ** Strikes and riots.**

14. **Bonds.**

15. **Insurance and indemnity.**

16. **Affidavits, etc.**

17. **Commencement, prosecution and completion of the work.**
18. Preparation of invoices, progress estimates.
19. Right to audit clause.
20. Miscellaneous provisions.

The description of the job section should provide a brief and general description of the work to be performed.

The contract price section should clearly define the cost of the work, the make-up of which depends upon the type of contract—lump-sum, unit price, or cost-plus a fee.

The specifications section will vary depending on the work to be done. This section should be detailed, explicit, and very clearly defined. If the specifications section is not a part of the contract, it is very important that all of the specifications applicable to the work be clearly referenced.

The internal auditor, as an expert on internal control, should review all sections of the contract draft and recommend controls and provisos that will assist in writing a more effectively defined and controlled contract.

The type of contract should also be decided upon. Major generating facilities are usually too large to consider the use of lump-sum or unit price contracts. Too much contingency would have to be built in the
bidders' prices. Specifications, also, are not finalized as a rule. Therefore, only cost-plus contracts should be considered for major generating facilities. Minor facilities such as substations, transmission lines, and pipe lines could be let on any basis as the quantity and specifications are usually firm enough to keep any contingencies low.

The instructions to the bidder and all specimen contracts sent to the bidder should emphatically state that all bids are to be on a forty-hour or straight-time work-week with alternate bids, if desired, for other work-weeks.

Once it has been decided where, what, and when a project is to be engineered, procured and constructed, the preliminary budget and specifications prepared and approved, and the bid contract is set to go, all potential bidders should be qualified and selected. It is not just a question of grabbing a list of all the contractors doing construction work for public utilities and giving the job to the lowest bidder. Potential bidders must meet certain qualifications before being allowed to bid. C. G. Lindeman makes the following reference in regard to the selection of a mechanical contractor:

One component of Construction Cost that cannot be overlooked is the experience and competence of the mechanical contractor. Each project must be examined and the bidders selected with care. The engineer
(owner's management engineer separate from the constructor) must be certain that all bidders are competent and experienced with the system to be installed. In addition, the contractor's size, facilities, and depth of supervision and management must be suitable for the project involved.  

First of all, a list should be gathered of all bidders who may be able to perform the work. Financial data and credit ratings for these firms should be accumulated and reviewed to ascertain whether any of the firms are not financially stable enough to handle such a project. The review should include an analysis of contract volume, working capital, net worth, bond rating, etc.

Secondly, questionnaires should be sent to those firms that qualify. The questionnaire should request the firm's interest in doing the work, ability to do the work, history of previous jobs with dollar amounts, amount of equipment available, financial data, technical data, experience and history of firm and personnel, trade references, etc.

Thirdly, the questionnaire data should be reviewed. The review should also include the recommendations and comments on those contractors whom the owner's personnel, including the internal auditors, have had any prior

---

experience and the comments of other utilities who have had experiences with any of the bidders. Those firms that appear completely competent and able are recommended for the bidder's list. The bidder's list should then be approved by the owner's management.

A bid package consisting of an invitation to bid, instructions to bidder, specimen contract with specifications, drawings, and other pertinent information is mailed to each approved bidder after being assured that identical packages are going to each bidder. The instructions to the bidder should include definitions, bidder's representation, procedures including the due date of the bids and a detailed format for bid prices, qualification of bidders, right of bid rejection, submission of post-bid information, and bonding instructions.

The time, date, and completeness of the bids received should be officially recorded. The bids should be analyzed and compared. A recommendation for an award should follow. Sometime before a bid is awarded, the internal auditor, as part of a contract negotiating team, should visit those bidders with the most qualified bids to clarify any possible misunderstandings that may exist between the parties in the bids and the specimen contract as to the detailed intent, controls, and restrictions that may prevail. This also assists the owner in further evaluating the capabilities of the bidder. In
addition, this visit allows the internal auditor to build a better framework for future audits. The visit also allows the owner some lead time for considering further negotiation with the chosen bidder. It is important to remember, also, that prior to the visit to the chosen bidders the other bidders not chosen for a visit be notified of their position in the evaluation, perhaps even informing them that they were unsuccessful in their bid for the work.

The visitation reviews and bids are then further evaluated and recommendations are made to the owner's management for the award of the contract. The award is officially made and the unsuccessful bidders are notified.

At this point the contract negotiating team should meet with the contractor to discuss the specimen contract. The potential contractor should have many questions and possible objections regarding the specimen contract. At this time the intent of the provisions of the specimen contract can be fully discussed. Some changes in the specimen contract may be requested by the contractor. These requested changes should be reviewed by the contract negotiation team and, if not detrimental to the effective control of work and liability of the owner, may be written into the specimen contract subject to the approval of the management of both parties. The
internal auditor can be extremely useful in these negotiating sessions with respect to any possible detrimental effect that may arise due to changes requested by the contractor. Quite often, the requested changes will arise in the definition of cost portion of the contract price section.

Further, the contractor's own unique mode of doing business or bid condition may lead to changes on the part of the owner's contract negotiating team to build controls and parameters into the contract for these special situations. For instance, the definition of cost sections usually have to be custom built for each contractor. Having a standard definition of cost for all contractors can lead to the utilization of percentages to cover many items. This would not result in the most economical contract.

Once the specimen contract has been changed and written to the tentative satisfaction of the contract-negotiating team, the specimen contract should be forwarded to the respective party's management with recommendations to approve and for signatures. The internal auditor, in addition to contributing to a more effective and clearly defined contract, also benefits from his role as a member of the contract-negotiating team by gaining and accruing a broader insight with the contract.
and the contractor. This permits the internal auditor to perform more effective operational audits later.

The contract having been executed should now be considered operational. The contractor is now expected to commence fulfilling his contractual obligations. It is at this point that the operational auditing of the contractor begins.

Operational Auditing

Operational auditing, to put it in reverse order, is the auditing of operations. This is further defined as the auditing of the contractor's operations during the construction of the public utility's facilities. Operational auditing is not only the financial auditing relating to accounting charges and monies associated therewith, but also the auditing of all the contractor's operations related to their compliance to the contract and specifications. C. T. Norgaard regards the operational audit as "an extension and/or modification of the traditional audit."12 G. A. Gustafson13 considers


Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
operational auditing synonymous with management-type auditing.

G. A. Gustafson also defines the scope of this type of auditing as follows:

The scope of management-type auditing goes beyond accounting, financial and compliance matters. It also focuses on operations to determine if they are carried out in an effective, efficient, and economical manner. To accomplish these objectives requires going behind the accounts into nonaccounting areas and beyond accounting records, analyzing and interpreting results of operations in terms of fundamental business policies and procedures and relating expenditures to the accomplishments.\(^{14}\)

This is the type of operational auditing that should be performed by the internal auditor.

In many cases, the internal auditor may have a different title. The internal auditor may be called an inspector, an engineer, a field supervisor, a construction accountant, a field auditor, etc. But, as long as these people do not perform the work required by the contract and are employees of the owner and are engaged in the operational auditing of the contractor, they are internal auditors.

One of the first things that should be required of the contractor is a procedure manual. This should be furnished before actual construction begins. The

---

\(^{14}\) loc. cit., p. 33.
procedure manual should outline step by step the various procedures the contractor will utilize to administrate the construction project in the field. In addition, the procedure manual should include the owner's requirements in the proper procedural order for all the authorizations the contractor will be expected to obtain from the owner. The procedure manual should be submitted to the owner for review by the internal auditor and others. The purpose of the review is to ascertain that the contractor's procedures with their inherent control meet the control and authorization requirements of the owner. If deficiencies exist, the contractor should be requested to make the necessary changes to correct the deficiencies.

The procedure manual serves as a guide for the contractor's nonmanual field administrative forces and the contractor's home office forces to administrate the project properly. It also serves as a framework around and in which the internal auditor will conduct his operational auditing.

Some of the items that should be covered in the procedure manual are:

1. Organizational chart and responsibility of titles.
3. Procurement.
4. Accounting.
5. Invoices.

6. Cost reports.

7. Scheduling.

8. Engineering including changes.

9. Quality compliance.

10. Sales and use taxes.

11. Subcontracts.

12. Distribution schedule.

Naturally, not all of this procedure coverage will be required for lump-sum or unit price contracts unless extra work is involved. Very few lump-sum or unit price contracts, however, are ever consummated without extra charges of some nature. Therefore, the procedure manual should be geared to its particular type of contract taking into consideration any possible extra work. The auditing and pitfalls unique to each particular type of contract will be covered in the chapters following.

Operational auditing in general means probing, finding and analyzing possible deficiencies, and reporting of the findings for corrective action. It is also important that follow-ups are made on all audit reports to ascertain the degree of corrective action taken. G. A. Gustafson\textsuperscript{15} made a similar statement regarding

\textsuperscript{15} loc. cit., p. 34.
deficiencies and also provides two operational audit standards:

The work should be sufficiently intensive to assure validity and usefulness of findings; and sufficiently extensive to support opinions, conclusions and recommendations.\(^{16}\)

Traditional internal auditing of lump-sum and unit price contracts, generally, does not pose much of a problem. Anton Steven, among others, concurs in that "the firm price contract is relatively simple to control after the contract has been formalized."\(^{17}\) But, from an operational auditing viewpoint, internal auditing becomes more complex for all types of construction contracts.

Even from a traditional viewpoint, it does seem unusual that the internal auditor has not been unduly curious in the past about the effect the non-accounting areas have had upon the accounting areas of construction contract administration.

A few of the non-accounting areas common to the operational auditing of all types of construction contracts that affect cost and accounting areas are:

1. Scheduling.

\(^{16}\) loc. cit., p. 34.

\(^{17}\) Steven, Anton, "Negotiation and Control of Construction Contracts." The Internal Auditor (September 1955), p. 42.
2. Safety.
3. Quality compliance.
4. Engineering changes.
5. Labor Management.

It is not as strange as it may seem that these non-accounting areas are inter-related to the accounting areas with cost as the common denominator.

**Scheduling**

The contract normally states beginning and completion construction dates. The completion date is usually critical. Public utilities are never generous with construction schedule spans. As a result, if the proper scheduling is not maintained and controlled, the public utility cannot place the facility into operation on schedule and extra costs may be incurred.

The owner should require all contractors to provide and maintain a schedule as a guide and a control. On larger projects, the computer run critical path method of scheduling may be used.

The American Institute of Architects has the following recommended wording for construction contracts:

The Contractor, immediately after being awarded the Contract, shall prepare and submit for the Architect's approval an estimated progress schedule for the work. The progress schedule shall be related to the extent required by the Contract Documents. This schedule shall indicate the dates for the
starting and completion of the various stages of construction and shall be revised as required by the conditions of the work, subject to the Architect's approval.18

The internal auditor or the scheduling analyst, or whatever the name may be, should review each periodic schedule for deficiencies and errors while taking into consideration the actual amount of completion in the various areas. Scheduling conferences should be held periodically with the contractor for the implementation of possible corrective action to maintain the schedule.

Cost enters the picture from many angles. If an item is ahead of schedule, it is possible that some other item has slipped in schedule and to catch up on that item may cost extra dollars. Also, if an item is ahead of schedule, a review should be made to ascertain whether the gain in schedule was made as a result of extra cost. Conversely, if the schedule is slipping, it may cost additional by way of overtime to catch up. Furthermore, the catching up of a delinquent schedule may have an effect on workmanship with extra costs resulting from correcting poor work.

Therefore, it is suggested that lump-sum and unit

price construction contracts include provisions to the extent that any overtime worked to maintain the schedule and correct any schedule slippage, if by fault of the contractor, shall be at the contractor's own expense. But if overtime is requested by the owner to maintain the schedule, then the actual net cost of the premium portion of the overtime shall be reimbursable to the contractor by the owner.

It should also be remembered, however, that such a clause in a lump-sum or unit price contract may cause the bid price to be increased by the bidder. The bidder may include a contingency in his bid for such a possible occurrence. These possibilities, pro and con, should be considered in the contract planning stage.

It is difficult to pin a contractor down for extra costs for schedule delay on a cost-plus contract. One method, however, would be to include a clause to the extent that if there is any delay of schedule caused by the contractor, then the premium portion cost of any overtime would be the responsibility of the contractor. It is also suggested that the contractor should absorb an efficiency loss charge along with the premium portion cost. This method, too, could cause the contractor to build a contingency into his fee to offset this potential nonreimbursable cost.
Therefore, upon reflection it can readily be seen that scheduling can have a significant effect on costs and it behooves the internal auditor to become involved with schedule and communicate frequently with others solely involved in scheduling.

Safety

A safety oriented construction project should be less costly than one which is not. A safety oriented construction project means that the official safety rules and regulations are followed. The project should be kept clean and free of miscellaneous debris. Hard hats should be worn at all times. Tools and equipment should be inspected and kept in a good and safe working condition.

Failure to do so results in accidents. Accidents are lost time and lost time costs money. Serious accidents can also lead to law suits. Therefore, it is important that the internal auditor among all others recognize this and take the time to report all safety violations for corrective action. The cost saved may also be one's life.

Quality Compliance

Quality compliance including workmanship can affect costs if the specifications are not followed, the work is shoddy, or the work is installed incorrectly or in
the wrong place. Such deficiencies ultimately must be corrected and corrections cost money. It also affects scheduling with possible escalated costs due to the correction of deficiencies.

The internal auditor is interested in any of these deficiencies and their effect on costs. A better understanding is achieved by becoming involved in these areas.

A certain amount of protection against defective work can be written into contracts. The American Institute of Architects has the following recommended wording for the correction of work:

The Contractor shall promptly correct all work rejected by the Architect as defective or as failing to conform to the Contract Documents whether observed before or after Substantial Completion and whether or not fabricated, installed, or completed. The Contractor shall bear all costs of correcting such rejected work, including the cost of the Architect's additional services thereby made necessary.¹⁹

Some contractors, particularly those on cost-plus for the construction of major facilities, will not accept such a clause in their contract unless they are allowed to add a contingency to their fee to cover such potential costs. Quite often, the proviso regarding the correction of defective work is limited to that defective work occasioned by negligence. While such wording is

¹⁹loc. cit., p. 17.
better than nothing, it does leave much to be desired. Negligence is not defined. Contractors tend to define such negligence as wanton or gross negligence. Such negligence is extremely rare and difficult to prove. A better definition, which if exercised, is that found in Webster's Seventh New Collegiate Dictionary which defines negligence as the "failure to exercise the care that a prudent person usually exercises." Many project deficiencies and mistakes should fall under this definition. Exercising this contractual provision can result in cost recoveries.

**Engineering Changes**

Engineering changes may affect costs and as such the internal auditor should become involved to the extent that he has a complete understanding of the effect such changes may have upon costs.

Changes usually result in extra work charges. Extra work charges is an area that must be monitored closely. This will be covered in depth later in the following chapters.

Generally, it is preferable to establish that minor

---

changes in the work will not involve any additional cost by the owner. The American Institute of Architects recommend the following wording for minor changes:

The Architect shall have authority to order minor changes in the work not involving an adjustment in the Contract Sum or an extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes may be effected by Field Order or by other written order. Such changes shall be binding on the Owner and the Contractor. 21

The prime concern for any extra work charge is its legitimacy, its effect on the total cost and, of course, the budget estimate. A budget can grow out of all proportion if changes are not minimized and limited to only the essential engineering changes.

Labor Management

One of the most expensive cost-loss areas is that of work stoppages. These are lost man-hours that must be retrieved to maintain schedules. The retrieval of these lost man-hours is usually more costly due to increased rates later in time or due to increased costs due to overtime.

The Edison Electric Institute reports the following tabulation of work stoppage for investor-owned power

21op. cit., p. 17.
plant work in 1969:

Work Stoppages by Categories—1969

<table>
<thead>
<tr>
<th>Category</th>
<th>Stoppages</th>
<th>Hours Lost</th>
<th>Picket Lines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jurisdiction</td>
<td>139</td>
<td>1,089,927</td>
<td>30</td>
</tr>
<tr>
<td>New Contract Negotiation</td>
<td>50</td>
<td>634,074</td>
<td>7</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>48</td>
<td>201,755</td>
<td>10</td>
</tr>
<tr>
<td>Discharge</td>
<td>38</td>
<td>121,113</td>
<td>4</td>
</tr>
<tr>
<td>Working Conditions</td>
<td>22</td>
<td>17,442</td>
<td>2</td>
</tr>
<tr>
<td>Contract Interpretation-Application</td>
<td>8</td>
<td>21,513</td>
<td>2</td>
</tr>
<tr>
<td>Pay Demands</td>
<td>19</td>
<td>90,057</td>
<td>4</td>
</tr>
<tr>
<td>Inter-Union</td>
<td>9</td>
<td>33,469</td>
<td>2</td>
</tr>
<tr>
<td>Supervision</td>
<td>7</td>
<td>2,725</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>340</td>
<td><strong>2,212,075</strong></td>
<td><strong>61</strong></td>
</tr>
</tbody>
</table>

At approximately $5.00 to $8.00 per hour, it can be seen that the amount of this cost-loss is immense.

The owner's representative should sit in on contractor-labor meetings involving any disputes to ascertain whether any unfair labor practices are taking place.

Most work stoppages that arise out of disputes are not unfair from a legal viewpoint. Labor is exercising their right. From a management viewpoint, many of the reasons for the work stoppages appear ridiculous. For instance, a stoppage may occur because the craft may be notified that there will be no more Saturday work. The craft may object and walk off the job.

A craft may walk off the job because a new business agent may require them to attend a funeral of an ex-business agent.

There may be gross walk-offs because it is a nice afternoon.

In many cases, walk-offs may occur because the contractor does not correct a jurisdictional dispute fast enough to suit a craft.

The internal auditor should be aware of all the labor problems and their ramifications. These problems play a large part in understanding the direct audit of the payroll records and other costs.

From the above discussion, it is apparent that non-accounting items do have a direct relationship to accounting items. Therefore, operational auditing by the internal auditor should encompass the entire contract and its administration.

The following chapters will cover in depth many of the internal auditing situations unique to their respective types of contracts.
Lump-sum construction contracts look easy and sound easy to audit. Many times they are easy to audit. A simple rule of thumb is that the smaller and simpler the job and, of course, the price, the easier the lump-sum construction contract is to audit, as a rule. The internal auditor should not be misled by this belief. Anything can happen and usually does. A. J. Gregory has the following comments to make regarding lump-sum construction contracts:

Simple lump-sum contracts which provide that specified construction work is to be performed for a fixed stated sum do not require specialized auditing procedures. A determination must be made by the company's engineer-in-charge that the work has been performed in accordance with the specifications of the contract; the auditor is then concerned only that payments authorized by the engineer are made in accordance with terms of the contract. This does not mean that these contracts warrant only a superficial review by the auditors.¹

A lump-sum construction contract is a contract whereby a contractor agrees to perform definitely described and fixed amounts of work for a fixed price. The lump-sum

---

construction contract has all the sections as mentioned in the previous chapter. The price section will vary depending upon the type of lump-sum contract and the use to which it is placed.

Type and Use of Lump-Sum Construction Contracts

The internal auditor should be aware that there are various types of lump-sum contract arrangements as well as their limitations, the proper time and place to use lump-sum contracts, and thereby be prepared to conduct his audit accordingly.

In general, the lump-sum construction contract may be utilized when the quantity is known and the plans and specifications are definite, clearly defined, and complete. To use the lump-sum contract otherwise usually leads to excessive contingency in the bids or excessive change order charges. If the specifications are poorly written, the contractor could furnish and/or construct the work in accordance with his interpretation. This could be contrary to the intent of the owner. If the plans contain errors, the lump-sum contractor could maintain that his bid was based on the plans as submitted. To correct the error in the plans, the owner often has to submit to extra work charges. Properly written plans and specifications curtail those contractors who bid low, sometimes
at a loss, with the hope of making a fat profit on extra work charges. In addition, the use of the lump-sum contract where the bidders have had considerable experience should be more economical than if the bidders had no prior experience. This would also be true in those cases where the type of construction is of a repetitive nature rather than a new or unique type of construction.

Furthermore, the smaller and simpler the type of construction work to be performed, the less chance there is for extra work charges and paying for excess contingency. The lump-sum construction contract is particularly well suited to small jobs or small portions of large jobs as subcontracts. The Internal Auditing Procedure Manual offers the following explanation for the use of lump-sum contracts:

This type of contract is used where it is possible to specify the quality and quantity of the particular commodity, work, or service desired. Specifications can be drawn up and submitted to various vendors or contractors solicited for bids. It is important, when reviewing the bid inquiry file, to determine that all vendors or contractors solicited were a representative group of the existing market and that they all bid on the same specifications.2

Ordinary Lump-Sum Construction Contract

This type of contract is also known as a fixed or firm price contract. Because the contract price is fixed for the work to be performed, the contractor is assuming all the risks and exposure including a possible monetary loss. Therefore, to compensate for this risk, the contractor, more than likely, has built a contingency into his fixed contract price. This is the reason why the lump-sum construction contracts are not normally utilized for major facilities or large subcontracts.

The contingency would be larger and therewith a total cost greater than the owner may be willing to incur. But in this day and age of specialization, the use of lump-sum construction contracts can be very economical when placed with specialty contractors for their specialty services.

The firm fixed-price contract is defined as follows by George J. Penick:

This contract is now regarded as suitable for use in procurements when reasonable definite design or performance specifications are available and whenever fair and reasonable prices can be established at the outset.  

---

The ordinary lump-sum construction contract should also be of a short duration. Long duration lump-sum construction contracts would also have additional contingency to provide for unforeseen events and future price increases for labor and material. Such a contingency should not be necessary for those contracts of approximately a year or less.

**Lump-Sum Construction Contract With Escalation**

There are times when the owner and the contractor may wish to write a construction contract or subcontract for a lump-sum when all the conditions favor a lump-sum contract except for the duration. The duration in these cases may be for as long as three, four, or five years. And, as mentioned above, future labor and material cost in this day and age will increase, but the amount of the increase is unpredictable. Therefore, the lump-sum bids will be requested or offered based on firm labor and material costs effective or to be effective to a certain date, usually in the near future. There are also other reasons. Among these, some contractors will not bid long term lump-sum contracts because of unforeseen and unstable labor and material costs. Therefore, to remove the risk for the responsibility of the contractor or to eliminate excess contingency costs, these contracts are
also written with a price firm to an effective date. Beyond the effective date or dates, the increase or possible decrease of labor and/or material costs will fluctuate and will be for the owner's account.

One method that is used to adjust labor and material cost is with the use of indexes, such as the labor, material, and consumer indexes announced by the Federal Government. The proper index may be used as a multiplier to the contract base total or to monthly bases on progress payments. The monthly method is more accurate than a one-shot application and as such should be considered the preferred method of the two. Further, the indexes may be used to key the use of different price ranges or step-type amounts that could be added to the base price. It is clearly important that the use of keys and indexes as well as the bases be specific and clearly defined. Without the proper caution, the wrong index or the index for the wrong month may be applied in error.

There are many other methods for reimbursing a contractor for escalated costs above the base lump-sum price. Probably, the most common method is that whereby all or part of the costs above the base labor and material costs is reimbursable to the contractor. On this basis, the escalation costs come under the cost-plus
category. Naturally, the contract should refer to such escalated costs as actual costs.

While lump-sum construction contracts with escalation may be economical from a furnish only standpoint, this writer can see no advantage to such a contract for construction or erection only, unless such construction or erection is a definite specialty. Cost-plus arrangements are more economical. Many of these lump-sum escalation contracts arise mainly on a furnish basis for large or major components being custom built for electric generating facilities. These furnish type contracts may include erection as part of the cost or as an option with the erection portion of the cost being a relatively small portion of the total lump-sum cost. Major components that are purchased on this basis are steam generators, condensers, turbines, nuclear steam supply systems, etc. On this basis, the bid award will probably be a function of the component price and with the erection price tagging along as part of the total package. It is preferable that the erection on this type of bid be requested as an option. A feasibility study can then be made to decide on the most economical contractual method for erection.
Control of Lump-Sum Construction Contracts

The audit review for lump-sum construction contracts varies depending upon the contract make-up which ranges from simple to complex. For instance, it is possible that the contract has but one fixed price to do some work that takes one day. The material and erection meet the specifications and operate satisfactorily. The contractor invoices for the fixed price. Obviously then, if the quality compliance is satisfactory and the invoice amount agrees with the contract amount, the invoice can be paid. The internal auditor's task of reviewing these transactions is simple.

On the other hand, suppose the contract is with escalation and of a long duration compounded by a number of fixed prices with alternatives making up the total package. The internal auditor's task, in this case, is not as simple. Continual monitoring of the material being furnished is necessary to ascertain that all of the many items meet specifications, that the owner is receiving the correct quantity contracted for, that the material is being erected in accordance with the plans and specifications, that the owner is properly billed for what was contracted, received, and erected at the proper contract price, and that all escalation charges
are properly documented, checked, and approved. The internal auditor should not underestimate the complexities that arise in a lump-sum construction contract. Many of these contracts cost many millions of dollars each and, therefore, deserve close attention.

Anton Steven lists a number of questions that should be answered while reviewing lump-sum construction contracts:

We must ask ourselves the question—"Are we receiving what we contracted for?"

1. Is the material used of the quality and quantity mentioned in the specifications? Some responsible company employee should report on the materials used or installed, and compare these with drawings, specifications, etc., given in the contract.

2. Does the performance or use of the equipment, building, service, etc., live up to the qualifications mentioned in the proposal and contract?

3. Has some responsible person certified to the quality and quantity of material used, and performance prior to final payment?

4. Items billed on invoices should be shown in such manner and detail that they can be identified with the same items in the proposal and contract. This avoids confusion as to what is being billed and aids in the verification or checking of invoiced items with units agreed to in the contract.  

---

Steven, Anton, "Negotiation and Control of Construction Contracts." The Internal Auditor (September, 1955), p. 49.
Inasmuch as it is intended that this chapter should also apply to the internal auditing of subcontracts, it is important that the proper controls exist in drawing up lump-sum construction contracts as well as obtaining bids, reviewing the bids, and executing the lump-sum construction contracts.

The internal auditor should verify that requests were made to contract the work on a lump-sum basis and, after reasonable justifications and feasibility studies, verify that approval was given to contract on a lump-sum basis. The type of material that is to be furnished and/or the type of work that is to be performed should be clearly defined in the specimen contract and supported by specific and complete plans and specifications.

The internal auditor should verify that the bid proposal was awarded to the lowest bidder and, if not, review the basis for awarding the contract. In turn, it should be verified that the contract award has the proper approval and the contracts signed by persons authorized to sign such documents.

Before any contractor starts work, the internal auditor should ascertain the insurance requirements of the contractor and that the evidence of such insurance coverage is on file and up to date.

Sometimes bid bonds and performance bonds are contractual requirements. The internal auditor should
review such requirements for approval of the requirements and compliance of the requirements. If the cost of the bonds being furnished is separate from the fixed price of the contract, the internal auditor should obtain comparison prices to be sure that the owner has been subjected to reasonable costs. Sometimes, a bond cost may be excessive due to the incorrect risk information that was furnished the bonding company. The internal auditor should also verify that the bond has been executed and is in force during the execution of the contract. The contract should contain a clause that requires ample notification by registered mail to the owner if the bond is canceled for any reason.

Before the contractor starts work or shortly thereafter, the contractor should submit a sample invoice for review. It is also desirable that a meeting be scheduled with the contractor to discuss and arrive at a mutually agreeable invoice format. So often, the requirements of the owner are not relayed to the contractor and, as a result, unsatisfactory invoices are submitted.

The invoice should be earmarked as a partial invoice or as a final invoice. The contract number should be shown on the invoice. If the invoice is based on a percentage of completion, rather than a contractual payment schedule, the invoice should show the total percentage
to date along with the respective amounts. The previously totalled invoiced amount before retention should be shown and deducted from the current total to date. Retention is a monetary amount withheld by the owner to guarantee performance and completion of the work and correct defective work by the contractor. The difference between the current total amount to date and the previous total amount to date is the amount of the current partial invoice. The retention on the current partial amount should then be deducted. The balance is the amount to be paid to the contractor. Under this approach the invoice reflects only the current retention and not the total retention. Therefore, the invoice should include a retention schedule showing previous retained amounts, retention for the current period less retentions paid, and the current total to date retention. It should be emphasized that there is a difference between amounts invoiced and amounts paid when retention is involved. Current escalation and approved change order work should be itemized separately, be properly identified and supported, and added to the current partial amount. The retention should then be deducted from the combined current total. A schedule for escalation and approved change order work to support the current charges should be included. This schedule
should be assembled in the same manner as mentioned above for current and previous total to date amounts.

Once the invoice format has been mutually agreed upon, the contractor may then commence invoicing as soon as required or contractually allowed.

During the progress of the work, the internal auditor should ascertain that the material being furnished and/or erected by the contractor meets with the plans and specifications as to both quantity and quality. Before final retention is released to the contractor the internal auditor should ascertain that the material, etc., furnished and/or erected by the contractor performs satisfactorily and is, in fact, in accordance with the specifications. The internal auditor should enlist the participation of the owner's engineer experts in verifying the compliance to the technical specifications. These engineering experts are also internal auditors in their own right.

Many contracts provide for the contractor to invoice on the basis of the percentage of completion. The internal auditor should verify that the percentage of completion being invoiced is the same as the percentage of completion for actual construction which was completed as of the date of the invoice. It is not uncommon for a contractor to indicate a higher percentage of completion
on an invoice than is actual fact. Further, some contractors will try to invoice for stockpiled materials by invoicing for a greater completion percentage than actually exists. If the material is on the owner's property, the contractor would appear to have a reasonable claim. But as long as the contract does not provide for the payment of stockpiled materials, such attempts to invoice for these materials by overstating contract price items should be discouraged. But if the owner feels the contractor should be reimbursed for stockpiled materials then a contract change order should be written to officially provide for such payments.

As mentioned above in Anton Steven's\textsuperscript{5} list of questions, it is extremely important that all invoice items be worded and identified so as to leave no doubt in anyone's mind that a specific invoice item refers to the same contract item. If fact, it is preferable that the contract price and its related provisos be so prepared and arranged that it can be easily utilized as part of the invoice format. Primary air piping is often duct type piping and the primary air ducts are part of the draft system for the boiler. It would be easy to invoice for fifty feet of primary air piping one time and at a

\textsuperscript{5}ibid.
later time as one lot of boiler duct. To the unknowing, such a rewording of an invoice could appear legitimate. Therefore, all invoicing should utilize the same language as the contract. The possible use of wording different from the contract should also be considered when reviewing all contractor's requests for subcontractor change orders for extra work.

**Escalation Based On Costs**

Having worked for awhile on ordinary lump-sum contracts, the internal auditor will have a more difficult task when the escalation invoice is submitted for review. The internal auditor should first ascertain how the escalation base is defined in the contract and how the escalation is to be computed and then verify that the invoices comply. It is preferable that escalation based on costs be on an actual cost basis.

The rules for cost-plus invoices apply when escalation based on cost charges come to fore. This means that certified payrolls, union agreements, copies of fringe benefit payment reports, etc., should be furnished to support the escalation charges. Copies of union agreements and price lists in effect before and after the effective escalation date should also be furnished to document and support the contractor's escalation charges. Chapter V will delve into the ramifications of
cost-plus charges.

Anton Steven relates two cases involving incorrect escalation as lump-sum contracts:

If an escalator clause is necessary, it should define the base and give the method to be used in computing escalation. Here many of the points applicable to cost-plus contracts also apply. You would want certain supporting evidence in the case of escalation billing. One of the points to keep in mind in escalation charges is the relationship between escalation increase dates and shipping dates.

There was the escalation case of a large equipment manufacturer overbilling a company $4,800. The facts were these:

The escalation clause allowed increases in accord with the industry price. The increase date was May 18, allowing a price increase of about $4,800 on two units. The units were invoiced and shipped June 3 after the increase date.

However, the auditor in his review of the purchase order file noted a bit of correspondence stating that the units would be ready late in April and that storage space was available. Upon further inquiry, it was determined that the units were actually completed and stored prior to the increase date. The old invoices were canceled and new invoices, less the $4,800, were issued.

There are numerous other cases where the contractor did not recognize the actual material or labor increase dates but applied escalation to all material and labor. A case of this nature involved a painting contract.

A painting subcontractor submitted an invoice for escalation amounting to $6,700. The escalation was based on a 25¢ per hour increase in painters' wages and, four months later, a 7-1/2¢ per hour increase in welfare fund payments. An audit of company records and subcontractor's time records disclosed that the escalation was in excess of what the subcontractor was entitled to by $1,700. Computation of the escalation by the contractor was based on an
estimate of work completed on the effective date of the increases, whereas the verification of the escalation invoice by the auditor was based on application of the increases to man-hours of labor on and after their effective dates.\(^6\)

Dates become important evolution points for escalation charges and as such become the control keys that the internal auditor must utilize to unlock any possible escalation charge deficiencies. Another important point brought out above is that the effective dates of fringe benefits do not always parallel wage rate increases. This is not unusual and, therefore, is an escalation variable for which the internal auditor must always be watchful.

**Escalation Based On Indexes**

The internal auditor should verify that the indexes and methods used to compute the escalating charge are in accordance with the contract conditions as well as verifying that the index applicable for a particular date was applied to the proper period base on the invoice.

**Change Orders for Extra Work**

Any and all changes and all charges for changes should be covered before the fact by properly approved

\(^6\)loc. cit., pp. 44-45.
contract change orders. The change order provision for extra work is the Achilles' heel of lump-sum construction contracts and of unit-price construction contracts, too, for that matter.

Many lump-sum construction contracts and subcontracts are written without any provision for the reimbursement of extra work. There are three philosophies for the lack of such provisions:

1. All parties inadvertently overlooked it; therefore, the extra work cost provisions were forgotten.

2. Someone was overly optimistic that no extra work would take place; therefore, it was felt that no extra work cost provisions would be required.

3. Someone considers it good psychology not to provide extra work cost provisions in the contract, thereby hoping the contractor will assume that extra work charges are not legitimate and should be part of the fixed price.

All three philosophies are examples of negligence or wishful thinking. The lack of any extra work cost provisions will definitely leave the owner in a weak position and permit the owner to be subject to the mercy of the contractor. When the extra work is to take place, the owner is almost forced to use the same contractor. It is not generally feasible to move another contractor onto the job to perform the extra work. Therefore, since the contract did not provide any extra work cost provisions, the contractor could charge any exorbitant
rate he so desired. While many contractors are reasonable and fair on extra work charges, there are also many other contractors who are not fair.

Therefore, it should be considered mandatory that all lump-sum contracts and subcontracts provide a definition of cost, clearly defined, for any possible extra work charges. In addition, no extra work should be allowed to commence before the work is authorized by the owner. Anton Steven states:

However, you do want an understanding on the following:

1. Extras or changes are to be authorized in writing and price agreed to in advance of the work.\(^7\)

Extra work can be reimbursed on a lump-sum, unit price, or cost-plus basis. It is even possible that all three types may be used on the same contract to reimburse for extra work. While it is possible to provide for extra work in the original contract on a unit price or cost-plus basis, provision for lump-sum extra work is difficult as the scope of the extra work is not known. Therefore, lump-sum extra work should be discouraged. Lump-sum extra work charges should, if used however, be quoted before the extra work is performed. Another

\(^7\)loc. cit., p. 44.
method which is preferred over the aforementioned method and often used is a cost-plus detailed estimate of the work, the total of which is converted into a lump sum. This method is feasible for analysis and audit.

Provision for cost-plus extra work automatically requires that the rules and controls for cost-plus contracts be utilized. Payrolls or payroll extracts, vendor's original invoices, etc., should be required to support the cost-plus extra work charges. In addition, all expenditures should be properly authorized by the owner.

The internal auditor must be exceptionally watchful of all extra work charges, especially to the extent that the owner is not charged via extra work invoices for any item that the contractor should have included as part of the original lump-sum contract. Labor and materials that are not part of the extra work but are reimbursed to the contractor as extra work means more profit to the contractor on his lump-sum. Because of this possibility, the internal auditor should place an additional emphasis on all the audit steps in his extra work audit procedures. Anton Steven concurs with these thoughts when he states that:

In some cases the "extras" are let on a cost-plus basis. You then must exercise exceptional care to avoid duplication of charges which are covered by the firm price contract.
An example of such a case involved a contract for a building—the low bid was approximately $190,000. There were 48 change orders of about $27,000. About $15,000 of the change orders were on a cost-plus basis because of unknown factors connected with the foundation work. In auditing the contractor's records, it was determined that he overbilled the company net $1,000.

He had billed for reinforcing rods used on the main contract. He had billed on the foundation extra for concrete used on the second floor and the roof. He had underbilled about $340 on excavation work. He had overbilled about $300 on insurance.8

This case points out that not only must the monetary charges be monitored closely, but also that the labor and material quantities must be monitored even more closely.

This case also points up why it is desirable not to contract on a lump-sum basis. There were too many unknown factors as well as obviously incomplete plans and specifications. Forty-eight change orders are far too many change orders for any kind of contract.

As mentioned previously, the bid instructions and the contract should state that the lump-sum amount should be based on a forty-hour or straight-time work week. On this basis, and if the owner requests the contractor to work overtime, then such overtime work should be authorized in writing or by change order. The contract should

8 loc. cit., p. 44.
state that the owner will be liable only for the actual cost of the premium portion of the overtime cost.

The internal auditor should ascertain that the proper documents such as payrolls, etc., have been furnished to support such premium portion costs and that the owner is in fact reimbursing the contractor the correct amount for any such premium portion costs of overtime. The internal auditor must also be extremely watchful that such overtime was actually worked.

Once the walls of the lump-sum contract and its fixed price are breeched, the internal auditor will find that the required effort to monitor and control the overflow of the extra work far exceeds that of a cost-plus construction contract.

The unit-price construction contract which is in reality a lump-sum for a stated unit will be discussed in the next chapter.
CHAPTER IV

INTERNAL AUDITING OF UNIT PRICE CONSTRUCTION CONTRACTS

The unit price construction contract or subcontract fulfills a very useful function for the public utility construction industry.

Type and Use of Unit Price Construction Contracts

While the unit price construction contract can be utilized when the total quantity is fixed or definite, it is where the quantity is not definite or known that the unit price construction contract is the most useful.

Actually, if the quantity is known and all the other rules and controls applicable to lump-sum contracts are fulfilled, the work may be let on either a lump-sum or a unit price basis, with the unit price basis being preferable over a lump-sum basis.

But when the total quantity is not definite or known and the work is composed of definite, fixed, or measurable units of the same physical quantity and quality, then the unit price should be used. Because the unit itself has quantity and quality dimensions and because all the rules and controls applicable to lump-sum
contracts are also applicable to the unit price, then it can be reasoned that each unit price is in itself a lump-sum price.

The Internal Auditing Procedure Manual offers this definition for the use of unit price contracts:

This type of contract is used where certain operations or services are to be performed or definite units of physical items of certain quality are to be provided and can be measured in some manner of units, but the final quantities to be provided are indefinite.

The unit price is readily applicable to such construction work as excavation and associated work, dredging, concrete work, steel work, asphalt work, pipelines, transmission lines, road work, etc.

Such work may be measured by the unit, each, foot, yard, square foot, square yard, cubic foot, cubic yard, pound, ton, hour, day, week, month, year, gallon, etc. Units such as these are established standards of measurement. Therefore, the variable that controls the price per unit is what is furnished and/or done to the unit.

Therefore, it is important that the wording of the specification be specific and clearly defined as to exactly what is involved in the measurement of the unit.

---

variable. The internal auditor can be very helpful in writing these specifications to the extent that his audit experience and knowledge can be beneficial in eliminating any pitfalls and providing coverage for any omissions.

Even though the quantities are not definite or known, the quantities should be estimated for bidding purposes and included in the bid instructions so that all bidders can bid on the same basis. The internal auditor should verify that this was done in addition to verifying that the same bid package was sent to all bidders.

The quantity estimates also provide a common ground for evaluating the bids. The internal auditor should verify that the bid was awarded to the lowest bidder and, if not, ascertain that the reasons were justified and properly approved.

While some contractors may maintain that the estimated quantities should not be a part of the contract document and only show the unit price, it is preferable that the estimated quantities be included in the contract document. Their inclusion serves two purposes. First, the estimated quantities can be converted into dollars for commitment and cost control comparison purpose. Second, the estimated quantities serve as general
target guide for invoice auditing purposes. This is supported by the Internal Auditing Procedure Manual in that:

Invoiced quantities should be compared with the contract and any differences supported by revised drawings or specifications, complete with reasons for the changes and approval by both parties.\(^2\)

In fact, it is preferable that any differences or changes also be covered by an approved contract change order.

From time to time, while evaluating unit price bids, the internal auditor will discover that a few unit prices from some bidders are much higher than others while, at the same time, those bidders with the higher unit prices on some items will be considerably lower on other items. Yet the total based on an extension of the unit prices for the estimated quantities from the bidders may be reasonably close. While the total evaluation should govern the search for the low bidder, further examination of the bids by the internal auditor may reveal that those unit price items priced higher than the normal bid by others may be those items scheduled first during construction.

If this particular bidder should be awarded the contract, a number of things could happen:

\(^2\)ibid, p. 12.
1. The higher unit prices for the early schedule items result in the payment of excess monies to the contractor earlier than normal, upsetting the overall cash flow control.

2. The overpayment tends to defeat the retention system.

3. The additional cost of money due to an earlier payment schedule could have an effect on the budget estimate.

4. The additional cost of money (interest) on the advance payment of excess monies may result in higher overall cost. The low bidder would no longer be the low bidder.

Therefore, the internal auditor should be watchful for this type of bidding and, if it exists, the cost of money, etc., should be considered in the bid evaluation.

Control of the Unit Price Invoice

Each invoice should be verified by the internal auditor that the proper contract number is shown. Those invoices or estimated invoices made during the progress of the work should be entitled partial invoice, and the last invoice upon the completion of the project should be entitled final invoice.

The invoice should include a summary of previous total to date invoices before retention, the current charges before and after the current retention, and the new current total to date invoiced before retention together with any supporting documents as may be required by the contract or necessary to support and document.
the current charges, all of which should be verified by the internal auditor.

The charges for extra work should be shown separately and properly identified with the appropriate approved contract change order. The internal auditor should verify, if any extra work is on a cost-plus basis, that all the rules and controls covered in Chapter V for cost-plus construction contracts are adhered to including the submission of certified payrolls, original vendor invoices, etc., to support the extra work charges. It is also essential that the internal auditor verify that all the contractor's charges are properly broken down in accordance with the owner's classification of accounts. An example of an ideal unit price contractor invoice breakdown is shown on the following page. Such an invoice segregates the component charges into areas compatible to similar such contract items or units to facilitate and simplify auditing while at the same time keeping the costs orderly.
**Contractor Name**  
Invoice for Contract Number 00

**Invoice Date**

**Quantities**

<table>
<thead>
<tr>
<th>Item or Unit</th>
<th>Current</th>
<th>To Date</th>
<th>Price</th>
<th>To Date</th>
</tr>
</thead>
</table>

**Contract Work for Period Ending X**

**Change Order Work**

**Change Order Numbers**

Previously Invoiced

Current Change Order Number

Current Change Order Number

**Total to Date**

**Less Total Previously Invoiced**

**Current Invoice**

**Less Retention**

**Amount Due**

**Account Distribution**

<table>
<thead>
<tr>
<th>Work Order Number</th>
<th>Current Invoice</th>
<th>Total To Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Account Number</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Account Number</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Account Number</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Total</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
Control of the Unit Variable

The unit variable is a function of the type of work performed. While the unit rate is contractual fact, it is the unit variable or quantity that must be measured. Therefore, it is the internal auditing of the unit variable associated with various, but specific, work areas that requires further consideration. The work areas that will be considered are excavation and associated work, dredging, and concrete work.

**Excavation and Associated Work**

The internal auditor should ascertain how the unit variable is contractually measured and then verify that the actual measurements are in accordance with the contract and shown properly and accurately on the invoice.

Two examples of a contract measurement and payment description with an option covering excavation and filling is as follows:

1. The unit of measurement to excavate from the high site areas, haul, and place in low site areas, site dirt in 8" layers will be the cubic yard. The quantity to be paid for will be the total number of cubic yards of dirt excavated, hauled, and placed as measured in the low areas and computed by the contractor from volume
computations obtained by a combination of actual survey and theoretical neat lines. Bottom of low areas will be established from actual field survey, aerial photographs, or cross section of the grades existing. Sections will be plotted every 100 feet and at abrupt changes in grade. Final top of low areas will be the theoretical line to slope and grade shown on the plans and as plotted theoretically on the 100 foot station cross sections. Intermediate top of low areas for monthly progress estimates will be made by the contractor from aerial photographs, transit and level survey, inspector's tape measurements, or inspector's load count all as the contractor may decide. No allowance will be made for overfill, unsuitable material, wasted material, bulking, shrinkage, or material removed that does not comply with the specifications. The unit price shall include all costs and expense of excavating the material from selected areas of high ground, loading, hauling, dumping, spreading on fill to required layer thickness, breaking of clods, moisture control, and preparing the material for compaction.

2. Should circumstances occur that the contractor is required to place the site dirt in stockpiles, he shall excavate from high ground, haul and store by dumping, spreading, and compacting in stockpile areas. The unit of measurement will be the cubic yard. The amount to be paid will be the total amount stockpiled, as
measured by the contractor from sections, calculations, or load count at his discretion. The unit price shall include all costs of excavating, hauling, dumping, spreading, compacting, and maintaining the stockpile.

General excavation, hauling, and filling is generally measured by the cubic yard moved. The excavated material may be moved by a clamshell or dragline cranes, bulldozers, motor scrapers or excavators, conveyors, trucks, etc.

Some modes of measurement relate to the size of the equipment used. The internal auditor may check equipment name plates for size data. Other sources to check equipment sizes and capacity data are found in the Green Guide and the Associated Equipment Distributors' Compilation of Nationally Averaged 1969 Rental Rates. The need to know capacities of equipment becomes apparent when excavation is measured by load count. The average capacity times the number of loads equals the quantity of units. The internal auditor should take a sufficient sampling of loads to determine that the average number

---


of units per load is reasonable and properly represents the average capacity used for invoice purposes.

The internal auditor will also want to verify total load counts. Sampling of the total may be verified by timing the cycles of the equipment. The average time per cycle times the average load capacity times the number of pieces of equipment used per day should yield a reasonable testing of the quantity. The internal auditor should watch the contractor's repair shop to determine how much time is involved in repairs and its effect on the number of pieces working all day. The internal auditor should also test under different weather conditions as well as different soil conditions for accuracies of load counts. These conditions can cause variations.

Since none of this type of work is actually metered, a cross-check should be utilized to verify a different method of measurement. The load count may be used to verify aerial survey, instrument surveys, and job plans cross sectioning or vice versa. Competent technicians can measure changes in volume by aerial photograph comparisons, by actual measurement with transit, tape, and level rod, and by utilizing a planimeter on a cross section. Care should be taken not to include too large a section for each measurement. For instance, on a scale of 1" to 50', the pencil line width could mislead the area reading of a planimeter. The internal auditor
should work closely with these technicians in verifying contractor's invoiced quantities.

**Dredging**

The internal auditor should be familiar with the technique utilized in measuring underwater removal of material. The total area is cross-sectioned on the plans with similar reference points on land areas. With a line marked at specific intervals and strung across the water, a boat with sonar equipment measures the depth at the specific intervals along the line before and after dredging. The readings are entered on the cross-sectioned plans and the change in volume calculated. By taking part in these procedures, the internal auditor can attest to the validity of the contractor's invoiced quantities.

**Concrete Work**

The concrete for facilities is normally measured by the cubic yard. The unit price varies according to the mix, total volume, and the site conditions surrounding the concrete work. E. E. Seelye furnishes the following brief specification for concrete:

*Fixed Ratios.* The concrete shall be proportioned as shown on the plan, by volume. The total water content shall be not more than ____ gal. per sack of cement and the slump shall not be greater than
4 in. for any mix. This concrete shall develop a strength of ____ lb. per sq. in. at 28 days (2,000-3,000 pounds per square inch being the rule in most cases). For each 150 cu. yd. of concrete, 4 cylinders shall be taken in accordance with A.S.T.M. Specification D-31, 2 of which shall be broken at 7 days and 2 at 28 days.

**Controlled Concrete.** The contract shall furnish concrete which shall develop a strength of ____. The strength is to be determined by 4 cylinders for each 150 cu. yd. of concrete . . . of which 1 shall be broken at 7 days and 3 at 28 days . . . .

**Cement.** All cement shall be Portland and shall conform to the A.S.T.M. requirements C-150-Type I, and shall be tested by a laboratory selected by the engineer.

**Sand.** Sand shall be capable of developing 90% of the tensile strength of standard Ottawa sand. Samples shall be submitted for the engineer's approval and for testing. Sand shall not contain more than 3% clay. Sand shall not show darker than a very light amber when tested by the colorimetric method. The size of the sand shall be such that not less than 85% shall pass through a 1/4-in. sieve, not more than 30% through a 50-mesh sieve, and not more than 5% through a 100-mesh sieve.

**Stone or Gravel.** Aggregate shall be composed of hard crystalline rock or gravel, free from shale or decomposed pieces. It shall be uncoated and clean; samples shall be submitted to the engineer for approval . . . . The water shall be clean.

The internal auditor should be familiar with specifications and the controls inherent therewith. It is not enough that the internal auditor just verifies the unit price contract rates and extensions on the contractor's

---

invoices. The internal auditor should verify that the quantity of concrete placed is in fact the same as the quantity invoiced. In addition, since there are different strengths and mixes of concrete, the internal auditor should verify the quantity relating to individual types. For instance, by observing concrete cylinder testing, reviewing concrete cylinder test reports and other concrete lab reports, the internal auditor can verify that the concrete is or is not the same as that invoiced.

From time to time, admixtures such as air-entraining agents which retard the setting of concrete are added to concrete at an alternative unit price. The internal auditor can determine that the admixture has in fact been added to the concrete by observing the concrete mixing at the batch plants and by reviewing lab reports.

Likewise, the internal auditor can review testing lab reports on aggregate and other component test reports. He should also visit the site testing labs to witness such tests. Variations or failure to comply with concrete specifications can cause serious consequences and monetary losses to the owner if these areas are not monitored and controlled.

Unit price construction contracts are very interesting from an internal auditing viewpoint because it
involves the verification of the unit variable.

But far more involved and interesting is the internal auditing of cost-plus construction contracts. This area is far and away the largest of all construction contract auditing. The internal auditing of construction contracts is covered in the following Chapter V.
CHAPTER V

INTERNAL AUDITING OF COST-PLUS
CONSTRUCTION CONTRACTS

There are many varying factors to be taken into consideration in the auditing and control of cost-plus construction contracts. These factors and their correlated internal controls depend, first, upon the type of cost-plus construction contract with respect to the fee factor covering the facility to be engineered and constructed, and second, upon the degree of internal control built into the various articles of the contract and existing under actual field conditions for the other varying factors. Most of the other varying factors revolve around the contractual definition of reimbursable and nonreimbursable costs. The other varying factors considered in this chapter are:

1. Field Manual Labor Costs
2. Field Nonmanual Labor Costs
3. Home Office Labor Costs
5. Field Nonmanual Labor Indirect Payroll Costs
6. Home Office Labor Indirect Payroll Costs
7. Permanent Material
8. Temporary Material and Facilities
9. Tools and Supplies
10. Construction Equipment
11. Subcontracts
12. Taxes
13. Insurance
14. Other Field Costs
15. Other Home Office Costs

93
There are many pitfalls and ramifications to be encountered while auditing the above factors. Knowledge of these possible encounterments is helpful in the development of adequate audit programs, in the development of more effective contractual conditions providing internal control, and in resulting cost savings.

Type of Cost-Plus Contract

The cost-plus type construction contract is quite often utilized on a large construction project when the design, specifications, costs, etc., are not far enough along to allow a unit price or lump sum contract. A contractor would have to include too much contingency for unforeseen factors, thereby making the cost of the unit price or lump sum contract prohibitively high. This is confirmed in the Internal Auditing Procedure Manual whereby it states that:

Cost-plus contracts are usually used wherever competitive bids are unobtainable because of unpredictable physical conditions or because of unstable labor and material markets.¹

The cost element of the cost-plus construction contract refers to those reimbursable labor, material, and


Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
other items, except fee, enumerated above. The degree of cost varies from actual to percentage applications to fixed amounts for some or a greater portion of the varying factors.

The plus element refers to the fee factor. The fee factor can take the form of a fixed percentage fee of some portion or all of the costs, a sliding scale percentage fee of some portion or all of the costs, a percentage as the above two types with ceilings or limitations, a fixed or lump sum fee, a target-sharing or incentive fee, or a combination of any of the above. The Internal Auditing Procedure Manual refers to the following types of cost-plus contracts:

1. Cost plus a fixed fee
2. Cost plus a fixed percentage of costs
3. Cost plus a percentage of costs with certain limitations as to the profit factor
4. A combination of either (1) or (2) with a provision for bonus (incentive) for under-running and a penalty for over-running the estimated cost.

In contrast, G. J. Penick refers to the following types of cost-reimbursement contracts:

The same four cost-type contracts which were prescribed in the ASPR (Armed Services Procurement Regulation) prior to revision remain in force:

\[\text{\textsuperscript{2}ibid.}\]
cost, cost-sharing, cost-plus-incentive-fee, and cost-plus-a-fixed-fee.\(^3\)

The plain cost type contract would not even be considered by any contractor for the construction of an electric generating plant or compressor station unless the profit or fee was part of the cost factors; e.g., labor at $10.00 per hour while actual costs may be $7.00 for labor and $1.00 for overheads for a total amount of $8.00 and the built-in profit is $2.00 per hour. The cost-sharing type contract could be a take-off of the cost type with an incentive or penalty built in such as a target amount or schedule.

**The Fixed Percentage Fee**

The fixed percentage fee should be avoided if possible as this type of arrangement does not lend itself well to any incentive for cost saving by the contractor. The fixed percentage is based on all reimbursable costs or some portion of the costs. As such, the more costs increase, the more the contractor's profit increases. The contractor, profit-minded by nature, is not concerned with cost saving as there is no incentive for economy or efficiency. The last statement parallels a similar

statement in the Internal Auditing Procedure Manual whereby:

Under the provisions of a cost-plus contract this incentive is not present when the profit is determined as a fixed percentage of cost.  

One of the worst evils that is attributable to the fixed percentage fee is that the system encourages the working of overtime. Since most of the construction direct labor receives double time for those hours worked prior to 8:00 a.m. and after 4:30 p.m., any overtime rapidly increases costs, decreases efficiency and increases the contractor's profit.

There is one advantage, however. The contractor is usually willing to provide all the services requested by the public utility. In this respect, cooperation is at its best. The American Institute of Architects has the following comments regarding fixed percentage fees:

The advantage of the percentage method is that, on the theory that the greater the cost the greater the Contractor's service, it automatically adjusts itself to the total expenditure. Its disadvantage is that it puts a premium for the contractor on a high cost and therefore it raises a suspicion that, to swell his own remuneration, he has permitted or encouraged a high cost.  

---

4 op. cit., p. 17.

Therefore, in an effort to minimize the undesirable elements, the fixed percentage fee is sometimes limited to some portion of the costs. The most common item removed from fee applicability is premium labor costs including payroll overheads associated with the premium portion of labor costs.

Another undesirable element is that of subcontracted work subject to the same fee as the work the contractor performs. This amounts to fee on fee and should be considered undesirable. Therefore, in many cases, subcontract costs are not includible as feeable costs or the fee percentage applied to subcontract work is a lesser rate.

The application of the fixed percentage rate for fee is usually one of the last computations found on a contractor's invoice. It is essential that the internal auditor continually monitor the fee and its applicable base, including the make-up of the base. The Internal Auditing Procedure Manual\(^6\) not only confirms this, but also emphasizes the desireability of having only a straight-time labor base.

There are, of course, many variations of the fee base. For instance, the fee base may only be on direct

\(^6\)op. cit., p. 20.
labor, but exclude payroll overheads such as payroll taxes and insurance. The Joint Internal Auditing Committees of the Edison Electric Institute and the American Gas Association report their findings on a similar case in their Auditing Case Studies\(^7\) where a subcontractor had included in his fee base, payroll taxes and insurance. The prime contract was specific in this area, whereas the subcontract merely specified a cost plus a fee. The internal auditors called this discrepancy to the attention of their management and the contractor. As a result, approximately $50,000 was refunded by the subcontractor. This points out the importance of fee bases and the continual need to audit these areas.

There is another important item that is generally undesirable in a fee base, and that is equipment rental. Equipment rental, first of all, refers to that construction equipment required to construct the facility for the public utility. It is usually cheaper to rent the equipment for the one to four year construction schedule than to purchase the equipment. Also, the equipment can be furnished by the contractor on a rental charge basis or leased from others. If the equipment is leased from

others, profit is included in the rate. That would then mean, if includible in the profit base, fee on fee. That would be undesirable. If the equipment is furnished by the contractor on a rental charge basis, there is a very good chance that these rates also include profit for the contractor; thus again, the undesirable profit on profit.

The Internal Auditor should thoroughly review the rental source, the rental rates, their fee base applicability, and, if legitimate per the contract, make recommendations to management that the contractual definition of cost be more specific in future contracts to avoid these double profit pitfalls. If not legitimate or if questionable, the internal auditor should recommend the disallowance of the equipment rental items. This would force the contractor to either withdraw the costs from the fee base or negotiate with the public utility for its legitimacy. There is no doubt that the internal auditor plays a very important watchful function in the fee base area.

The Sliding Scale Percentage Fee

The intent of the sliding scale percentage fee type construction contract is to put a damper on some of the disadvantages of the fixed percentage fee type
construction contract and to attempt to keep the fee in line with the type and amount of work originally estimated at the date of the original contract.

It is generally conceded that the rate of the fee should be higher for small volume contracts and should become progressively smaller as the amount of the work increases, keeping in mind the various degrees of technical expertise that may come into play. Therefore, it is the sliding scale percentage fee that is utilized to provide for possible increases in the volume of work.

The Auditing Case Studies call attention to a case that did not provide for a sliding scale percentage fee:

The auditor called attention to the amount of a percentage fee for overhead expenses that was being charged by a subcontractor. The fee appeared to be reasonable for the kind and volume of work that was originally contracted for. However, the scope of the subcontractor's work was increased considerably by the General Contractor without changing the fee. In considering this fact, the fee resulted in a high profit. The fee was subsequently reduced about 50%.

This finding indicates the necessity for periodic reviews of contracts by the General Contractor and the company's Purchasing Department for the purpose of negotiating revisions in contract terms, when required, in consideration of major changes in the scope of work being performed by subcontractors. 8

This also points out the need to audit subcontract proposals for prudent fee bases, and in the case

8 ibid.
mentioned, the subcontract proposal should have provided for a sliding scale percentage fee for possible extra work. It also points out a not uncommon fault regarding subcontracts in that general contractors, often, do not provide adequate internal cost controls over their subcontractors on cost-plus contracts. Internal auditing, therefore, is very important in this area.

**Percentage Fees with Ceilings or Limitations**

It is not surprising to note the differences in efficiencies during construction between lump-sum or unit price construction contracts and cost-plus construction contracts. Word gets around fast as to just what type of contract is in effect. The contractor has a good incentive to push for production on lump-sum or unit price contracts. Profit is dependent upon production. This is not so with cost-plus contracts based on percentage fees. The attitude, generally, reaches a "so what, the public utility is paying for it" state.

Therefore, to place a certain amount of incentive back into its proper perspective, a ceiling of a certain amount is placed on the total fee. The contractor's attitude then becomes one of vital concern. He must get the job done as there's no further profit to be made and he earns no more for his efforts.
But the internal auditor should not allow such a ceiling to lure him into an unconcerned state. The bases for the fee are just as important as mentioned above and there is always the possibility that the ceiling will not be reached. But, with the economy accelerating rapidly at an increasingly inflated rate, the ceilings set for maximum fees are usually reached. Therefore, it is important that the internal auditor ascertains the contractual conditions relating to the scope of the work and what constitutes a scope change that may possibly result in an additional fee.

Some contracts have very broad scope bases that may state that the contractor is to provide all that is necessary to engineer, procure, and construct a satisfactorily operable and maintainable plant, while other scope bases are exceptionally specific. Thus, in the first case, it is difficult for a contractor to come up with a scope change whereby he may request additional fee. The second case, however, leaves the contractor considerable maneuvering room for extra fee requests. This is one area where it is prudent to be broad and not specific.

From this, it is important that the internal auditor be cognizant of the contractual scope of the work and its limitations so that he can properly verify additional fee billings. It is important to point out that, not only
must monetary ceilings be monitored, but also that the contractual limitations of the scope of the work must be properly interpreted and the accounting thereof properly verified.

The Fixed or Lump-Sum Fee

This type of cost-plus fee provides a bit more incentive than the percentage fee with a ceiling in that the disadvantage of increasing profit at the expense of increasing cost is removed to a certain extent. While the contractor now has no incentive to increase costs, he also has no incentive to decrease costs. But at least some incentive is provided with this type of fee. One such incentive is that of meeting the construction schedule. To maximize his net return on the fee, the contractor is not going to spend any more time than necessary earning the fee. Thus, the fixed fee does provide a certain amount of incentive.

The contractual limitations that the internal auditor should monitor were mentioned above, relative to percentage fees with ceilings or limitations, also apply to fixed or lump-sum fees. This is also a disadvantage when a lump-sum fee type of cost-plus construction contract is utilized without a properly written scope of work and provision for a change in fee.
The above comments regarding the fixed fee are also confirmed by the following statements from *The Handbook of Architectural Practice*:

If the amount of the fee be fixed in advance, no such suspicion can arise and the Contractor can effect savings for the Owner without penalizing himself for so doing. The disadvantage of the fixed fee is that in case of any great change in the scope of the work, a readjustment of fee ought, in equity, to be made. Such contingency should be provided for in the Agreement.\(^9\)

**The Target-Sharing or Incentive Fee**

Whenever possible, the target-sharing or incentive fee type cost-plus construction contract should be utilized as this type of fee provides more contractor incentive than any of the aforementioned types. Incentive is provided by the fact that the amount of the contractor's profit is regulated by his performance.

Basically, this type of fee is based around a target or goal. If the contractor under-runs the target, his profit increases and if the contractor over-runs the target, his profit decreases. The target may be based on manhours, monies, time schedule, or a combination of these. For instance, it could be provided that the contractor has a zero base fee if he constructs a facility

\(^9\) *op. cit.*, p. 156.
for $100,000,000 and with the facility completed within three years. Also provided would be the stipulation that, should the final cost be less than the base amount, the contractor is to receive as his fee $1.00 for every $2.00 the final cost is below the base. Should the final cost be greater than the base, the contractor is to pay a penalty of $1.00 for every $10.00 the final cost is above the base. In addition, the contractor is to receive $1,000 for each day the facility is completed before the target completion date or is to pay to the owner $100 for each day the completion of the facility is delayed beyond the target completion date.

Such an arrangement not only provides a time schedule incentive but also a monetary saving incentive, both of which are very desirable.

From an internal auditing standpoint, it is essential that internal control is monitored closely, as a contractor, depending upon the scope conditions of the contract, may attempt to exclude target monies under some accounting guise; e.g., a contract target which may exclude fencing but include the installation of all piping. During the installation of the piping, a section of fence has to be removed and reinstalled after the piping is installed. Since the handling of the fence section is caused by the piping installation, it should
be charged to the piping account and would thereby become part of the target base. But an alert contractor could attempt to charge the fence handling to the excludable fencing account, thereby keeping target costs down.

Any target excludable item must be carefully scrutinized from all directions by the internal auditor to ascertain its legitimacy. The internal auditor should observe the actual target excludable work being performed, make tests of the manhours involved, and follow up these observations with the verification of the contractor's time sheets to ascertain the accuracy of the excludable time charges for the excludable target work involved. In addition, the internal auditor should verify that there are records, properly controlled to accumulate these excludable target charges in conformance with acceptable internal control principles and practices. Also, much of this internal auditing can be carried out in conjunction with normal labor audits.

It doesn't appear that the Internal Auditing Procedure Manual\(^\text{10}\) makes any provision for the audit of excludable target fee items. But then, this is not surprising since the use of incentive fee type

\(^{10}\text{op. cit., pp. 1-35.} \)
construction contracts for public utilities was not utilized much until recent years. The reason for this is that incentive targets are difficult to arrive at for large electric generating plants and other large and expensive facilities. It requires an exceptionally experienced estimating department to determine reasonable target incentive bases.

The Combination Fee

The variation of the fee type utilized with cost-plus contracts is limited only to the resources and imaginations of the individuals who write construction contracts. For instance, the incentive target fees with their inherent profit or penalty could be on a sliding scale basis. G. S. Penick\(^{11}\) mentions successive targets limited by ceilings and floors.

But, no matter what the combination type fee may be, it is important that the internal auditor be aware of all of its facets and underlying problems, and set up and conduct his audit program accordingly.

\(^{11}\)op. cit., p. 32.
Control of the Varying Factors of Cost

The varying factors are the definition of cost items or contractual reimbursable costs to the contractor plus a fee. The various type fee construction contracts mentioned above may be utilized with any of the following variable factors of cost. The fact that contract costs can and do vary makes it essential that internal controls be reviewed and the necessary internal auditing be performed to be assured that all the varying factors are accurate, reasonable, and in accordance with the cost-plus construction contract. But all definitions of cost are not as specific as they should be. For instance, not all contractors interpret costs to mean actual costs. R. L. Zeiders interprets costs to mean actual net costs.

The closer that costs are controlled, the greater will be the savings. This is one of the purposes of the cost-plus construction contract. R. L. Zeiders confirms this by stating that:

From an auditing point of view, the type of contract which requires the most time and is more

---

likely to result in cost savings is the cost plus contract. Cost plus contracts usually come about when the scope and/or details of the work cannot be fully defined . . . . We have been able to effect very substantial cost savings in the last few years through the auditing of various contracts. Most of these savings involve billings of costs under cost-plus contracts.\(^{13}\)

Also, the American Institute of Certified Public Accountants recognize that internal control is weak in the construction industry:

Internal control weakness and deficiencies in accounting records may frequently be noted in the following areas of a contractor's operations:

1. Failure to periodically evaluate contract profitability on a realistic basis.

2. Inadequate control over estimating and bidding on new contracts.

3. Inadequate contract cost records.

4. Weaknesses in billing procedures.

5. Inadequate control of construction equipment and lack of adequate cost records applicable to this equipment.

6. Poor control of job site payrolls and other disbursements.\(^{14}\)

Public utilities are also aware that deficiencies

\(^{13}\text{loc. cit., p. 1.}\)

\(^{14}\text{American Institute of Certified Public Accountants, Committee on Contractor Accounting and Auditing and the Committee on Cooperation with Surety Companies, Audits of Construction Contractors. New York: American Institute of Certified Public Accountants, Inc., 1965, p. 43.}\)
are frequently encountered. It is for this reason that there is an increasing emphasis on the internal auditing of construction contracts.

Field Manual Labor Costs

The field manual labor costs make up the bulk of all construction labor costs. Field manual labor is, usually, made up of asbestos workers, laborers, carpenters, piledrivers, ironworkers, operating engineers, millwrights, boilermakers, pipefitters, bricklayers, cement finishers, sheet metal workers, electricians, and teamsters. These crafts or trades are, generally, unionized and, while they are referred to as construction trade unions, they are to a certain extent made up of independent localized unions. The Association of General Contractors negotiates locally with some of the architectural crafts, the National Electrical Contractor's Association negotiates locally with the electricians, independent contractors negotiate with some construction union locals, etc. This results in many different union agreements.

Therefore, because of the lack of uniformity, it is important that the internal auditor be familiar with each union agreement for each project. The union agreements will vary. The various rates of pay must be
correlated to the actual work performed, the foreman's time sheets, and the payrolls. This means that, if the internal audits are to be effective, the internal auditor must observe the work being performed, be cognizant of the trade and rate applicable to the type of work, and then follow through to ascertain that the time sheets, wherefrom the payroll records originate, are reasonably accurate. This requires continual vigilance. In addition, the payrolls themselves, which are to be considered a prime support document for the contractor's labor portion of the invoice, should be tested for correct rates of pay, correct travel allowances, correct hours for pay, possible duplication, etc.

For instance, it is possible on some projects, where internal control is weak, for the timekeeper to perform both the timekeeping and payroll clerk function. This person could conceivably alter or add to the reimbursable payroll. This is only one of many reasons why all payroll documents and the work itself must be tested continually. In addition, there are many cases where the union agreements allow the union steward to check the time sheets. In some cases, the foreman fills in the rates. It is very possible for incorrect labor rates to be entered upon the foreman's time sheets. One might wonder why a foreman would enter an incorrect rate.
In many cases the foreman is selected by the union.

This man may be a foreman on one project and a journeyman working with the tools on the next. This man, generally, disdains any form of paperwork and, because he is union oriented, is, usually, not concerned with cost savings and administrative accuracy. The Joint Internal Auditing Committee of the Edison Electric Institute and American Gas Association sum up some manual labor deficiencies as follows:

Stationing company representatives at job sites to verify the presence of contractor's employees on the particular job, the hours worked, the materials and equipment used, and certain other charges does not constitute sufficient substantiation of the amounts billed, even though the costs checked through this means make up the bulk of the charges rendered. Some reasons for this are:

1. The rates billed may be incorrect for the particular labor classification.

2. The rates billed may be other than those paid by the contractor.

3. Premium time labor may be calculated incorrectly.

4. Premiums for Workmen's Compensation, public liability and property damage insurance, Federal and State payroll taxes, etc.

For example, a recent audit disclosed errors in the labor charges under one contract amounting to $6,234,000.15

---

It is obvious the company representatives at these sites were not performing all the necessary audits to protect the public utility's interests.

In another case reported by the Joint Internal Auditing Committee, an independent contractor overbilled a public utility $23,000 during a four-year period by padding the payroll being billed for hours the contractor's employees did not work and for nonexistent employees. There was no adequate check of the work by the public utility. A field audit by internal auditors along with a test of hours billed brought to light the defalcation. The corrective action taken is as follows:

1. That all contractors furnish daily reports showing employees' names, badge numbers, hours (from, to, and total) by projects.

2. That one combined daily time report be used for all job locations of a contractor.

3. That employees assigned to inspecting jobs and preparing reports of materials received be rotated periodically.

4. That Company inspectors be required to check each project several times daily and specifically note who and how many workers are present.  

---


\[17\] Ibid.
Another area to be watched is the case whereby a general foreman is absent for one-half a day, a foreman takes over the general foreman's duties, and a journeyman takes over the foreman's duties. In each case where the employee steps up, he receives the grade increase. Care should be taken to ascertain that any overlapping of the rates is justified and that the employee's rate is reduced in each case to the former rate when the general foreman returns to duty.

The watchfulness required for rate variation errors is almost without limit. Within one craft for one local, many possible rates can and do exist. The work performed may govern or it may be eight hours pay for seven hours worked. In another instance, a laborer may get ten cents more per hour when working with air tools or thirty cents more per hour when working on scaffolding over twenty feet above a ground or floor level. Some agreements provide for shift work rates under certain circumstances and others do not. Some agreements provide for premium time pay at time and one-half and others provide for premium time pay at double time. There are some agreements that provide for premium pay under both arrangements. This writer recollects that a few years ago a cement finisher's local provided for time and one-half for overtime hours worked before 8:00 a.m. and after
4:30 p.m. on Monday through Thursday and from 4:30 p.m. to 6:30 p.m. on Friday. All other overtime worked was at double time. There are some agreements that provide for time and one-half or double time but only on a base rate and not an additive such as the additive of, say, twenty cents per hour for vacation pay. The variations appear endless. The internal auditor must keep abreast of the latest provisions of all union agreements applicable to the project.

It is the labor rate multiplied by hours that yields the reimbursable labor costs. Care must be taken that the hours being invoiced are proper and accurate. Labor is not cheap. Winton M. Blount reports that in Michigan "the electricians are asking $10.22 per hour and the ironworkers want $10.54." At high rates like these, it is easy to see why the internal auditor needs to be concerned about the proper reporting of manual labor time.

The construction trades have very strong unions. They are, generally, opposed to the utilization of punch card time clocks. The system generally used to log manual labor in and out of the construction project is

---

the brass system whereby the employee is issued a badge and a brass disc with his payroll number stamped thereupon. The employee, upon passing a guard or brass shack when entering the work area in the morning, shows his badge and receives from the timekeeper his corresponding brass. The brass is turned in at the brass shack upon leaving at quitting time. Care should be taken to see that an employee turns in only his brass and not his brass along with his friend's. The contractor keeps a record of all brass activity.

In addition, the contractor's timekeeper makes face checks during the day to ascertain that the manual employees are on the job. The internal auditor must continually monitor the contractor's efforts at the brassing in and out areas, during the face checks, and while passing out paychecks. These records are cross-referenced to the foreman's daily time sheets and payrolls. It is not uncommon for discrepancies to occur. For instance, an employee could be thirty minutes late. The gate records show the employee on the site for one-half hour less than the full normal working day. The foreman, however, may have shown that employee as having worked all day. At the present high rates of pay, the loss could be substantial if not properly policed and if the project is working overtime, which is not uncommon these days, the loss
could be doubled. Consumers Power Company has established the following guidelines for their construction accountants to follow while performing internal auditing work on their construction projects:

Distribution of the hours and/or dollars to Work Orders and Accounts and/or Responsibility Areas and Functions should be carefully checked by the Construction Accountant as being proper. The Construction Accountant must make daily observations of various phases of the work in progress in order to make any sensible audit of the account numbers charged in this exhibit.

Copies of union agreements, insurance adjustments, or labor escalations affecting labor rates must be furnished the Construction Accountant to be attached to this exhibit. The weekly payrolls should be immediately checked by the Construction Accountant using gate reports, daily log, daily force reports, irregular hour reports, field inspection reports, union agreements, and whatever other notes on labor the Construction Accountant may make during the week involved. It is the Construction Accountant's responsibility to verify that the rates of pay are correct, to make random checks of actual hours worked, gate reports and face checks, and to follow up to make sure all errors are properly corrected. Extensions of rates multiplied by hours need not be checked in the field unless the Contractor normally makes many errors of this kind, since this is done by the Accounts Payable Department in Jackson. The amount of travel allowance and subsistence should be field verified . . .

Credits, back charges by the Contractor, or anything of unusual or out of the ordinary nature, should be thoroughly explained on the face of the payroll or by an attached note. The payrolls should reflect only actual hours worked. Contractor's employees receiving vacation pay should not be marked on the payroll as working eight hours each day during the vacation period. Vacation days should be plainly marked 'vacation' and should show no hours worked.

Payrolls to be furnished Consumers Power Company are not to be prepared by the Contractor copying from the original.
At least once a month, but at irregular intervals, the following spot labor checks should be made by the Construction Accountant and entered in the Construction Accountant's log:

1. A count is to be made of one or two crafts of all brass outstanding before issuing brass in the morning. Then observe the timekeepers passing out brass numbers at the start of work in the morning and continue the observation beyond the starting time in order to observe the timekeepers recording the names of Contractor's employees who are late beyond the time limit allowed by his employer for tardiness. The early count of brass is to be reconciled with absentees and tardy reports and cross-checked to the foreman's reports and weekly payrolls. This observation should include noting that each man receives a brass and/or is accounted for. Absentees are to be entered into the Accountant's log daily and are to be cross-checked to the weekly payrolls.

2. Observe the timekeepers receiving back the brass numbers at the close of the normal day's work. Brass not turned in is to be entered into the Accountant's log and cross-checked against the payrolls and irregular hour reports for accuracy of overtime payments. A spot check should also be made by counting brass turned in for one or two crafts, which in turn should be reconciled with the payrolls.

3. Face checks will be performed by the Contractor regularly. Obtain the names and/or numbers of a foreman and his crew or a group from the timekeeper. Have the timekeeper use this list and accompany the timekeeper and observe the timekeeper verify the presence of these workmen. Upon completion of the check, obtain a copy of this check for later cross-checking against the foreman's reports and payrolls. It is emphatically important that the Construction Accountant is accompanied by the Contractor's timekeeper and that this timekeeper does the actual checking. The Construction Accountant is only to observe that the timekeeper makes the check. This check is not to be made alone by Consumers Power Company personnel. In the case of a "Cost Plus" Subcontractor, the Subcontractor's representative, or a person designated by him, is to accompany the Contractor's timekeeper and the Construction
Accountant. If the Subcontractor has no one available at this time, this check will be considered aborted, logged as same, and attempted again at a later date.

4. Large crews working overtime during the evening or weekends should be spot-checked regularly, including shift employees, and a record kept of the observations.

5. Names of all employees, including those of Consumers Power Company and the Contractor's supervisory and administrative personnel, should appear on the gate watchman's daily report if they go in or out of the jobsite other than normal starting and quitting times. Names of Contractor's employees showing on the payrolls as earning pay for overtime should also be shown in and out on the gate watchman's daily report and should agree with the hours for which overtime was paid.

6. Foreman's daily reports will be continually spot-checked to insure that the foreman's word description of the work accomplished is accurate and this description is interpreted into the proper account number.\(^\text{19}\)

A. J. Gregory\(^\text{20}\) would not consider anything less than daily field checks as he feels that it is extremely important to determine that all labor being charged are actually present on the project. But, regardless of how often labor checks are made, it is far more important that the labor checks are made at random and are unscheduled.

---


All subcontractors should be issued brass thereby making it mandatory for all manual personnel to brass in and out. If some personnel did not have brass, the contractor's personnel could go in and out and would only have to tell the guard at the gate that he works for some subcontractor. The guards cannot possibly know everyone. One of the reasons some contractors do not require subcontractor's personnel to carry brass is where the subcontractor has a lump-sum. The contractor feels it is none of his concern regarding the coming and going of lump-sum subcontractor personnel; but for proper internal control, all manual personnel must be brassed in and out.

A listing by A. J. Gregory of the most common errors found in auditing the labor portion of cost-plus construction contract billings is as follows:

Labor
Incorrect rates
Incorrect classification
Incorrect computation of overtime (double or time-and-a-half)
Time charged not spent on the job
Extension\(^{21}\)

The internal auditor must be vigilant in his continual monitoring of the field manual labor costs. It is this direct labor cost that often is the basis of other

\(^{21}\) loc. cit., p. 21.
indirect costs. Without the proper maintenance of accuracy for direct labor costs, inaccuracies will cause a pyramiding of excessive indirect costs.

**Field Non-manual Labor Costs**

Field non-manual labor costs are represented by supervisory, engineering, and administrative personnel working directly in the field on the project for the contractor. These personnel are, usually, combinations of salaried and hourly personnel and are not unionized. In contrast to the manual personnel who are union-oriented, the non-manual personnel are contractor-management-oriented. These costs represent from 5% to 20% of the total field labor cost depending upon the complexities of the project and the contractor's established mode of doing business.

The contractor's established mode of doing business is often a controlling factor for the make-up of the field non-manual labor costs. Manual labor is usually spelled out in the various union agreements and as such is public knowledge. But the contractor's salaries for his non-manual personnel are not published nor are the salaries public knowledge. The salaries for a field engineer, for instance, not only vary from contractor to contractor, but also vary depending upon the ability and
negotiating power of the individual. Some contracts may show salary ranges for various classifications of non-manual personnel; some contracts may show specific salaries; some contracts may provide for a percentage of some base such as direct straight time manual labor; some contracts may provide for actual costs; and some contracts may provide for costs in accordance with the contractor's normal procedures for doing business.

It is preferable that the non-manual salaries be specifically covered in the contract. On this basis, invoice costs for non-manual salaries can be easily monitored. This is also confirmed by Anton Steven's study whereby:

Rates to be paid for labor, whether union or other approved rate, should be agreed upon and stated in the contract. These then will serve as contract basic rates, should there be any negotiations for increases.\(^{22}\)

For those cases that depend on the contractor's normal procedure or policy for doing business, copies of the procedures should be furnished the owner's auditors. Also, proper procedures should be set up and followed to be assured that costs being charged the owner are in accordance with the contractor's normal procedures for doing business.

\(^{22}\) Steven, Anton, "Negotiation and Control of Construction Contracts." The Internal Auditor. (September 1955), p. 46.
non-manual salaries.

Percentage cases should be avoided if at all possible as they are clearly non-incentive. In addition, this type, even more so than in the other cases, requires continual vigilance as there is a tendency for contractors to classify some supervision or non-manual labor as manual labor. Classification tends to follow the path that is the most lucrative to the contractor. Another example of this is a cost-plus contract whereby labor is reimbursable up to and including the general foreman. Other labor above the grade of general foreman is included in a reimbursable overhead rate. The contractor then proceeds to classify his superintendents as general foremen for invoice purposes. The contractor not only is reimbursed for his superintendents' wages, but also makes an additional profit on the overhead portion applied to these particular wages. The *Internal Auditing Procedure Manual* states that it is important that non-manual "supervision should be classified as to whether it is included in labor costs or overhead." raising the tendency for contractors to classify some supervision or non-manual labor as manual labor. Classification tends to follow the path that is the most lucrative to the contractor. Another example of this is a cost-plus contract whereby labor is reimbursable up to and including the general foreman. Other labor above the grade of general foreman is included in a reimbursable overhead rate. The contractor then proceeds to classify his superintendents as general foremen for invoice purposes. The contractor not only is reimbursed for his superintendents' wages, but also makes an additional profit on the overhead portion applied to these particular wages. The *Internal Auditing Procedure Manual* states that it is important that non-manual "supervision should be classified as to whether it is included in labor costs or overhead." Furthermore, titles should be specific and classified both in the proposal for bidding and in the contract.

23 op. cit., p. 19.
Wages, hour, and working conditions for non-manual personnel; vacation accruals; overtime and holiday pay; sick leave and leave of absence; transfers; employee status and salary increases; travel; etc., are but a few of the many policies that may come under the category of the contractor's normal operating procedures with respect to non-manual labor costs. In addition, these items may also come under the category of direct non-manual labor costs or indirect non-manual labor costs depending both on the contractor's method of doing business and on the contractual conditions.

What is important under the direct category is that there is no overlap between direct and indirect costs, that salaries and salary increases are reasonable and approved by the owner, that overtime is approved in advance by the owner, that vacations and other absences are reasonable and not abused, that the contractor does not overstaff the project with excess personnel, that the contractor does not use the project as a training ground by moving novices onto the project for a short training period and then transferring the trained novice to another of his projects, and that the contractor's non-manual personnel are performing for the benefit of the owner's project and not some other project. Anton Steven also

\[24\] op. cit., p. 46.
J. S. White mentions the following cases involving overstaffing:

Overstaffing the job bears careful scrutiny. On one of our jobs the ratio of supervision to direct labor was 41% while it was only 13% on another job. This was called to management's attention with the result that the supervisory staff was reduced, the savings amounting to over $100 per day. This was in March. By July supervision appeared again to be excessive. Our auditor again referred the matter to management and eleven un-needed supervisors were laid off with a savings of $240 per day being realized.25

Home Office Labor Costs

Home office labor costs are one of the least audited areas because it is, generally, not feasible to keep auditors in the contractor's home office which in some cases may be hundreds of miles away from the project and the owner's operating area.

It does, however, behoove the owner to send his internal auditors to their contractors' home offices from time to time at random. First, most contracts include a right to audit clause which is highly recommended by this writer to be includable in all contracts, and by many institutions and groups such as the Consulting Engineers

Second, the mental attitude of the contractor becomes one of awareness when they know that an owner will and does audit his home office labor costs in his home office more than once. There is much to the philosophy that a threat to audit at any time keeps dishonesty and errors at a minimum. The Internal Auditing Committee reports a case on the psychological effect of internal auditing whereby:

Some years ago our Internal Audit Staff was taken away from audit duties and assigned to a job, which, in the opinion of Management, was quite urgent. As this job lasted for about two years, no audit work was performed in the meantime. At the conclusion of this job, audit work was again commenced with a visit to one of our district offices. It was not very long during the course of the audit before signs of a defalcation were discovered. Upon completion of the audit, it was found that this defalcation amounted to approximately $800.00, traceable to the office manager.

The office manager was then called in for his explanation of the facts as they were uncovered by this audit. His reply was as follows:

'Since you fellows have not been here for several years, I figured that you weren't coming back and, therefore, concluded that I could get away with this defalcation without detection.'


Labor costs originating in the contractor's home office must be audited to ascertain that the time charged the owner was in fact spent performing work applicable to the owner's project. This becomes apparent when one realizes that the contractor's home office forces may be working on many different projects and that it is more lucrative for a contractor to charge as much time as possible to a reimbursable cost-plus project rather than one of his lump-sum projects. This writer has always been impressed with the fact that cost-plus contractors, generally, require larger home office support staffs as contrasted to lump-sum contractors.

The Internal Auditor must also be watchful for those home office direct labor charges that should be part of a home office overhead or burden rate or the fee. For instance, many contracts provide for the salaries of the contractor's corporate officers as part of the contractor's fee, while other contracts may only provide for reimbursement to those home office employees directly engaged in performing work on the owner's project and with an overhead rate to cover those labor costs of employees indirectly engaged with the project.

Quite often, the home office labor charges are extrapolations from time sheets with rates applied to the time for a specific classification, while the employee
may be paid by computer payroll accounting. The two may not agree. Therefore, it is important that the job classifications be checked in the home office with the actual salary rates as compared to the charges to the owner. C. J. Hoeflick concurs in that:

Job classifications and salary rates have to be verified to the contractor's records to ensure that each individual is paid by the contractor at the same rate charged to the company. A further audit of canceled payroll checks after being cleared by the bank provides evidence that payments were made in the amounts billed to the company.28

Similarly, salary increases showing up unannounced on the contractor's home office labor invoice should be verified to the actual records. Sometimes the salary increase to the owner is greater than the actual salary increase to the home office employee. J. S. White reports the following case:

Labor escalation should be carefully checked. We recovered, as a result of audit of a Contractor's Home Office Charges, more than $40,000. A general wage increase was granted during the course of construction and the contractor's office personnel had incorrectly escalated rates for supervisory personnel.29

As mentioned above, it is not feasible to audit the


29 op. cit., p. 68.
contractor's home office charges at the contractor's home office on a steady or very regular basis. Therefore, the internal auditor cannot completely verify the time worked versus the time charged to owner. Since the only time checks that can be made are those that the internal auditor makes during his audit, it is important that the internal auditor review the contractor's internal control for those areas and precisely how the contractor keeps a tally on his client charges. C. J. Hoeflick has made the following comments regarding the verification of professional time worked:

Hours worked is not an easy area to audit, yet it is the basis for charges to the company for labor. This area may be considered in two parts.

First is the group of professionals and clerks employed by the engineering contractor to design the plant and perhaps the equipment. These persons are usually staff personnel and may be fully assigned to the contract in question or, as is usually the case, may divide their time among several projects and clients. In both instances time records are kept, but how does the auditor, other than seeing a time sheet, satisfy himself that all charges are proper? As a matter of fact, the auditor in most instances cannot be fully satisfied! His recourse is to prepare a program that will give him his best assurance under the circumstances. A review by the auditor of the methods used in keeping score on the engineering contractor's personnel should be made, with such suggestions and recommendations by the auditor to strengthen this control if necessary.

If the contractor assigns a team to the project, the company's engineer by knowing who is assigned can control hours worked by merely recording absenteeism for reference when he approves the weekly time reports.
The time charged by contractor's personnel other than engineering such as purchasing, accounting, data processing, etc., is not usually amenable to checking by the company engineer. It would be well if the contract included these items in the overhead rate or at a fixed charge but, in some cases where it is difficult to estimate the demands on these people, their salaries are also on a cost-plus basis. Auditing of actual time of these persons is extremely difficult, which compels the auditor to find a way of evaluating the reasonableness of these charges.\textsuperscript{30}

The utilization of time with salaries can sometimes be complex and at times result in incorrect charges to the owner by the contractor. One such utilization is the division of the annual salary by the number of working hours in a year, or 2,080 hours. If this be the case, it should be understood that the rate may be applied to all hours worked in a week as the rate reimburses the contractor for vacation, paid sick leaves, and absences only if time is charged for these absences not actually worked. Caution should be used on charges for holidays worked. The employee is, usually, entitled to be paid for the holiday and the time worked. But the contractor may charge the owner for both while not actually reimbursing the employee anything extra for working on the holiday.

Now, to carry this approach a step further, assume

\textsuperscript{30} op. cit., p. 54.
it is provided that the contractor is to invoice only for hours worked. The contractor must then arrive at a rate that will compensate for vacation and holiday costs paid his employees. This is accomplished by deducting 80 hours for two weeks paid vacation and 48 to 88 hours for 6 to 11 paid holidays from the working hours in a year. This results in a lower divisor and a higher effective hourly rate. Again, caution should be used in checking the application of this rate as the application to overtime, in effect, results in an overcharge by the contractor on vacation and holiday pay. The employee probably only received his annual salary and may or may not have been reimbursed for overtime and then only possibly at some rate other than the rate charged the owner. The internal auditor must also be always watchful for these types of applications.

The internal auditor must also be aware that possible overlapping of labor charges is possible in those types of construction contracts where the engineer portion of the engineer-constructor's invoice is separated due to contract conditions from the constructor's portion. This separation is a legal separation required by some states that require all officers of an engineering firm to be licensed by that state to practice engineering in that state.
Employees, then, while actually being paid by the parent firm, charge work to both the legal engineering and the legal constructor firms. Thus, it is fairly obvious that possible overlapping could exist in this area.

Field Manual Labor Indirect Payroll Costs

The indirect payroll cost is a function of direct payroll cost. As such, it can readily be seen why it is so important for the direct payroll base to be accurate. Any inaccuracies in the direct payroll base would reflect additional inaccuracies in the indirect payroll costs.

The field manual labor indirect payroll costs consists of:

1. Federal Insurance Contribution Act (Social Security)
2. Federal Unemployment Insurance
3. State Unemployment Insurance
4. Workmen's Compensation Insurance
5. Vacation Funds
6. Health and Welfare Funds
7. Pension Funds
8. Apprenticeship Funds
9. Travel Allowances and Subsistence

The above list is not intended to be all-inclusive. The verbal terminology also varies from place to place; e.g., Social Security is also referred to as Old Age Benefits; Federal and State Unemployment Insurance are also referred to as Federal and State Unemployment Taxes, and sometimes states may have a disability tax in addition to unemployment tax.
The Federal Insurance Contribution Act, more commonly known as Social Security Taxes, is currently based on 4.8% of the first $7,800 gross taxable earnings of each individual.

The Federal Unemployment Insurance in Michigan is currently based on 0.4% of the first $3,000 of gross taxable earnings of each individual.

The State Unemployment Insurance which varies depending upon each contractor's unemployment experience in a particular state is currently based upon four to seven percent of the first $3,600 of gross taxable earnings of each individual. In Michigan each contractor receives a Notice of Contribution Rate Determination from the State each year denoting the percentage rate he is obligated to apply to his payroll for that year. Internal auditors should obtain a copy of this notice each year to verify the rate charged the owner on those contracts reimbursing actual payroll costs. A. J. Gregory reports the following on the unemployment tax rate:

Has the employment tax rate charged by the contractor been checked to determine whether it is the actual rate paid by him and whether he is allowing for the tax exempt portion of wages? One of our largest recoveries on payments which had been made to contractors prior to our audits of contracts, consisted of unemployment tax charges of a rate in excess of the contractors' actual cost and payroll taxes applied to tax-exempt wages. Our recoveries on this type of overbilling amounted to approximately $55,000.31

---

31 op. cit., p. 20.
The above three indirect payroll costs are commonly referred together as payroll taxes. This is usually a very fruitful area for the auditor. It is not uncommon for a contractor to charge the full payroll taxes rate to all earnings and pocket the difference as profit by not giving the owner the benefit of the limitations and tax exempt earnings. R. L. Zeiders concurs whereby he states that:

In some contracts certain additives or overheads are billed at estimated amounts because the exact amount of the costs are not known at the time of billing. This is one area where overbilling is likely to occur.

Payroll taxes and insurance are cost items that are often estimated and overbilled. As you probably know, there are certain maximums that apply to the payment of payroll taxes . . . . What often happens is the contractor or supplier will continue to bill these taxes on labor even though tax payments were not made after the maximums for each tax were reached. Once the maximums are exceeded, and this doesn't take long, overbilling can be substantial . . . . We have experienced cases where we were overbilled amounts reaching as high as five figures on this very thing—payroll taxes. 32

In Case Study No. 4, the Joint Internal Auditing Committee reports that in:

One recent audit of the charges billed under a $150,000.00 contract disclosed that payroll taxes had been billed at four percent on individual employee's earnings in excess of $3,000.00 (Federal Social Security and State Unemployment) aggregating an overcharge for that item alone of $2,260.00. 33

32 op. cit., p. 2.
33 op. cit., Case No. 4.
Case Study No. 139 reports a refund of $5,500 for payroll tax overcharges.

In other cases where the contractor's employees move from job to job, the amount of overcharge becomes a bit more complex. For instance, if one owner has his project under construction during the first part of a calendar year and another owner has his project working in the latter part of the calendar year with all work performed by the same contractor on an actual cost basis, the first owner would bear the brunt of almost all the payroll taxes while the second owner would bear little payroll tax cost. Some argue that the contractor should not be allowed to do this but that the payroll tax cost should be prorated between the owners. One answer to this problem would be by using the contractor's annual average rate based on experience. C. J. Hoeflick has somewhat the same thoughts:

One of the greatest areas of disagreement in contract interpretation is in this area (of other payroll charges). For instance, an employee's FICA and unemployment taxes are computed only on the first so many dollars (base amount) paid an employee in a calendar year. Many contractors charge the company for payroll taxes on wages beyond the base amounts. Since the contractor ceases to

generate a cost, it is incumbent on the auditor to take exception to the excess charges. Some contractors will argue that their employees previously earned most of the base amount before they were assigned to the company's project; therefore, the company should not benefit as a result of a prior client being charged. We cannot completely disagree with this argument. We would, however, expect to see overcharges credited to all their clients, including us. This can best be done by utilizing a standard rate based on average annual earnings.35

From time to time during the course of long-term construction projects, the contractor may have back-charges to vendors or subcontractors for defective work that has been corrected by the contractor, etc., and/or work that is not reimbursable. In these or other similar cases, it behooves the internal auditor to ascertain that the payroll tax limitations are reduced on a pro rata basis so that these other nonreimbursable labor costs accrue their share of payroll taxes. This would also apply to payroll insurances and other items that have a limitation or ceiling.

Workmen's Compensation Insurance, which is also commonly referred to as payroll insurance, is the most abused of all the indirect labor costs. While there are other insurances that utilize direct labor as a base, Workmen's Compensation Insurance is unique in that most
states have statutory requirements for this type of insurance and that the direct labor base, usually, must be adjusted in many ways before the workmen's compensation rates may be applied. In addition, and perhaps unknown to many, the workmen's compensation premiums and records may be subject to an outside audit with a resulting adjustment to the premiums paid—usually a credit—which the contractor, in many cases, fails to pass on to the owner unless the owner is on his toes. Anton Steven states that:

Any payroll insurance or taxes which are a cost to the contractor should be provided for with proper allowances for non-taxable wages, and refunds on insurance. 36

First of all, Workmen's Compensation Insurance is based on straight time direct labor dollars and as such excludes the premium time labor dollars. Secondly, there may be an average weekly limitation on the straight time direct labor dollars; e.g., many coverages in Michigan are limited to $300.00 per week average for the policy year per individual. Thirdly, each individual policy should be examined to ascertain the exact straight time dollar base as some contractors will attempt to include travel allowances, commissions, relocation reimbursements,

36 op. cit., p. 46.
etc. This writer questions the inclusion of these items in the insurance base under any circumstance as they are not genuine wages. They are included in the direct payroll costs in only recent years because of Internal Revenue Service rulings. Just as many Internal Revenue Service rulings do not constitute acceptable accounting principles, the inclusion of travel allowances and relocation reimbursements as part of a direct labor base for Workmen's Compensation Insurance should not be considered an acceptable accounting principle and should be discouraged if at all possible. The Internal Auditing Committee also comes to the conclusion that workmen's compensation premium bases should conform with that required in the policy. W. L. Dowd had reported a similar case whereby the contractor included cost of living allowances in his insurance base incorrectly.

Above it was stated that Workmen's Compensation Insurance was based on straight time direct labor dollars. This is correct as far as it goes. In addition to that


and the other restrictions mentioned above, the labor dollars are classified into many different work operational groups. There is almost an unlimited list ranging from asphalt work to railroad construction, including many subgroups for such items, for example, as various types of concrete, steel, and piping work. The rates to be applied to the labor dollars assigned to each category varies from a few cents to approximately $15.00 per hundred labor dollars. From this, it can be determined that it is important to verify that the contractor properly classifies the direct labor to the proper operational classification. It is due to this classification factor that Workmen's Compensation Insurance is subject to audits by outside auditors. R. L. Zeiders also points out some payroll insurance pitfalls:

Payroll Insurance is another cost item that can be overbilled and is not always as easy to detect as payroll taxes. Payroll insurance usually includes Workmen's Compensation and public liability and property damage insurance. These insurances are usually billed as a certain percentage of labor.

To verify the correctness of the billed rates, the auditor will need to review the contractor or supplier's insurance records if these are made available to him. This review should include the following:

1. The verification of premium payments and adjustments, and determining that these have been allocated correctly.

2. A review of all divided credits to determine that they have been properly allocated.
3. The development of a net cost billing rate for each type of insurance.

We encountered one instance where the premium cost of payroll insurance was billed but no deduction was made for dividends received or premium adjustments. In another instance the rate that was billed for payroll insurance was about double the going rate for similar type work. In both cases the cost savings were in the five figures. 39

Occasionally, the contractor, for some reason or another, neglects to submit their payroll taxes and/or insurance payments to the respective agency on time. The contractor then usually receives a penalty invoice which he may attempt to collect from the owner. This type of reimbursement should be discouraged when the fault lies with the contractor. W. L. Dowd 40 reports a similar case of late filing of Workmen's Compensation Insurance by a contractor. The reimbursement was disallowed.

Sometimes a contract is written utilizing a fixed percentage rate for payroll taxes and insurance. This is done for simplicity in some cases and to eliminate more complex invoice requirements in other cases. This type of utilization will result in an overcharge above actual costs on the one hand and an excessive overcharge

39 op. cit., p. 3.
40 op. cit., p. 36.
when applied to overtime on the other hand. In Case No. 92, the Internal Auditing Committees point out a situation where the contractor charged for insurance using an average rate which amounts to the same thing as a fixed rate. The overbilling above actual cost was disclosed to be $3,513.34. While the use of the fixed rate may not be too excessive when applied to a project that only works 40 hours per week, very few ever take it into consideration that on overtime work, much of which is on double time, that the application of the fixed rate to the premium amount of overtime costs results in excessive costs, most of which are not out-of-pocket costs to the contractor. A portion of the fixed rate will apply to overtime with respect to payroll taxes. But that portion of the fixed rate that applies to Workmen's Compensation Insurance does not apply to the premium portion of overtime. This would also pertain to a contractor's home office overhead and percentage profit. His overhead and profit does not and should not double just because labor on the project works overtime. What these contracts require, and that refers to the majority of all contracts of this type written today,

---

are two rates— one for straight time and one for overtime. A. J. Gregory draws a similar conclusion as:

It is usually necessary to make a separate computation of the total labor of regular rates and the amount of premium pay involved because the latter will normally not bear as high an overhead rate as the regular labor charges. For example, our company has cost-plus contracts on which the overhead applied to straight time labor runs as high as 62% for profit, insurance, equipment, payroll taxes, etc., while the corresponding premium time is subject only to a 4-1/2% overhead to cover payroll taxes. 42

Union fringe benefits made up of vacation funds, health and welfare funds, pension funds, apprenticeship funds, travel allowances, subsistences, etc., is another indirect cost that requires continuous monitoring not only because of the near infinite varieties that exist across the country but also because they are ever changing from one union agreement renewal to another. For instance, the Kalamazoo electricians' health and welfare fund is known as the National Electric Benefit Fund and is currently 2.8% of each individual's gross salary while the Michigan Local 169 boilermakers' health and welfare, vacation, pension, and apprentice fund is $0.30, $1.00, $1.00, and $0.01 per hour respectively with the vacation and pension doubling on overtime according to the

42 op. cit., p. 18.
Michigan Chapter of Associated General Contractors of America, Inc. The boilermakers' travel ranges from no allowance up to 12 miles to $8.00 for 50 miles and over. Subsistence, however, is only applicable on those projects over 50 miles from one of four state shipping points and is $0.12 per mile from the City Hall of a local shipping point by the most direct route and only occurs on the first and last day of employment. The operating engineers' travel is based on the employee's home address rather than a local shipping point. Another operating engineer wrinkle occurs when apprentices are working on the project. Apprentice hours are not eligible for that craft's apprentice fund. Travel allowance is also pointed out by A. J. Gregory:

In many localities it is an accepted practice to give travel allowances as additional compensation for the time spent and distance traveled between the workmen's homes and the job site. Not only must the auditor verify that the proper amounts are being paid, but he must also determine that they are paid only to those workmen eligible to receive such payments. It is also necessary to determine that these amounts are given the proper accounting treatment for payroll tax purposes in accordance with recent decisions made by the Bureau of Internal Revenue.


44op. cit., p. 18.

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
These voluminous and changing variations make it mandatory that the auditor be currently aware and always watchful of all union fringe benefit charges to the owner. H. F. Stettler agrees in that:

The auditor should always read all union agreements in order to become acquainted with any provisions in the contracts pertaining to vacation pay or other obligations upon the company that may have a direct bearing on the financial statements.  

R. L. Zeiders also mentions that union fringe benefits is an item to watch:

The billing of union fringe benefits is another item to watch. Some benefits are based on straight time labor dollars only. By reading the union contracts involved, the auditor can determine what benefits apply to straight time labor only. We have on occasion been billed for union benefits on overtime labor when the benefits applied only to straight time labor.

Field Nonmanual Labor Indirect Payroll Costs

The above commentary relating to payroll taxes and insurance also applies to field nonmanual labor indirect payroll costs in most cases. While manual payroll taxes and insurance apply, generally, to actual hours worked and paid, nonmanual payroll taxes and insurance may be


46 op. cit., p. 3.
applicable to a portion of a salary not worked for vacation, sick leave, etc. The contract must be examined to ascertain whether this is a legitimate reimbursement or whether payroll taxes and insurance applicable to time not worked is includable in some overhead rate.

Quite often, a contract will provide for an overhead rate to be applied to nonmanual salaries adjusted to actual time worked for the purpose of compensating the contractor for their employees' vacations, sick leave, health and accident insurance, pension, payroll taxes and insurance on nonreimbursable salaries, etc. And just as often the contract may provide for an overhead rate to cover these and similar items but fail to enumerate all the items covered. The auditor must then go back to the contractor and obtain his declaration of the make-up of his overhead rate. Failing in this approach, the auditor should consult with the writers and negotiators of the contract to ascertain what was intended to be included in the overhead rate.

A. Steven also concurs that the overhead rate should be explicit:

A clear statement as to what is included in overhead and on what basis computed should be made part of the contract in order to avoid misunderstandings and excessive billings.47

47 op. cit., p. 47.
Equally important and often not explicitly stated in the contract is the application of the overhead rate on salaries or wages paid over forty hours. Again, as mentioned above, two rates should be provided as the application of the overhead rate to overtime results in payments to the contractor over and above out-of-pocket costs. As only one overhead rate occurs frequently in contract provisions, the internal auditor should analyze the cost ramifications of overhead rate applications and present his findings to his management for their review and action. One of the reasons for a single rate is that the parties to the contract have good intentions and feel the project can be built on a 40-hour work week basis. But the economy of today forestalls such a possibility with the result that overtime is implemented to improve a slipping schedule for a badly needed facility.

Travel and relocation expenses while not functions of direct or indirect payroll costs are included in this section. Travel and relocation expenses are really miscellaneous labor costs. This is another item not usually explicitly defined in the contract other than such expenses are reimbursable in accordance with the contractor's normal operating policies. Therefore, the internal auditor must acquire copies of these policies and thereby ascertain that the contractor's charges for the travel
and relocation of employees to the construction project are legitimate.

Mileages should be verified by referring to travel maps. The rate per mile should be in accordance with the contractor's policies. If train or plane fare is allowed, the fare from origin to destination should be verified with an airline taking into consideration the variations as to class and what the contractor's policy is regarding class rates. If the relocation involves members of the family, the auditor should check for compliance to the contractor's policy and for accuracy.

Often a contractor will issue a memorandum to the employee, the contractor's field office and the owner stating explicitly what relocation allowances that specific employee is allowed according to their personnel policy. Such a memorandum should not only be compared to the contractor's general policy regarding relocation but also used as a check against the contractor's charges for that specific employee.

Some contractors have relocation policies that allow the employee a living allowance for a limited number of days to find a place to live upon reaching the destination project. In addition, this living allowance may or may not provide different rates for different periods of time within the total time limitation along with varying
rates for his spouse and dependents. The internal auditor must be aware of many different variations that may occur and, therefore, should take the time to be aware of the latest contractor policy on relocation and conduct his audit accordingly.

Once in a while, a contractor will attempt to charge the owner for relocation expenses for nonmanual employees leaving the project. This should be discouraged for the reason that the employees are usually transferred to other projects. The contracts on the other projects probably provide for the reimbursement of incoming relocation. Therefore, if each project pays for its incoming relocation, then all out-of-pocket costs of the contractor should be offset equally with reimbursed costs. But if one project reimburses for costs out and another project reimburses for costs in, then the contractor profits. This is not desirable. On the other hand, the contractor may have a legitimate claim for outgoing relocation expenses, such as if the employee is transferred to his home office. Perhaps a policy covering both situations should be established in the provisions of the contract. It would solve this ever-occurring problem.

Relocation expense can also pyramid unrealistically if the contractor is allowed to place trainees on the owner's project and then, after a few months, ship the
new experienced employee to another of his projects such as a lump sum project. The employee recently transferred would then be replaced by another trainee or employee. This results in excessive relocation costs to the owner. The internal auditor should be watchful for trends of this nature and, if the situation exists, call the problem to the attention of his management for corrective action.

**Home Office Labor Indirect Payroll Costs**

The commentary above relating to payroll taxes and insurance and overhead rates also applies to this section. In addition, the internal auditor should be aware of the fact that, if the contractor's home office is out-of-state, the payroll taxes and insurance rates and rules may be different. For instance, one state may have a disability insurance tax along with unemployment insurance while another state has only unemployment insurance.

Home office overhead rates are usually much greater than field overhead rates. Justification for this higher rate is not always valid. F. E. Hall reports:

A careful analysis of the equity of the Contractor's assignment of overhead may pay off handsomely in terms of reductions in amounts claimed. Do not be swayed by arguments about consistency of treatment. The fact that a procedure has been consistently wrong for 100 years does not make it any more
acceptable now.\footnote{48} Anton Steven\footnote{49} reports a case where a flat 10\% was charged and upon examination of the Contractor's records found the rate should have been on a sliding scale. The audit resulted in a $5,000 savings.

In addition, R. L. Zeiders of the West Penn Power Company concurs on the basis of a study his firm made:

Many companies will bill separately an overhead rate which is intended to cover general office expenses. These costs often include rent, utilities, supervision, clerical cost, etc. We, as auditors, had an opportunity to get involved in verifying the accuracy of a proposed overhead rate that was to be used in a contract. We were able to establish that the denominator used in calculating the overhead percentage was considerably understated. This resulted in an inflated overhead rate. A lower overhead percentage was agreed to which resulted in substantial savings.\footnote{50}

Another important item to watch for is the incorrect application of the overhead rate to the premium portion of overtime. The philosophy is the same as mentioned previously.

The overhead rate base may be on labor, material, subcontracts, etc., and on an infinite number of

\begin{footnotes}
\item[49] op. cit., pp. 50-51.
\item[50] op. cit., p. 3.
\end{footnotes}
variations of these items or parts of these items. The larger construction contracts appear to base overheads mainly on labor. It also appears that those contractors who do not charge for any home office labor base the overhead rate on project labor and those who charge for home office labor base the overhead rate on the home office labor only. The latter, if there is a choice, is more preferable. It is common sense that the overhead rate which is supposed to cover home office and direct administration, etc. is more of a function of home office direct labor than field direct labor. But no matter what the base may be, it is of the utmost importance that the base be explicit as to exactly what is to be included in the base and what is included in the rate. This is the only way to justify the reasonableness of the rate for its inclusion in any construction contract. In addition to making similar statements, R. L. Zeiders also warns against overhead costs being invoiced as direct costs.

Permanent Material

Major construction projects of today are becoming more and more involved and as such more and more equipment and materials of many kinds are being required. The

51 op. cit., p. 3.
current trend in contracts for major construction projects is to allow the engineer-constructor to procure most of this equipment and material. This policy usually results in having material purchase orders and invoices being processed in the field by the contractor's field administrative forces.

Permanent material for a generating plant includes structures and equipment with costs ranging from a few cents for a small bolt to amounts in excess of $10,000,000 for a turbine-generator or a nuclear steam supply system.

The acquisition of permanent material is generally considered to have three phases—procurement, receiving, and invoice processing for payment.

Prior approval by the Owner should be required for all permanent materials and such procurement should be on a competitive basis. The owner should also review the bids before the contractor places any orders with the vendor, particularly on major purchases. The internal auditor should review the Contractor's procurement procedures to ascertain that internal control is adequate.

W. L. Dowd provides a procedure utilized by his firm:

On purchases of major materials and equipment, the contractor makes all the contacts for bids, etc., and submits these to our chief engineer and executive committee with their recommendations for approval before placing any orders . . . . Minor materials, even though collectively costing a great deal, are purchased through the contractor's local purchasing department with the approval of our
purchasing department. \footnote{op. cit., pp. 36-37.}

Also includable in the bid evaluation review should be the review of the vendor terms and discounts. The review of procurement internal control should also be extended to the contractor's field procurement operations. The owner should provide the contractor with a list of approved vendors; vendors that through the years have furnished material at the lowest costs along with satisfactory service. In addition, it is preferable that the vendors be in the owner's service area, all others being equal. All too often a contractor has placed an order for equipment on one of his preferred vendors, perhaps halfway across the country from the owner. Then, when the equipment needs servicing by the vendor, service is found lacking or too slow.

The review of procurement internal control should include observations for any possible vendor favoritism or collusion. This can leave a bad taste in the owner's project area if improperly handled. The contractor would not really care as he will be gone when the project is complete, but the owner will remain and good customer relations is a necessity. The owner should favor spreading the business around and should instruct...
the contractor to do the same. M. S. Fonorow has the following to say about collusion on construction projects:

In this area, an auditor must be on the lookout for favored contractors and suppliers. A review of disbursements should point out possible favorable contractors or suppliers. Records of bids or quotations submitted by those customary contractors should indicate whether the business they obtained was at least outwardly based on competition.

Such a review is useful because the first indication of possible collusion will generally appear in the bidding stage. It is here that the favored contractor, or the "cooperating" supplier appear on the scene; and such appearance may be a warning of collusion.

Collusion indicates some type of "pay-off." This pay-off may be made in cash; through an interest in a business venture; by gifts; by repairs, additions, or construction of a home; or merely by free dinners on special occasions. In some instances, favoritism may be based simply on friendship with no material goods being transferred.53

While free dinners and vendor friendship may appear to be collusion indicators, the internal auditor should be cautioned and not draw any conclusions from false indications. Many a buyer-salesman luncheon relationship has resulted in better vendor service. The two may be utilizing the luncheon to solve some delivery problems which may well be in the best interests of the owner, not only for present needs, but also for the future.

The internal auditor may wonder if the audit of procurement functions is beyond the scope of internal auditing. It is not. The purchasing people have come to realize that the internal audit group can be beneficial to their needs. P. V. Farrell concurs that a "good audit is a good thing for purchasing."

Also, in his review of the contractor's procurement procedures, the internal auditor should ascertain, with the assistance of the owner's traffic department, that the routing of material is both the most economical and expeditious. In addition, if in the course of his audit the internal auditor finds any trend of excess air freight, the auditor should immediately notify his management. Too often, the contractor does not allow sufficient lead time for procurement or fails to provide adequate expediting with the result that equipment is shipped by the more costly air freight to shore up a slipping schedule. Result—excessive freight charges.

In addition, the owner's traffic department should review the freight bill rates to determine the correctness of rates. The owner's traffic department should also make recommendations to the contractor on the wording of

freight bills. The contractor would then notify his vendors. The same material may be worded many different ways on a freight bill with a different freight rate for each verbiage. From time to time, the internal auditor may observe different freight charges for the same quantity of material from the same shipping point. The contractor should be requested to have his vendor have a correcting bill of lading issued which, in turn, should result in a freight credit. W. L. Dowd states that his firm has their traffic department check shipment routings before they give the contractor approval to purchase major materials and equipment. The Internal Auditing Procedure Manual also concurs that freight bills should be audited by transportation specialists.

Owners should also provide a procedure when reviewing bid evaluations whereby the contractor is required to furnish the budget estimate for items being considered for procurement. This would provide for better cost control. The Joint Internal Auditing Committee recommended a similar budget compliance

55 op. cit., p. 36.

56 op. cit., p. 31.
procedure in Case Study No. 10.  

Part of cost control also involves the verification of the quantity ordered with the quantity in the budget. The internal auditor must look to many sources to verify quantities—bills of materials, budgets, specifications, etc. This includes getting out of the office and performing the audit checks for the actual material itself. Any internal auditor worth his salt can realize more effect from his audit by not being afraid to get his hands dirty. F. E. Hall says that:

The good contract auditor does not stop here (verification of purchase orders and invoices); he will check bills of material, plans and specifications to determine that the material was actually needed for the job. He will check on the usage factors to determine whether excess quantities were purchased or whether efficient production methods have enabled the contractor to divert supposedly needed material to other jobs. He will check waste and scrap losses for evidence of inefficiency and unnecessary rejections, and assure that the contract is credited with salvage values.  

A good example of costs becoming excessive can be illustrated by inept substitution of costly material when less costly material could have been utilized. For


\[58\] op. cit., p. 68. (Parenthetical statement by writer.)
instance, a house service water line may have required low cost bronze screwed valves on the blueprint bill of material. The operating department, however, may feel that due to vibrations, welded valves should be used. The contractor having then been instructed to furnish welded valves would proceed to order and install very costly forged steel valves without considering medium-priced cast steel valves. Incidents such as these multiply excess costs. By learning about the many kinds of permanent material, the internal auditor can make more effective observations and recommendations that can result in cost savings to the owner.

So far, only the procurement aspect of permanent material has been considered, but equally important is a face check of material. The receiving function of the contractor is quite often tied in with purchasing functions much too closely. On some of the smaller projects, it is conceivable that the purchasing agent would also be the material checker as well as the accounts payable clerk. This is clearly a violation of sound practices of internal control. There should be a division of responsibilities between purchasing, receiving, and accounts payable. The American Institute of Certified Public Accountants' Committee on Auditing Procedure states:

The procedures adopted should provide the steps whereby transactions are authorized, recorded, and
the custody of assets accounted for. Sound practices should provide the means whereby the integrity of such authorizations, recordings, and custody may be reasonably assured. This is usually accomplished by a division of duties and responsibilities so that no one person will handle a transaction completely from beginning to end. The person authorizing or initiating the transaction should have no part in either its recording or the stewardship of the asset. Where circumstances will not permit such a division, an automatic check on the accuracy of the work is provided and the probability of errors or fraud being detected promptly is substantially enhanced. As was mentioned earlier, this division of responsibility applies departmentally as well as to individuals, and should carry through the entire organization at all levels of authority.59

Even with a separation of duties, the receiving function requires auditing. C. J. Hoeflick also concurs that "on-site receiving procedures should be reviewed."60 Reviews of this function from time to time usually result in a more positive performance by the contractor's receiving section.

From time to time, complaints are received from the contractor's receiving section to the extent that material is being received without a packing list. While packing lists do facilitate the checking of material, they may


60 op. cit., p. 56.
also lead to a laxity in checking. For instance, a material checker may prepare his material receiving report based on the packing list information which all too often is incorrect. Recourse to a vendor is extremely difficult at a later date when a shortage is discovered during installation. Therefore, complaints regarding the lack of packing lists should be countered by having the material checker count the material and make his own packing list. At the same time, his material received report should be noted that no packing list was received. This should alert the accounts payable clerk that if the invoice does not agree with the material received report, to request a recount before contacting the vendor regarding any overage, shortage, or other error. On the other hand, if the packing list agrees with the actual count and then the resulting material received report disagrees with the invoice, contact can be made with the vendor immediately regarding the discrepancy. Favorable vendor reaction appears to depend upon an immediate response upon receipt of a shipment. A. J. Gregory has similar thoughts:

The procedure for verifying materials and rental equipment should include a physical check of all items as they are delivered to the job site. Any differences in the quantity and description of items received from those listed on the vendor's delivery tickets should be followed up promptly.61

61 op. cit., p. 18.
Consideration should also be given to the feasibility of having the material checker or some such similar person assume the responsibility of determining whether all material received is properly tagged or marked with bill of material item numbers and, if not, see to it that the material is properly tagged or marked. This will facilitate installation, eliminate much searching, and result in cost savings.

The audit of the contractor's receiving function should also include a review of whether the correct material is being received in addition to the quantity. This, of course, requires some experience and the ability to think on the part of the receiving people. For instance, if not observant, it is possible for socket weld fittings to be mixed with or substituted for screwed fittings, A-53 seamless tubing substituted for A-106 grade A or B seamless tubing, rising stem valves substituted for non-rising stem valves, etc. While, in many cases, the substitute may be acceptable, there are many times when the specifications do not allow for any substitution. Therefore, it is extremely important that the material be reported accurately both as to quantity, quality, and type. C. J. Hoeflick draws a similar conclusion:

In addition to equipment, machines and other items shipped to the new plant after construction is
underway, there should be adequate receiving information for all the steel, bricks, lumber, concrete, pipe and other construction items that go into the new facility.62

Another quantity area the internal auditor should be watchful is that of bulk materials. Bulk material is, generally, based on weight. In many cases, such weight may be based on truck weight tickets that show the gross weight and the tare weight, both of which are sometimes stamped on the ticket by large truck scales. One thing to watch for in these cases are tickets on the same truck whereby the tare weight never changes. If it does not change, there is usually something wrong. An investigation should follow. The tare weight is supposed to be the weight of truck when empty. But the tare weight should fluctuate due to, possibly, part of the load still on truck, possible and variable accumulations of mud on the underside of the truck, and variations in the amount of gasoline in the truck's gasoline tank. Some trucks have tanks in excess of one-hundred gallons and, at approximately eight pounds per gallon, a one-half ton variation in the tare weight is possible.

Another possible weight discrepancy that can arise is in the area of fabricated metals. Quite often the

62 op. cit., p. 56.
Billing weights are predicated on shop drawing take-offs by size and converted into weight by tables before fabrication. The actual weight received is generally less, due to holes and cut-outs made during fabrication. In these cases, the weight on the railroad or truck freight bills may also be subject to question if the weight on the freight bills is a stated weight furnished by the fabricator. From the start of deliveries an occasional weight check on a railroad car or truck should be requested to monitor the freight bill weights. If a discrepancy occurs, this should be called to the attention of the internal auditor's management for immediate corrective action. Then, to carry this audit further, the freight bills having been reasonably verified are tallied and cross-referenced to the invoice weights. If a significant variance occurs, the variance should be brought to the attention of the vendor for a recheck of his billing weights. Credits could be the result of this type of monitoring. The joint Internal Audit Committees report similar possibilities in Case No. 134:

On many large construction projects, weights of steel for billing purposes are computed by converting lengths, as detailed on construction blueprints or steel company cutting shop job tickets, to pounds. Conversion tables, such as published in American Institute of Steel Construction handbooks or steel companies' catalogues, are used in computing these conversions. Weights so secured are, in some instances, used as the billing basis for steel material costs, steel erection costs, escalation costs, etc.
For audit purposes, if actual weight tickets (weightmaster scale certificates of either the rail or highway carrier, or independent weighing by the steel supplier) are available they may be used to verify, within reasonable variances, that billed weights, arrived at by the conversion process, are acceptable. In the absence of actual weight tickets, it has been our practice to insist on a detailed re-check, by our engineering staff, of all suppliers' conversions. This re-check has disclosed errors resulting in substantial recoveries of overbillings, for steel, freight, and erection labor, on several of our major construction projects.63

On some projects, the material checkers also have the function of checking the received material off of bills of material, etc. The internal auditor should also consider this area for audit as there is always the possibility that more material may have been ordered than was required. Anton Steven comments that "field engineers should also inspect materials for quantity and quality."64

Security is not only of significance to permanent materials but also is of importance to all aspects of a project. It is preferable that the entire project be fenced and patrolled by an independent guard service.


64 op. cit., p. 50.
Equally important is the security within the construction project area and the proper protection and storage of all materials. It can be very costly if excess time is spent searching for material not properly stored or spent cleaning and repairing material not properly protected. If these precautions are taken, mysterious disappearance lessens. A permit system or owner approved shipping ticket system should be provided and monitored for all material, etc., shipped off or removed from the construction project. A. Steven states that "materials arrived at or leaving the site should be controlled if practicable,"\(^\text{65}\) and F. E. Hall comments that:

Actual on-the-job verification on a selective basis of the receipt, storage, and protection of materials furnished for or charged to the contract, as well as frequent checks of usage to guard against waste and diversion to other uses, are highly recommended.\(^\text{66}\)

Once the material is received and checked out, the material received report is made out and submitted with supporting packing lists and freight bills to the accounts payable section for processing and payment. When the accounts payable section receives an invoice, they should match the invoice with the material received report and

\(^\text{65}\) op. cit., p. 50.

\(^\text{66}\) op. cit., p. 70.
check the invoice thoroughly with regard to price, extensions, trade and cash discounts, FOB points for freight, sales and/or use taxes, and, where procedures call for it—note the usage and accounting charge on the invoice. Upon completion of the above or similar procedures, the contractor should furnish to the owner the original invoice, material received report, freight bill or bill of lading, a copy of the voucher check certifying that the contractor has made payment, and a copy of the purchase order. While the procedures and documentation requirements may vary slightly, these are the procedures and documents that the internal auditor should audit. W. L. Dowd's statement as to coverage is as follows:

The internal auditors periodically check the cash vouchers for authenticity of payment, extensions, discounts, f.o.b. points, material received reports, etc., and spot check materials on hand to the contractor's record.67

J. S. White68 also concurs along with the verification of the construction account code classification.

Some may question why only original invoices should be required to support the procurement of permanent material or any material for that matter. While it is

67 op. cit., p. 37.

68 op. cit., p. 65.
possible to duplicate original invoices, it is a rare occurrence. But copies or duplicate invoices exist in profusion. The argument that material received reports eliminate duplicate payments does not always hold true. They, too, may be duplicated. Therefore, to keep duplicate billings to a minimum, the contractor should submit original invoices for reimbursement. J. S. White states:

Duplicate Billings have been made in several instances. During the construction of one of our operating units we were billed twice for the same purchase of valves in the amount of $5,000.69

Duplication of charges is particularly prevalent with freight bills. It seems the original always turns up last.

A contractor should always support a vendor's invoice that includes a freight charge with a copy of the vendor's prepaid freight bill. It will pay the internal auditor to be aware of those purchase orders that state FOB shipping point where the vendor ships collect and then adds freight to his invoice.

Many contractors will attempt to obtain reimbursement on invoices without passing any discount on to the owner. This is the reason many contracts written today make provisions specifically stating the discount is to

69 op. cit., p. 69.
be passed on to the owner. R. L. Zeiders states:

Another cost that sometimes is not billed at net cost is materials and supplies. Some companies will bill the gross cost of materials and supplies and not pass on any cash discounts that may be taken by them. We have experienced this situation on several contracts.\(^{70}\)

And Anton Steven states:

The method of handling trade, quantity, cash and prompt payment discounts, etc., should be specified in the contract and should usually be passed on to the company.\(^{71}\)

The high cost of money has brought about many serious objections by contractors in recent years to the passing on of the discount to the owner. On those projects where the owner advances monies to the contractor, or in other words finances the contractor, there is not too much objection. But on those projects where the contractor is only reimbursed periodically for out-of-pocket costs, the passing of the discount is questioned. C. J. Hoeflick makes a similar statement:

Refunds and rebates should certainly be credited to the company when received by the contractor. Cash discounts sometimes present a problem. In a cost-plus contract, it would appear reasonable for whoever does the financing of the particular charge to get credit for the cash discount. Thus, if the contractor takes the discount and withholds billing to the company until the normal time allowed by the

\(^{70}\) op. cit., p. 3.

\(^{71}\) op. cit., p. 46.
vendor without benefit of the cash discount, then
the contractor is doing the financing and the dis­
count is not a reduction of purchase price. How­
ever, if the contractor takes the cash discount
and immediately bills the company, the contractor
is merely passing the financing on to the company
and in this instance should also pass on the cash
discount.\textsuperscript{72}

The Joint Internal Auditing Committee\textsuperscript{73} points out
another discount area whereby an audit disclosed an
intercompany discount that was not passed on to the
owner by a vendor owned by the contractor. The credit
amounted to $2,723.01.

Electric generating plants require huge quantities
of electric cable. This cable normally comes on reels.
Some of these reels are returnable. Other returnable
containers consist of oil drums, carboys, etc. The in­
ternal auditor should ascertain that the contractor
maintains a container inventory, ships the empty con­
tainers back to the vendor promptly and passes the credit
on to the owner. J. S. White\textsuperscript{74} also calls attention to

\textsuperscript{72} op. cit., p. 55.

\textsuperscript{73} Internal Auditing Committees, Edison Electric
Institute and American Gas Association, Auditing Case
Studies. New York: Edison Electric Institute and

\textsuperscript{74} op. cit., p. 64.
returnable containers as does A. J. Gregory. More returnable items that yield credits and which the contractor occasionally overlooks are tarpaulins, equipment cradles, special tools furnished for the installation of permanent material, and special shipping containers.

Long-term major purchase orders are often quoted on a firm price to a certain date with increases for labor and material beyond the specified date to be charged to the owner or with adjustments to the base or firm price based on material and/or labor indices. The internal auditor should review all escalations especially taking note that indices escalations correlate to proper time periods. The Joint Internal Auditing Committee reports that one utility company was allowed $17,000.00 credit due to the incorrect timing correlation with escalation indices by a vendor.

**Temporary Material and Facilities**

While permanent material accounts for the major portion of all material costs, temporary materials and

---

75 op. cit., p. 18.

facilities make up a large number of miscellaneous items that in many ways are unique and require, at times, slightly different approaches. The requirements covered in the permanent material section relating to procedures, auditing, and control also apply to temporary materials and facilities and to all others sections involving material.

Temporary materials encompass many items such as form lumber, form oil, form tie rods, patented forms, wire, pipe, nuts, bolts, miscellaneous steel, water, oil, gasoline, electric heaters, pipe and electrical fittings, etc.

Temporary facilities include such items as temporary buildings, barricades, electrical service, piping for water and air, sanitary facilities, parking lots, roads, ramps, bridges, etc.

While permanent material is usually of a special nature and may be custom built, temporary material is of a nature that such material may be universally used. This factor leads to the requirement that security and control are of utmost importance for the protection of these temporary materials in order to keep mysterious disappearance to a minimum. Many crafts prefer to set up craft stock and tool rooms. This does not lend itself to an economic and efficient use of temporary materials.
and tools. Each craft then insists on their own stockroom man with the result of overstaffing as compared to a central warehouse and surplus at job's end. A check in and out system should be implemented on many items that are reusable. The internal auditor should investigate the contractor's existing procedures and controls in this area, report, and recommend accordingly. A. G. Beers has similar comments:

In construction it is essential that material control procedures have strength. It may be unpopular, but you should make every effort to provide the supply organization with adequate backing. Set quantities of material are usually purchased for specific purposes. If these are not on hand when required by the construction schedule, the time losses involved in their replacement can be out of all proportion to the original excuse for misappropriation. Construction foremen can be the world's worst packrats and, given half an opportunity, will create their own area warehouses, especially in small tools and general stock items. If they are made to learn early that "moonlight" requisitions will not be tolerated, and that the material organization is there of a good purpose, then a great deal of time loss and eventual unwelcome surplus might be avoided. Watch receiving and dispatching activities very closely—they have a habit of breaking down when confronted by strong, negative personalities—and be tolerant about pricing and posting standards as long as the incidence of error remains compatible with a temporary and generally overworked organization.  

Temporary materials are not quantified on bills of material. Therefore, it is important to monitor closely.

the quantities ordered by the contractor. There are two philosophies to consider in regard to quantities of temporary material. The first philosophy would consider buying in large quantities to obtain larger discounts. With this approach, the temporary material would always be on hand. The disadvantages of this consideration are mysterious disappearance, surplus at job's end, and material deterioration. The other philosophy would consider buying in small quantities as needed. While this approach would eliminate most of the disadvantages of the first philosophy, this approach would be more costly due to loss of quantity discounts, increased costs due to increased handling and processing, and possible schedule loss due to holdup for slow deliveries of required temporary materials. There does not appear to be any best approach. Nevertheless, continuous reviews of the contractor's control of temporary materials is very important.

Another thing sometimes unique in regard to temporary materials is that small miscellaneous items may be purchased via petty cash. The important thing to be watchful for in this area is that the material is required and that the receipt is legitimate. The use of petty cash vouchers also improves the uniformity of the petty cash system and provides for approvals by the
proper party. Case Study No. 57 made by the Joint Internal Auditing Committees suggested the use of cash purchase vouchers limited to $10.00 for field use.

While most contractors allow the contractor to pursue and construct the project as an independent contractor, there are times when the contractor appears to "gold-plate" things for their comfort. One of the items that requires a review for "gold-plating" is the contractor's field construction office. Often a contractor will become carried away in providing for his own comfort. The thing that should always be remembered is that such facilities are temporary. Therefore, the internal auditor should review for tendencies of this nature.

Other facilities such as construction air, water, and electricity are also temporary and as such should be built accordingly. Fancy lighting systems are costly as are air and water systems that are built to last a lifetime while the project is only scheduled to last a few years.

A considerable amount of the material built into a project is welded. This requires the use of many

electric welders. Quite often, at quitting time, the craft welders will just throw down their electrode holders and go home without shutting their machines off. This results in the wasted electrical costs. From time to time the internal auditor should tour the construction area after quitting time and review the waste of electrical facilities. This should be reported to the proper authority for corrective action. Often the action taken results in a person working overtime for a half hour touring the plant construction area to turn off construction equipment not turned off by the crafts.

It would be nigh on impossible to cover all the unique possibilities the internal auditor should be watchful for in the area of temporary materials and facilities. The internal auditor must be alert at all times with the thought that just around the corner, something new and different may turn up. As an example, the internal auditor may have fresh oxygen and acetylene bottles weighed when arriving on the job. It may be just possible the owner is being short-changed by the gas vendor.

**Tools and Supplies**

Like temporary materials, tools and supplies must be subject to control with the control procedures
reviewed and that the tools and supplies are properly accounted for. Tools are the most likely of all construction materials to disappear as construction progresses.

There are many different ways that tools may be handled as a reimbursable cost to the contractor. But, no matter which method or methods are utilized, the construction contract should be explicit. Guidelines should be made part of the contract. This aids all persons to determine the proper categories for borderline items. While this may appear obvious, many contracts do not define tools or distinguish between tools and supplies. Supplies, as referred to here, generally mean consumable tools. In addition, the contract should provide that some means be established to dispose of the surplus tools and supplies at the end of the job. C. J. Hoeflick states that:

The terminology "small tools" is often used in contracts and they are often charged to the company. Very few contracts, however, adequately define what is meant by small tools. The company would do well to have this spelled out so that it knows what it is agreeing to. The absence of proper definition poses another dilemma to the company's accountants and auditors.

When it is decided exactly what "small tools" means, the auditor should review the procedures for the use of and return to inventory of these tools. Despite the fact that the company is charged for these, they are usually in possession of the contractor for use by his personnel. The auditor should also be aware of the method of

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.
turning over all these tools to the company at the close of the project.\textsuperscript{79}

The definition of tools will vary from contractor to contractor. Some will include equipment and tools with an original cost of $300.00 to $500.00 or less as tools. Some will include hand tools but exclude power tools. This is one of the reasons that contractual guidelines are so important.

Tools may be procured outright on a direct cost basis, rented from the contractor or outside source, lump sum, or furnished by the contractor at a percentage of some base. J. S. White\textsuperscript{80} is of the opinion that, while large tools are usually rented, small tools are usually purchased outright and charged to the job.

Procured tools become the property of the owner while the contractor is using the tools. These tools should be brassed in and out and identified or marked in some way such as branding or etching with the owner's emblem or initials. This tends to discourage mysterious disappearances. A. G. Beers concurs in that "all tools should be stamped or burned with identifying marks and a

\textsuperscript{79} op. cit., p. 55.

\textsuperscript{80} op. cit., p. 64.
check system placed on the tool cribs."\(^{81}\)

Under the direct procurement system for providing the project with tools, the commentary for procurement of permanent material applies. The internal auditor should review the tool requisitions and inventories periodically to ascertain whether the contractor is buying more tools than is really needed. For instance, this writer can never understand why a contractor needs one hundred weld chipping hammers when there are only fifty welders on the job. J. S. White states:

> Over-tooling the job must be closely watched. On one of our jobs the contractor submitted a tool list amounting to a total cost of $160,000. Our field auditor questioned the need for some of the items and with the cooperation of our Engineering Department the job was tooled for less than $100,000.\(^{82}\)

Rental tools will be considered with the rental of construction equipment in the next section. This writer does not favor the rental of tools unless it is for a short period of time and economically feasible. Too often the rental rates for tools will exceed the cost of the tools many times over a three or four year period. In addition, the rental records and administration for rental tools becomes an administrative and audit nuisance

\(^{81}\)op. cit., p. 70.

\(^{82}\)op. cit., p. 68.
and out of proportion to the value involved.

The lump sum tool allowance or arrangement certainly should provide an incentive to the contractor to keep tool costs down. The system requires little audit effort. Whether the lump sum arrangement is an advantage to the owner or not from a monetary viewpoint depends upon the sharpness of the owner's pencil at the contract negotiating table. Audit watchfulness is required, however, for items the contractor may submit for direct reimbursement that really are not reimbursable and are part of what the contractor is required to furnish under his small tool allowance.

The percentage type small tool allowance is often based on labor with the rate often excessive and its application abused. The base should be explicitly defined in the contract. It is more preferable to base the rate on manual direct straight labor time costs and most certainly should not be based on additional overtime costs. Anton Steven reports that:

Tool charges are usually on the basis of a certain percentage of labor. If not on an actual cost basis the tool charge percentage used should be equitable and not contain a profit factor. One company was charged 8% on total labor for the use of small tools, charges for the year totaling about $6,700. During an audit of the contractor's cost ledger it was determined that his tool costs for the same year amounted to approximately $1,100, an over-billing of $5,600.83

83 op. cit. p. 47.
Whenever possible the internal auditor should re-
view the small tool allowance to compare the percentage
invoice charges to the contractor’s actual costs. Watch-
fulness of this type usually results in lower rates being
negotiated as change orders to construction contracts
according to the report of one utility as discussed in
the Joint Internal Auditing Committees’ Case Study 59.84

Construction Equipment

Like tools, construction equipment may be procured
outright, leased, or provided as a lump sum allowance or
percentage basis. Rentals of construction equipment are
by far the usual method of providing construction equip-
ment. Outright procurement accounts for most of the
rest of construction equipment utilized. Commentary in
above sections also apply in this section particularly
to outright procurement, lump sum, and percentage allow-
ances.

It is the rental of equipment that deserves further
commentary. Rental equipment can be grouped as three
different areas. First, the contractor may charge rental
rates to the owner for his use of his own equipment.

84 Internal Auditing Committees, Edison Electric
Institute and American Gas Association, Auditing Case
Studies. New York: Edison Electric Institute and
Second, equipment may be leased from outside vendors with the contractor providing the operation of the equipment. Such rental is referred to as bare rental. And third, equipment may be leased fully maintained and operated. Fully maintained and operated lease agreements should be written up as subcontracts thereby setting up a contractual relationship for insurance and indemnity, particularly Workmen's Compensation Insurance.

Hopefully, the contract will contain such control clauses as the owner's right to approve or disapprove all rental activity and the owner's right to procure or lease from the source providing the greatest savings to the owner. This means that comparable feasibility studies should be made. The internal auditor should review these studies for compliance. Also, it is preferable that contracts provide lists of rental equipment with their corresponding rental rates to be charged by the contractor. Anton Steven concurs that the:

Rental of equipment rates should be included. A list should be submitted giving a description of equipment and the hourly, weekly, or monthly rentals.\(^8^5\)

Other methods to arrive at rental rates involve references to rental rate guides such as the 21st Edition

\(^8^5\) op. cit., p. 47.
Compilation of Nationally Averaged 1969 Rental Rates or the Contractors' Equipment Ownership Expense guide. The first guide is commonly referred to as the AED book and the second guide as the AGC book. The AED book gives rental rates for construction equipment by the month, week, or day. While the rates are supposedly only suggestive, the AED rates or xx percent of the AED rates are the rates charged. The AGC book is intended primarily as a costing guide for a contractor's lump sum or unit price contract. But the utilization of the percentages given in the AGC book to original costs yields rental rates that are often used with cost-plus contracts. There are also other minor and seldom used approaches, but most contracts only refer to one method and may or may not cover other equipment by mutual agreement. J. S. White states that "in keeping with contractual arrangements, the contractor usually furnishes equipment and tools used in construction work and rental


is charged at rates approved by the owner's management." 88

The internal auditor should be watchful of rental charges based on daily rates when weekly and monthly rates exist. The construction contract that provides all three rates should also state that all three rates are to be used to arrive at the lowest rental charge to the owner for the time used. For instance, one month's rental rate may be less than the charge for three weeks' or one week's rental charge may be less than the charge for four days. The Joint Internal Auditing Committees found in Case Study No. 77 that:

Prices charged by contractors for rental of major equipment may be at daily rates or monthly rates, as specified in the Contractors' Associated Schedules of Rates. The auditor observed that certain equipment was being used almost every day of the month and that daily rental rates were being paid. A study of costs indicated that it would be more economical to rent the equipment by the month, with the result that a yearly saving of $15,000 was made. It was also found that it would be more economical to purchase certain equipment, such as trenching machines, than to rent them. 89

There are two approaches to the apportioning of monthly rates. One approach is based on a thirty-day

88 op. cit., p. 64.

month. The other approach is based on a twenty-two day month at eight hours per day for one hundred seventy-six hours per month. Again, with these different approaches, it is important the contract be specific on what and how rental rates are to be charged. This is also pointed out by R. L. Zeiders:

Be sure there is a clear understanding of the basis on which (a) the work will be done, and (b) the costs will be billed . . . . The second example involves the billing of equipment. In this case, the contract provided that equipment billed be at the lowest rate. The understanding that the company had was that the lowest rate was the one (hourly, weekly, or monthly) which resulted in the lowest cost based on the use of the equipment. For example, let us assume a bulldozer was used 176 hours during a particular month, and the equipment rates were $10 an hour, $360 per week, and $1,240 per month. If the hourly rate was used the billing would be $1,760, but if the monthly rate was used the billing would only be $1,240 or a savings of $520. In this instance, the contractor submitted his hourly rates for equipment and this was made part of the contract. The contractor's interpretation was that the hourly rates were the lowest rates for the type of work covered by the contract. Since most of the contractor's equipment was used extensively over an extended period, the difference between hourly and monthly rates was significant. This item was negotiated and substantial savings were realized.90

Rental rates whether part of the original contract negotiations or added later should always be viewed with caution. Comparative reviews are always in order.

Rental rates, regardless of source, normally include

90 op. cit., pp. 4-5.
the rental, repairs due to normal wear and tear, and profit. This should alert the internal auditor to a few things. Because profit is normally included in rental rates, the rental charges should not be included in any base from which any fee or other profit is derived. In addition, the total profit from rentals increases with usage. From this, it follows that the on and off dates for rental must be monitored as the contractor has the incentive to place as much equipment on rent as soon as he can and leave as much equipment on rent as long as he can. Idle equipment should be reported for corrective action. This is one of the reasons frequent equipment rental checks should be made. A. Gregory states that "in verifying rental equipment it is necessary to determine not only that the equipment is on the job but that it is being used."91

Further, the contractor must be continually monitored by the internal auditor for normal repairs to equipment that are sometimes passed on as reimbursable costs under the guise of abnormal repairs or maintenance. One approach to help keep maintenance and repair costs down is to insist that the contractor furnish new or like-new equipment and, according to J. S. White, "it is

91 op. cit., p. 18.
the field auditor's responsibility to see that rented tools and equipment are in good operating condition when received on the job as evidenced by inspection reports." 92

There is nothing worse than the contractor who brings his worn or damaged equipment on rental and then promptly proceeds to repair the equipment at the owner's cost. Repairs should be close to nil during the first three years of life on major construction equipment.

Another unique approach by a contractor is reported by the Joint Internal Auditing Committees:

Internal audit of a cost-plus contract disclosed an unusual situation involving equipment repairs which had resulted in an overcharge by contractor.

In the construction of a pipeline, it was necessary for the contractor to rent construction equipment and the rental paid amounting to $100,700 was charged to the cost of the job. Under the rental agreement, the contractor was required to make such repairs to the equipment as would be necessary to keep it in as good condition as when received on the job, with reasonable wear excepted. The total cost of the repairs to this equipment was $25,800, and this amount was charged to the job.

Shortly before the completion of the construction, however, practically all of this rented equipment was purchased by the contractor. Of the $25,800 charged to the job, $12,700 represented the cost of rehabilitating the equipment after it became the property of the contractor. While it was perfectly proper for the contractor to charge the cost of repairing equipment while on job location to the cost of that job, it was evident in this particular instance that the repairs to the equipment after

92 op. cit., p. 64.
purchase represented a capital investment of the contractor and should not have been charged to the cost of the job. Upon disclosure of the facts, the overcharge of $12,700 was recovered by the company.93

This episode also teaches a few lessons. The internal auditor was watchful of repair responsibilities and was instrumental in saving his firm from being charged unjustly.

It should be noted that the contractor purchased rental equipment from a lessor. While this may be an ordinary purchase, there is the possibility that the contractor had recaptured that equipment. Recapture of rental equipment means that a certain percentage, say 90%, of the rentals paid may apply against an agreed to purchase price of the equipment being leased. It is similar to buying equipment on the installment plan and is also referred to as a lease with an option to buy. The prudent owner should instruct his contractor to include recapture rights in all outside bare rental agreements when allowable and economically feasible. Further, the recapture right should be in the owner's name. This is a good method for an owner to acquire construction equipment. The internal auditor should review the

contractor's records for these recapture clauses and monitor the accounting thereof. In addition, steps should be taken to have the newly recaptured equipment marked or identified as the owner's.

The internal auditor should be watchful for the possible use of cost-plus rental equipment being used on lump sum or unit price work. A. J. Gregory concurs that:

We must distinguish between items of material and equipment which are used on cost-plus jobs from those which are used on lump-sum jobs. On cost-plus jobs we must further distinguish between items of equipment which are on a rental basis and those which are furnished under the provisions of a fixed overhead or a lump sum payment.94

As mentioned above, rental rates normally include repairs due to normal wear and tear. This means the owner is to pay for operation, maintenance, and abnormal repairs. The internal auditor would find it helpful if the contract contained guide lists distinguishing between repairs and maintenance.

But all contracts do not necessarily include normal repairs as part of rental basic rates. Whatever is or is not included in the rental rate should be specifically stated along with explicit definitions to reimburse the contractor for operating, maintenance, and repair costs. Sometimes percentage arrangements are included in the

94 op. cit., p. 18.
contract based on rental charges for equipment and tools. The internal auditor should verify that rentals are not charged for those items that are includable in the charges based in the percentage rate.

Under the field nonmanual labor section above, reference was made to the fact that the internal auditor should be watchful for unacceptable charges covering the relocation of personnel leaving the project. Such charges should be considered unacceptable because the owner receiving the relocated contractor's employee should normally be charged. The same philosophy should apply to the contractor's rental equipment. Incoming freight should be considered acceptable by the internal auditor if the charges are reasonable. Outgoing freight should be considered acceptable only when the construction equipment is being returned to the contractor's yard for storage. While this should be considered reasonable for the contractor, it is often very difficult to lease from outside vendors without having to agree to be liable for freight in both directions. The internal auditor should, however, monitor all lease agreements to ascertain whether the contractor negotiated for the best rental agreement and attempted, reasonably, to exclude outgoing freight.

Quite often the contractor chooses not to furnish
rental equipment. As mentioned above, the two other modes of construction equipment rentals take the form of bare rental and fully maintained and operated rentals. This leads one to wonder why the contractor does not buy the equipment and then rent it to the owner. To aid the internal auditor in understanding why the contractor may seek alternate methods of renting, the following advantages and disadvantages of leasing as set forth by the National Industrial Conference Board are listed:

Leasing has several widely acknowledged advantages over ownership. It enables the lessee to:

1. Obtain the use of facilities that cannot be acquired in any other way or that are needed only temporarily.
2. Hedge the risk of equipment obsolescence.
3. Avoid administrative, maintenance, and service problems.
4. Obtain an additional source of financing.
5. Gain flexibility.

Several claims that used to be made concerning the advantages of leasing are now pretty well discredited by the financial community, such as the claim that it is the only financing mechanism that frees working capital for other purposes, that it yields tax savings, that it improves the lessee's apparent financial position, and that it eliminates the need for management to review capital expenditures.

The principle disadvantages of leasing are: (1) as a rule it is a high-cost form of financing, and (2) it entails the lessee's surrendering the residual value of the assets leased.\(^{95}\)

Consideration should also be given to the fact that many contractors do not want to own vast fleets and warehouses of construction equipment. Another reason contractors dislike owning much equipment is that hardly ever are there two jobs alike which would have similar equipment requirements. This same factor also makes it difficult for the internal auditor to justify rental rates by comparison. W. H. Rossman\textsuperscript{96} also agrees that, in addition to job differences, location and conditions affect rates. There is no doubt that equipment rental auditing is very complex and that the internal auditor must bring many factors into play in making considerations for his reports. Also, the American Institute of Certified Public Accountants Committee on Contractor Accounting and Auditing report that the auditor should be alert for:

\begin{itemize}
  \item \textit{excessive charges for contractor's equipment used on the jobsite}---the contractor's accounting system should provide for charging contracts in process with the costs related to the equipment used on the project.
  \item \textit{charges for rented equipment, with option to buy}---contractors often rent field equipment with option to buy, with rental payments to apply against the purchase price.
\end{itemize}

Equipment rental charges, and the related rental contracts should be reviewed.\textsuperscript{97}


\textsuperscript{97} op. cit., p. 45.
Subcontracts

It is very rare indeed when a general contractor does not subcontract some portion of his work during the construction of major facilities for utilities. But the fact that some of the work is subcontracted does not alter the necessity to audit cost-plus subcontracts or any extra work on a cost-plus basis on lump-sum or unit price subcontracts. All the rules, procedures, and controls that apply to general contracts also apply to subcontracts, whether lump-sum, unit price, or cost-plus.

The subcontractor section of the general contract should provide for complete owner approval of all subcontract work and the subcontract format should be written in a manner that is satisfactory to the owner and subject to owner approval. Anton Steven states that:

The company should have the authority to approve or reject subcontracting of any portions of the work. The terms of the general contract should also apply to any subcontractor so that the company will essentially have the same control over any of the contractors on the job. The contract should specify whether or not subcontractors' charges are to be included in the base on which overhead and profit are computed. 98

Included in the subcontract section of the general contractor and for the general control of subcontracts

98 op. cit., p. 47.
should be a clause requiring the contractor to include a right to audit clause in all cost-plus subcontracts and in all extra work change orders. This audit clause should provide for audits during and after the work and not just after the completion of the work. Effective audits just cannot be made after the fact. Also, it is not just enough that the general contract provides that all subcontractors must abide by the terms contained in the general contract. The general contract conditions are agreements between the owner and the general contractor and not between the owner and the subcontractor. Therefore, it is important that subcontracts have all the essential control conditions as do the general contract.

The internal auditor should review the contractor's controls and procedures relating to subcontracts. First, the contractor should submit a proposed subcontract, a list of qualified potential bidders, and the budget amount for that portion of the work to be subcontracted for the owner's review. The internal auditor, among others, should review these three items for conformance to proper procedures and control and assurance that the subcontract will be in the best interests of the owner. The bidders' qualifications should be verified to ascertain that the bidders are both interested and capable of
performing the work. Capability refers to financial responsibility as well as experience and know-how. The budget amount is necessary to assist in the bidder qualification review. Without knowing the estimated amount of the work proposed to be subcontracted, the internal auditor cannot determine whether a proposed bidder is able to handle the financial responsibility for the work. A small contractor may or may not be able to handle a large subcontract. Only a review of the contractor's financial statements and credit rating will assist in making this determination.

The budget amount of the estimate also comes into play when, after the approved proposal is submitted to the qualified bidders, the contractor submits to the owner for review an evaluation and recommendation of the bids received. The budget amount should become part of the evaluation. It assists in the project cost control program.

A review should also be made to verify that the bidders were properly instructed on how to bid, that all bidders were sent the same information, and when and where the bids were due. The acceptance of late bids leads to possible "hanky-panky" and should not be tolerated. If one bidder is allowed a rebid, the other bidders should be allowed the same privilege. If a bid is
accepted, the other bidders should be notified of their position. After the last step has been consummated, and only then, should the contractor be allowed to carry on further negotiations with the potential subcontractor. It is also preferable that the owner's representative sit in on all sessions relating to subcontract awards and negotiations.

One of the reasons why general contractors sometimes subcontract portions of their work is that some portions of the work are specialized and are not of the type that the general contractor normally performs. Examples of specialized work often subcontracted on large generating plant projects are insulating, painting, sheet metal work, independent testing, marine work, etc. It is understandable in these cases that specialized work should be subcontracted. It also follows that the general contract should have been negotiated with this understanding and the fee properly reflected thereby.

M. S. Fonorow would also add that:

Savings will not be passed on unless the contractor is required to submit a competitive bid for handling subcontracts at the same time that he is submitting his bid for the major work.\(^9\)

Another of the reasons certain portions of the work

\(^9\)op. cit., p. 43.
are subcontracted is that there may be a misleading consensus of opinion that it is cheaper to subcontract the work than have the general contractor perform the work on a cost-plus basis. If the general contract had been negotiated on the above basis mentioned by M. S. Fonorow, then it is very possible that subcontracting of the specialized work may be cheaper. But, if the general contract fee was not predicated on subcontracting any portion, it is doubtful if any savings can be realized by subcontracting any portion of the work on a cost-plus basis. On the other hand, the subcontracting on a lump sum or unit price basis may be cheaper. This is somewhat similar to the thoughts of M. S. Fonorow:

The subcontract phase of contractual provisions is frequently skimmed over. Subcontract work is usually less expensive for a contractor than the work which he performs with his own men. Some general contractors occasionally operate as brokers, and "sub" out everything but the profit. Overhead cost for subcontract work is cheaper because the general contractor does not usually have to locate suppliers; expedite delivery; pay for materials; maintain detailed payroll records; and provide home office supervision. He should therefore be willing to pass some of this savings on to the purchaser (owner). 100

In other words, if a contractor has a cost-plus a fee contract to do the entire job, the contractor should not be allowed to subcontract any portion of the work unless

100 op. cit., p. 43. (Parenthetical note by writer.)
the contractor can show the owner that such a subcontract arrangement will result in no additional cost to the owner. Subcontracts which would result in reduced costs should be looked upon favorably.

On a cost-plus basis, the source and cost of labor is essentially the same for the contractor as it is for the subcontractor. So, unless the subcontractor can furnish material considerably cheaper than can the contractor, it is this writer's opinion that such cost-plus subcontracts result in extra costs to the owner, mainly due to the subcontractor's profit. The contractor may have included the same profit in his fee. This is profit on profit.

There are even times when lump-sum and/or unit price subcontracts, which many consider a cheaper way to do parts of the work rather than on a cost-plus basis by the general contractor, may result in higher costs than if done on a cost-plus basis. As almost everyone knows, a contractor bidding on lump-sum or unit price contracts must include a contingency in his bid for unforeseen costs. Unless the contractor is able to reduce his other costs substantially to offset the contingency, such types of bids could result in costs higher than on a cost-plus basis.

The internal auditor should view with suspicion
bids that have wide spreads, bids that group but with one extra low bid not in the group, and bids that group high or low compared to the contractor's estimate for the work. Bids that have wide spreads may have been based on insufficient information to properly bid the work. Such subcontracts usually result in excessive extra work charges. Bids that group except for one extra low bidder may be a case of deliberate underbidding with the hope of making a killing on extra work charges. Bids that group high or low compared to the contractor's estimate could be due to insufficient information and/or the contractor's estimate is in error.

The statements in the above paragraph should not lull the auditor into believing that, if subcontract bids do not fall into the above stated categories, all is well. All extra work charges must be reviewed carefully. One important thought to keep in mind when reviewing extra work is whether or not the extra work charges are part of some lump sum or unit price contract.

Bids for subcontracts that are to be based on lump sum or unit prices should also include some definition of cost arrangement for extra work. While it may be redundant, it is important to remember that the rules, procedures, and controls mentioned in this paper also apply to subcontract extra work charges. If not controlled, extra work charges will become excessive.
Equally important is the proper control of change orders for extra work. The subcontractor should not be allowed to proceed with any extra work without an approved subcontract change order. H. W. Wolkstein states that it is important to establish a policy and standard practices for controlling and authorizing extra work.

All portions of the subcontractor's invoices should receive as much attention by the internal auditor as any of the portions of the contractor's invoices. At times, it appears that the contractor does not maintain the proper control over the subcontractor's actions and invoices. This places a greater burden on the internal auditor. The owner ends up performing management and audit work on subcontracts. In these cases, the internal auditor has the responsibility to report the deficiency. The owner's representative must then take the necessary corrective action to place the contractual responsibilities back into their proper perspective.

Taxes

Many taxes are usually included in the contractor's

---

fee. Such taxes usually are federal income taxes, business activity taxes, corporate franchise taxes, and corporate property taxes. The contract should specify what taxes are included in the contractor's fee. The internal auditor should be aware of exactly what taxes are reimbursable or nonreimbursable to the contractor.

Some of the reimbursable taxes are state and federal gasoline taxes, states' sales and use taxes, federal excise taxes, and personal property taxes on construction equipment in some cases.

Most states levy gasoline taxes on purchase of same. The owner normally reimburses the contractor, who, in turn, reimburses the vendor for such taxes. There is nothing unusual in this except the fact that in many states, such as Michigan and Wisconsin, gasoline used for non-highway purposes is gasoline highway tax exempt. The contractor may apply for a refund from the state for gasoline used for non-highway equipment. In Michigan, this application for a refund must be made within six months of purchase or the potential refund is lost. If the internal auditor is not alert, the contractor may obtain such a refund but fail to pass the credit on to the owner. The Joint Internal Auditing Committees reports such a case:

The internal auditor noted that large quantities of gasoline were being delivered to the job site
and invoices supporting the deliveries were being approved for payment and included in the job cost. This gasoline was being used in various pieces of construction equipment in off-highway construction and therefore was not subject to State Motor Fuel Taxes. An examination of the books and records at the contractor's head office revealed that they had claimed and received from the State a refund of 4-1/2 cents a gallon, less State Sales Tax, on all gas purchases but had not passed the credit on to the job cost. This item was called to the attention of the contractor and a credit of $4,349.29 was allowed the utility company to cover the period from beginning of work to date of audit, and arrangements were made to credit the job costs with the amount of gasoline tax refunds in the future.102

A. J. Gregory103 and Anton Steven104 also caution the internal auditor to be alert and expect gasoline tax refunds.

It is suggested the internal auditor be familiar with his applicable state or federal laws and regulations related thereto for each tax. For instance, in Michigan the contractor is eligible for the gasoline tax for that gasoline purchased for non-highway use. There is a slight hitch to this rule. A truck may be used entirely for construction, all of which is non-highway, but if the


103 op. cit., p. 18.

104 op. cit., p. 51.
truck is licensed, it is not eligible for the non-highway use exemption.

Federal gasoline tax refunds may be slightly more difficult to obtain. While based on the same principle as most states, the tax is not refunded directly. The taxpayer is allowed to utilize the amount of exempt taxes as a credit against his federal income taxes. In most cases, the contractor must be requested to pass the credit on to the owner.

Michigan State Sales and Use Taxes become more complicated each year. Utilities receive an industrial processing exemption for the equipment in their generating plants and compressor stations. Structures, even though special and custom built, and transmission lines are taxable. The State of Michigan recently passed an amendment to the Michigan Sales and Use Tax Act effective May 1, 1970 for administrative purposes on construction contracts dated after this date. In essence, the new ruling places a dichotomy on the tax structure. Equipment not a part of or permanently affixed to realty is considered tangible personal property. Most of this equipment qualifies for the industrial processing

---

exemption. Tangible personal property may be purchased tax exempt by the subcontractor or contractor for resale or use. If the equipment is taxable, the subcontractor or contractor may pay the tax directly to the State. The contractor or subcontractor must have a sales tax license to do this.

Other equipment, materials, etc., that are structures, a part of or permanently affixed to realty are considered taxable. These items may not be purchased for resale. The contractor or subcontractor is required to remit the tax to the seller in those cases where the seller is located in Michigan or has a sales tax license to sell in Michigan. In those cases where the seller is located without Michigan and has no sales tax license, the contractor or subcontractor is to procure the material tax exempt for resale and remit the tax to the State as a user under the Use Tax rules.

While this recent change from the contractor being able to purchase all items exempt and remitting the applicable tax to the State themselves does not individually pose any particular operational problem, it does become a problem with certain bulk items and with the structural steel on fossil fuel generating plants.

Those who are familiar with large fossil fuel generating plants know that the steam generator (boiler) is
supported from the roof steel. This means that the structural steel columns and beams from the base slab to the roof have to be engineered structurally to support the greater weight. Thus, the structural steel, in addition to being the structural skeleton for the structural building, also must act as an equipment support base for the steam generator. This means that the structural steel is a dual purpose for tax law application.

To make such an arrangement workable under the new tax rules, it is important that the proper tax base be furnished the steel supplier.

Other rules in the sales tax law must also be considered when reviewing the various bids for structural steel purchase orders or contracts. The contractor may purchase the structural steel outright and do his own erection. It is also possible to contract with the supplier to furnish and erect. Structural steel for major generating plants is custom designed and fabricated by the supplier from his supply of bulk steel. If the structural steel is purchased outright for the contractor's erection, both the structural steel and the cost of shop fabrication is taxable. The rule changes when the supplier furnishes the structural steel, shop fabricates the structural steel, and erects the structural
steel. In this case, only the cost of the steel before fabrication is taxable. This difference may have a profound effect on which route the contractor may take.

All of this can be further complicated during the evaluation stage by changing the point of title transfer. F.O.B.-destination means that the title changes at the jobsite and F.O.B.-shipping point means that the title changes at the supplier's shipping dock. In case of damage during transit, the party having title to the material is responsible for initiating freight claims. Also, freight follows the taxability of the material only if the material is purchased F.O.B.-destination.

Those items, too, can be of importance in evaluating the various modes of construction and delivery. The Joint Internal Auditing Committee has the following to say regarding sales and use tax:

In many contracts covering purchases of large transformers, condensers, turbines, boilers, etc., provision is made for purchase "F.O.B.-(actual location) Point of Shipment--Freight Allowed to Destination" or its equivalent and a freight allowance is included in the total contract price. In some instances, salary and expenses of an installation supervisor, in the employ of the manufacturer, are also included in the total contract price.

In states levying sales or use taxes, an appreciable tax saving may be made by adhering to requirements which, if followed, permit eliminating transportation and installation supervision costs from the total contract price to arrive at sales or use tax base. Requirements usually include that:

(a) An estimate of both freight and
installation supervision costs are separately stated in the purchase contract.

(b) Manufacturers' invoices separately state the estimated or actual amounts of freight and installation supervision costs.

During the recent construction of a major addition to plant, freight on large equipment totalled more than $250,000 which, when eliminated from tax base, resulted in a tax saving of $7,500.\textsuperscript{106}

Therefore, it is important that the internal auditor be aware on a current basis of the effects of the sales and use tax laws as they may apply to each and every phase of construction contract operations. Verifying sales tax is a continuous function of the internal auditor.

Federal excise taxes on lubricants is another area the internal auditor must monitor. From time to time, oil is purchased for purposes other than lubrication. Such purposes may be insulating oil used in transformers and circuit breakers and hydraulic oils. Without the proper claim for exemption during procurement, the vendor will add the federal excise tax for lubricants. Contractors could be unaware of this exemption. Should any cases of this nature arise, the internal auditor should

inform the contractor of this exemption. The Joint Internal Auditing Committees report on such a case involving the federal excise tax:

The company had recently completed construction of two large earth-fill dams in connection with development of hydrogeneration facilities. Both projects were cost-plus jobs.

During the examination of the contractor's records, the auditor noted that a considerable amount of hydraulic oil had been purchased for use in hoists and shock absorbers on earth moving equipment. Subsequent investigation disclosed that the vendor's price included federal taxes. As hydraulic oil is normally used for other than lubricating purposes, a tax exemption certificate should have been executed to recover taxes included in vendor billings.

The contractor was not aware that oil used for non-lubricating purposes is exempt from federal taxes. A claim for credit was prepared and approximately $1,000.00 recovered.\textsuperscript{107}

Personal property taxes on construction equipment can be a vague or unsure item with no one really sure if it is reimbursable to the contractor or not. Personal property taxes is that tax assessed on the value of the contractor's construction equipment and is usually assessed on that equipment on the owner's project on a particular day in each year. Most contracts are silent regarding the disposition of this tax. It is this writer's

opinion, however, that such a tax is not reimbursable as a tax alone but should be reimbursable as part of the contractor's rental rates. Some contracts, while silent regarding this tax, do state that any taxes or permits required to do business in the locale of the owner's project are not reimbursable.

Insurance

The insurance requirements vary from contract to contract. The owner will have certain requirements. The owner may furnish some insurance for their benefit and, in some cases, for the benefit of the contractor. The owner may also require the contractor and his subcontractors to furnish certain minimums of insurance, the premiums of which are reimbursable.

The contractor, too, may have requirements. Some of these should be negotiated before the execution of the contract. These requirements will vary depending upon the amount of liability the owner wants the contractor to assume. Premiums for these requirements are normally reimbursable. Requirements of the contractor may exceed the owner's contractual requirements. Premiums for this excess coverage are normally not reimbursable. In addition, the contractor may require their subcontractors to carry more insurance than contractually
required under the subcontract requirement section in their contract with the owner. Costs for these excess coverages are also nonreimbursable.

The internal auditor should be familiar with the insurance sections of the contracts. This will enable the auditor to know what insurance premiums are reimbursable or nonreimbursable. Should there be any evidence of duplicate coverage, the internal auditor should report such duplication for corrective action. Duplicate coverage may occur as is evidenced by a case study by the Joint Internal Auditing Committees:

For proper and complete protection, companies must necessarily insure against liability for all possible and unforeseen casualty and property damage losses. However, the widely diversified types of insurance protection, covering all causes, can very easily lead to a duplication under one type of policy, when complete coverage under another policy already has been effected.

In order to obtain complete fire insurance protection on all company properties, because of the number of properties and large values involved, insurance may be placed with both stock and mutual companies. Fire insurance policies issued by stock companies normally insure against fire damage only, whereas policies issued by mutual companies are more comprehensive. The mutual companies form of standard coverage provide protection against loss due to damage by riot and civil commotion, but not including malicious mischief and vandalism. It was, therefore, necessary to place insurance to cover all properties against such losses, including the malicious mischief and vandalism features.

The Audit Procedure provides for an examination and comparison of all insurance policies, to determine the possible existence of any apparent similarity in the types of coverage. In a recent audit, this
comparison of insurance policies revealed that mutual companies had changed their standard form of fire insurance policies to include protection from damage caused by malicious mischief and vandalism, thereby making the inclusion of such properties unnecessary in the blanket policy for riot and civil commotion insurance. This condition was brought to the attention of the Insurance Agent who arranged for the immediate cancellation of the duplicate coverage under the riot and civil commotion policy, resulting in a premium refund of approximately $10,000.00.

In addition, a reclassification of the property covered under the riot and civil commotion policy will be required due to the elimination of those properties covered under the fire insurance policies. This will reduce the average premium rate and result in further annual premium savings.108

There are times when either the owner or contractor should allow the other to procure the necessary coverage. By obtaining wider coverage or by obtaining more and/or different coverages from the same insurance company, it is possible that the total overall premium cost may be cheaper.

Some of the insurance coverages the internal auditor will encounter are:

1. Workmen's Compensation Insurance
2. Public Liability and Property Damage Insurance
3. Comprehensive General Liability Insurance

4. Contractor's Protective Liability Insurance
5. Excess Liability Insurance
6. All Risk Insurance for Installation and Transportation
7. Equipment Insurance
8. Nuclear Insurance

Some of these insurances have deductibles. The internal auditor should be sure the deductible amount is proper when auditing insurance claims. In addition, the internal auditor should review construction operations to ascertain that all possible claims covered by insurance are made and the claims received.

Care should also be taken that the contractor and his subcontractors furnish evidence of insurance coverage before they commence work. This is particularly important with Workmen's Compensation Insurance. If a policy is about to expire, the contractor or his subcontractor should be notified that insurance coverage renewals are required. If the insurance is not renewed, the contractor or his subcontractor should not be allowed to continue work until the evidence of renewal has been received.

Many insurance premiums are arrived at by applying a rate to some base. The internal auditor should review these insurance bases to ascertain that the bases include only those items called for in the policies.
authorized by the contract. In many cases, the internal auditor will have to review the actual policies to determine the make-up of the rate base. For instance, equipment rental damage insurance may be based on the bare rental charges in each month. The internal auditor should ascertain that the base does not include freight charges or state use taxes.

**Other Field Costs**

This section includes some of the miscellaneous varying factors that may arise in the field and have not been covered above. Some of these miscellaneous field items are office supplies, medical supplies, reproduction, surplus and salvage, backcharges, and performance bonds.

Office supplies contain certain items that are normally not used up by the end of the job. An example of such a supply is the stapler. Whether the owner or the contractor furnishes these supplies, a perpetual inventory should be kept on some of these items to assure the return of these items to the owner upon the completion of the project.

A review should also be made on the controls for the issuing of office supplies. For some reason the quantity of office supplies consumed appears at times to be out of
proportion to the number of personnel on a project. The internal auditor should pay particular attention to stationery issuance in late August and early September as well as a possible run on tape at Christmas time. Tighter controls on the postage stamps or postage machine is also in order prior to Christmas. The contractor's requisitions for additional postage to mail federal income tax statements in January should be withheld until the end of December.

Everyone favors a safety-oriented project with adequate first-aid facilities, but there are times when a contractor may allow their safety and first-aid supervisors to provide more facilities than is necessary. This results in first-aid facilities almost comparable to emergency rooms in hospitals. While it is not objectionable to be well equipped, care should be taken that the first-aid personnel do not administer medical care and/or medicines that they are not licensed or qualified to do. Such well-meaning action could lead to law suits. Therefore, a review should be made from time to time of the type and kind of medical aid and medicines dispensed.

It is only in recent years that the reproduction or copying machine has been utilized to a great extent on construction projects. It makes one wonder, upon reviewing the huge quantity of copies being made, how a
plant was ever built years ago. From time to time, the internal auditor should review the distribution of copies and their use. The review should point out excess copies being made and not used. The review, of course, should lead to corrective action for fewer copies.

Oftentimes, the contractor needs to be reminded that, when forms or a large number of copies are required, there are cheaper methods of reproduction. Such cheaper methods are ditto machines, mimeographing machines, and even outside printers.

When the project is about complete, the contractor should be instructed by the owner to make an inventory of all surplus material, equipment, tools and supplies along with any other item of value that may be salvaged. Upon review of the inventory and its recommended disposition by the owner, the contractor should take the necessary steps to dispose of the surplus and salvaged materials as directed. The internal auditor should review the inventory and disposition and verify that the project is receiving the proper credit for the surplus and that the credit is charged to the proper account. Often, surplus materials, etc., can be transferred to another of the owner's projects.

The Internal Auditing Procedures Manual states that "salvage or reusable materials removed by the contractor
should be credited to the cost of the job at a fair value."\textsuperscript{109}

Before the contractor leaves the project, it should be ascertained that the facility is operating satisfactorily and that backcharges to vendors and/or subcontractors for corrective actions have been properly billed and collected. It is preferable that backcharges are collected before the final retentions are released.

The contract and/or subcontract, as the case may be, should specify which party is responsible for the premium cost of any performance bonds if such may be required. If such a cost is presented to the owner, the internal auditor should verify that such costs are not only acceptable, but are accurate and reasonable.

\textbf{Other Home Office Costs}

Some of the other home office costs that the internal auditor may encounter are computer charges, telephone expense, supplies, reproduction costs, outside consultants, and temporary help charges. These costs may or may not be supported. The most effective method of auditing these costs is for the internal auditor to travel to the contractor's home office to perform his audit. The charges may be reviewed in the field.

\textsuperscript{109} op. cit., p. 19.
CHAPTER VI

CONCLUSION

Throughout this paper, the current techniques of internal auditing on construction contracts have been demonstrated. Conclusions relative to individual items were made at the same time.

The internal auditor has considerably more audit work to perform during the course of following the construction of facilities under a cost-plus type contract than any other type of contract.

The audit work performed should be flexible and geared to the degree of internal control existing at any time. The internal control system should be reviewed periodically. An adequate internal control system should provide for a separation of duties. Such an internal control system minimizes errors. Auditing patterns should be variable and flexible. Experience is essential in determining what to audit and which procedures should be used.

But no matter how good the internal control may be, the internal auditor must still review and verify the contractor's costs. Incorrect labor, material, equipment, and other charges are all common items where errors
are always being found. In many ways, it is similar to plugging holes in a leaky dike. It is always the goal of the utility's internal auditors to plug the holes in construction contracts and their related contractor invoices.

Further, the internal auditor should be involved in all aspects of the writing of construction contracts. This provides the framework for audit programs as well as eliminating contractual clauses that could be detrimental to the owner's best interests.

The internal auditor, while internal auditing on construction contracts for public utilities, does provide a useful service. Through internal auditing, mistakes are corrected and adequate internal controls instituted. These activities result in monies saved and excess costs averted. These actions, in turn, relate to management's goals to provide prudent management and protect the assets of their firm. Prudent management and the protection of assets result in lower costs which, in turn, means lower utility rates for the customers. Therefore, it is the function of internal auditors to serve both their management and the utility's customers by the internal auditing of construction contracts.
BIBLIOGRAPHY


219

Reproduced with permission of the copyright owner. Further reproduction prohibited without permission.


Penick, George J.  "ASPR Revision No. 8--Defense Contract Types."  NAA Bulletin.  XLIV, Number 1, September 1962.


