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Contractors' Accounts

BY A. R. M. BOYLE

The accounts of contractors and construction engineers present some peculiar and interesting problems which it might be profitable to discuss. Some of the projects undertaken by this class of business enterprise are of considerable magnitude. It is not uncommon for a single contract to extend over five years or more, and a payroll of from two to five thousand men is not a rarity. Such a contract assumes the proportions of a separate and complete business which would, in itself, be considered of sufficient size and importance to warrant and require the highest degree of organization and the most effective form of executive and accounting control. And, in addition to the hazards of ordinary business, there are frequently encountered engineering problems difficult to foresee, impossible to avoid and far-reaching in their consequences.

Many of these projects are in the nature of public works. A change of government or a political campaign may place the contractor in the unenviable position of having to defend his conduct in a most searching and bitter inquiry. Or the contract may be taken on a cost-plus basis, the accounts being subject to examination by the owner.

There is, therefore, often an added necessity for a contractor to have his accounts and business records kept in such a way as to give accurate and satisfactory information in regard to his affairs.

The divisions of a contractor's organization may be briefly stated as: management, engineering, purchasing, general office, field.

Where the contracts are large and far-flung and not conducted in close proximity to the head office, the tendency is to conduct in the field all the business appertaining to a contract which may safely and economically be delegated thereto, sometimes even a field purchasing office being established.

The field organization, then, may consist of: engineering, superintendence, field accountant and other staff, purchasing, receiving, storekeeper, timekeeper, pay office, in addition to which may be found, for the convenience of the men, a commissary, store and hospital.

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In many cases the contractor is subject to severe penalties for delay in the progress or completion of the work. Sometimes attractive premiums are provided for completion in less than the stipulated time. The despatch and precision gained by centering control in the field may therefore far more than compensate for any disadvantages, and it also has the advantage of allocating as direct charges to the job, many items that would otherwise have to be dealt with as overhead.

The expenditures of a construction company may be divided into two chief groups—direct and indirect.

In this division, direct expenditure is meant to include every kind of expense or disbursement that can be definitely charged against a particular contract. Indirect expense is composed entirely of head-office expenses. It includes general management salaries and expenses, head-office purchasing department, accounting and clerical, engineering and estimating not applicable to work in progress, supplies and other office expenses.

DIRECT EXPENSE

Direct expense may be dealt with under the subheads, labor, materials, supplies and tools, machinery and equipment, miscellaneous and sub-contracts.

The problem of maintaining a force of skilled and unskilled labor at work on a contract at some distance from the centers of employment has always been a difficult one. In recent years, when labor has been scarce and dear under the best conditions, the task of getting men to go into camps miles from any social activities has been an almost impossible one. In one instance which came to the attention of the writer, the labor turnover for one month on a job employing two thousand men, was three hundred per cent. That means that to keep two thousand men on that job for that month, six thousand men had to be hired and six thousand men quit. This sounds ridiculous, but it was a fact.*

Such a condition of affairs necessitates the maintenance of an employment office and a force of employment agents. These agents visit the various employment agencies in the large cities and collect gangs of men to be shipped out to the job, the company's own agent usually accompanying each gang to its destination. In some cases, fees have to be paid to city agencies,

* This incident occurred about the time of abnormal building conditions which existed in 1919 and 1920. Labor difficulties are less severe today.

and in nearly all cases the fares of the men have to be advanced. The latter are usually deductible from the first earnings. Then, too, these men will have to be housed and fed at the commissary, for which charges are made deductible from wages earned. It frequently happens that men ship in, turn up regularly at the commissary for meals but fail to report at any time for work. In order to prevent this the commissary must be supplied with daily reports of the men on the payroll. It is then the duty of the commissary to see that only such men are accommodated.

Quite frequently when such men are found they simply walk off the job. Fares, commissary and other charges against them are therefore lost. Often they will work a half day or a day and then quit, the charges against them being more than the wages earned, again resulting in a loss to the contractor.

The most common method of dealing with these expenses is simply to charge all such items to employment expenses, fares advanced, commissary losses, etc., as and when incurred, these accounts being in turn credited with any amounts deducted on the payroll. This, however, will not detect any of these losses which are due to the carelessness of the time office or of the pay office in not properly reporting or deducting such expenses from wages. In order to detect these a report should be prepared weekly and submitted to the superintendent or field accountant. This report should be in columnar form with columns for the name of the man, date and place hired, fare, commissary and other advances, particulars of time worked and wages earned, amount of advances deducted from wages, and advances lost. The totals of the columns relating to advances and deductions must agree with the entries in the corresponding ledger accounts. The particulars of time worked and wages earned need not be filled in where the advances have been wholly recovered. A glance at such a report will immediately reveal any wages that have been paid before all advances were recovered in full.

The method of time-keeping employed by contractors differs somewhat from that employed by most industrial concerns. In the ordinary factory or works, when a workman enters the gate he is confined within his employer's premises by walls or fences. In most cases he is stationed at a certain point or has certain work to do and his absence from his appointed place would soon be noticed. In any event, he can not leave his employer's premises except through the gate where the timekeeper is stationed.

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On a construction job, however, no such restrictions can usually be placed on a man's movements. There is often nothing at all to prevent him, so far as physical barriers are concerned, from leaving the job at any time. In such circumstances the following method of checking time is resorted to.

A daily time-sheet is prepared in columnar form, the columns being headed somewhat as follows:

Field	Foreman
No. In A.M. P.M. Out Hours	No. Hours

These sheets usually contain two sets of the above columns and have fifty lines, numbered from 1 to 100. This allows one hundred men to be recorded on each sheet.

When a man is hired he is given a number and a badge with this number on it, which he is expected to wear constantly while at work. These numbers are arranged in series of, say, thousands. Each class of labor is given a different series. Thus, bricklayers may be numbered from 1000 to 1999, carpenters 2000 up, ironworkers 3000 and so on. This method is most helpful to the inspectors and superintendents who can tell by a man's number the kind of work he should be doing.

As each man comes in in the morning he files past the time office and reports his number. This is recorded in the daily time-sheet by the clerks on duty in the "in" column in numerical order. A separate sheet is kept for every hundred. At the same time the man receives a work-card which he takes to his foreman. This work-card is filled in by the foreman as to the number of hours worked and the nature of the work done, or if the man has worked for more than one foreman, by each foreman for the number of hours worked under his supervision. This card is turned in at night to the time office as the man reports out, the clerk on duty marking the time in the "out" column of the daily time-sheet. From the time entered in the "in" and "out" columns the number of hours worked is entered in the "hours" column.

Each foreman is required to make out each day a card showing all the men who worked for him that day, the time worked by each and the nature of the work done.

The foreman's card is first checked from the work card turned in by the men and then the time on the foreman's card is entered on the daily time-sheet. When this is complete, the total time reported by the foreman for each man should agree with the time-

keeper's record in the "in" and "out" columns. The analyses of labor or the cost sheets from which the unit costs are prepared are then entered from the foreman's cards. The total of these cost analysis sheets for a week must agree with the weekly payroll.

A further check, peculiar to the class of work, is kept on the time of the men. It is called the field check. As already mentioned each man must wear a badge with his number on it all the time he is at work. The field checkers go over the entire job twice each day, once in the forenoon and once in the afternoon. Their duty is to find and take the number of every man that is working. They then return to the time office and turn in their check to the timekeeper. Each man reported by the field checkers is then marked off in the field column on the daily time-sheet. This completes the preparation of the time-sheet. The time shown to the credit of each man is then entered from the time-sheet to the payroll.

Before leaving the consideration of the time-sheet, however, it may be well to mention another step which is sometimes but not always taken. It can be readily imagined that the field check does not always tally exactly with the time office reports of the men at work. The field checkers are given no information as to the men on the day's payroll. Each checker is given a portion of the job which he has to cover. The men are constantly being transferred from place to place. When the checkers have half finished their check it is quite possible for a man to transfer from an unchecked portion to a checked portion either of the ground covered by different checkers or even within the territory of the same checker. That man will in all probability be missed by the field check. It is also quite easy for a man to be working by himself in some out-of-the-way or hidden corner so that he is missed by the checker, without any great fault of the latter. A man working down in a sewer or up on structural steel work may call his number to the checker. The checker may get it incorrectly and so report as working a number not on the payroll and fail to report a man who is on the payroll. Inquiry should be made immediately as to all missing men and in addition a daily and monthly report of men shown missing by the field check should be prepared.

This daily report should show the name of the foreman who reported the man as working. This will form a valuable check on the foremen and indicate any who frequently report men who can

not be found. The monthly report should have thirty double columns, a column for the a.m. and p.m. of each day. The name of the workman should be entered on the left-hand side and each time he is missing from the field check marked. This will indicate the frequency with which a particular man is missed and draw attention to any who make a habit of loafing or absenting themselves from the job.

The payroll should be divided into sections to correspond with each class of labor employed, such as carpenters, bricklayers, etc. Sections should also be provided for foremen and superintendents, purchasing, accounting office, etc. The time is entered from the daily time-sheets. The preparation of the payroll should be subject to approved methods of internal check which present no peculiar features and need not be discussed here. A recapitulation should be made giving the total of each section and the total payroll. The section totals should be charged in the job ledger to the account for each class of labor and the total should be credited to payroll account. Columns should be provided for commissary, stores, hospital or other deductions. All wages paid should be charged to payroll account and not to the labor account.

The materials to be used are first dealt with by the engineers and architects in their preparation of the plans and estimates for the work.

The actual requisition usually originates with the foreman in charge of each section and is submitted by him to the superintendent. All material requisitions should be submitted to the engineer in charge of construction for the approval of his department. It is his duty to see that the material requisitioned is in accordance with the plans and specifications and also to keep a record of materials ordered so that duplications may be avoided. Much of the material is ordered from blueprints and is of special pattern and size, as, for example, structural steel. In such a case each piece as ordered should be marked off the plans by the engineer.

In many instances the requisitions originate in the superintendent's or engineer's office.

The approved requisitions are passed to the purchasing agent. It is his duty, not only to keep familiar with market conditions, receive bids, award contracts and place orders for materials, but also to keep accurate records of the materials ordered, quantities delivered and balance due, so that information is available at all

times as to the necessity of placing further orders. It is also his duty to see that the materials are on hand at the time required and of the required quality. Any failure to maintain an adequate supply of materials may result in delays in the work which may prove expensive.

In recording purchases a card record is usually employed. Orders placed are entered both as to name of materials and also under name of vendor. The purchasing department should advise the receiving office of all orders placed and the date when delivery has been required or is expected. Carbon copies of all orders should also go to the accounting and engineer's offices.

The work of the receiving office is most important. A car scale should be provided early so that the car weights of bulk materials such as sand and gravel may be checked. The chief receiving clerk should receive a copy of all orders issued by the purchasing department. In the case of specially designed or cut materials such as steel, the receiving clerk should be supplied with sufficient information to enable him to store or deliver to the proper foreman these particular goods. Any failure to do this may result in such materials being cut up or used in a wasteful way for purposes for which they were never intended. These materials if improperly used will then be missing when wanted for work which may have been started with the knowledge that the necessary materials had been received.

The material checkers should not be supplied with full information as to the material they are assigned to check. They may be supplied with descriptions and sizes, if necessary to place and classify the goods properly, but should generally have no intimation as to quantities. When materials have been checked, a receiving report should be prepared, a copy of which should go to the purchasing office, a copy to the engineer's office and a copy to the accounting office. The purchasing office makes a record of the materials received so as to keep its record of materials on order correct. The accounting office should enter the receipts on its copy of the purchase order, space for this being usually provided on the back of the purchase order. Invoices are then checked and passed for payment from the accounting-office copy of the purchase order which contains a complete record of goods ordered, prices, terms, quantities received, shortages, damages or other deductions. The invoices when thus passed for payment are charged to the various materials accounts in the job ledger.

The receiving office on a large contract is a complete and important unit. It should be fully equipped. A part of its work is the maintenance of complete and accurate car records from which to refute or substantiate demurrage or other charges which often assume large proportions. Some familiarity with freight classifications and regulations is also essential.

Supplies and tools when received are delivered to the storekeeper. A stock record should be kept of all stores. Supplies are issued by the storekeeper on requisitions signed by the foreman or superintendent. A recapitulation of all stores issued should be made daily and submitted to the accounting office so that the proper charges to material or expense accounts may be made and stores credited.

Various methods of checking tools have been adopted. One that is as satisfactory as any is as follows:—Each man is given a tool check when he is engaged. When he needs any tools he is supplied with an order by his foreman. He then goes to the storeroom, turns in the foreman's order and also his tool check and receives the tools he requires. So long as he is in possession of any tools, his tool check remains in the storeroom. When he has returned all tools taken out his tool check is returned to him. Before any man can receive pay on being discharged or quitting, he must return his tool check to the paymaster as evidence that there are no charges against him in the storeroom. It is usual for such items as picks and shovels to be issued to the foremen who take charge of them, issuing them to their men in the morning and collecting them at night.

A contractor's machinery and equipment is all of a movable character and is transferred from job to job as need requires. In many cases equipment such as locomotives, cranes and steam shovels are not owned by the contractor but rented, or the contractor may augment his own equipment during a busy period with rented machinery.

In any event, whether rented or owned, a machinery and equipment record should be kept. In this book a separate account should be kept for each item of machinery. It should show whether each item is rented or owned, and cost or rental, where and when employed, etc.

In the case of rented machinery the charge to be made against the job is simple. It consists solely of rentals paid, repairs and running expenses.

In the case of machinery owned the matter is more difficult. A regular depreciation rate per annum can not always be employed. Depreciation accrues more rapidly on equipment that is in use on a job than when it is in the contractor's shed. It also is subject to greater wear and tear on a job where it is being worked night and day at high pressure than on one where it is employed in a more leisurely fashion. The question, then, is one to be answered according to the conditions surrounding each case.

A method which has been employed, and which would appear to be a most satisfactory one, is to charge all equipment and machinery to the job at a fair value as it is shipped. When it leaves the job it is again valued and the job credited. This method has some advantages especially so far as equipment is concerned. Since the job is charged with what it receives and credited only with what it returns, lost, broken or damaged pieces are not overlooked. For many items of equipment this is the only practicable and accurate solution. When it is employed care must be taken to see that the method of valuation takes into consideration only original cost and wear and tear through use. Any mere fluctuations in market values must be disregarded.

It is usual for the main contractor to sub-let large portions of the work. Any part of a contract may be sub-let but the most common sub-contracts are for plumbing, heating, electrical and machinery installation, etc.

Sub-contracts present no peculiar difficulty. An account should be opened for each sub-contractor. The job is charged with the amount of the contract awarded to him and his account is credited. Payments made on sub-contracts are regulated according to the amount of work done as shown by the certificates of the engineers. Extras, shortages or changes in the work contracted for are adjusted between the job and sub-contractor's accounts as and when determined.

Items of miscellaneous expense such as photographs, insurance, traveling, field-office supplies and stationery can be charged to the proper expense account in the ordinary way.

As already mentioned, in dealing with labor, the payroll should be divided into sections to record each class of labor separately. All superintendence, field-office salaries, wages of men engaged in the laying and removing of temporary tracks, watchmen and guards will therefore find their way into corresponding larger

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accounts. Other items of miscellaneous expense will be charged through the voucher register.

INDIRECT EXPENSES

Indirect expenses comprise all expenses that can not be charged against any particular contract, that is, expenses of maintaining the contractor's general office and organization. The only special question here is the apportionment of these expenses over the various contracts on hand, as an item of overhead. In some cases a distribution is not attempted, especially where complete field organizations are maintained. Where, however, all purchasing and management are conducted from the general office it becomes necessary to apportion general office expenses over the work in hand. This may be done on the basis of materials and labor consumed.

GENERAL

In the preparation of the annual accounts of a contractor, departure must be made from the general rule that no profit on work in progress can be taken. Anyone who insists otherwise will soon find himself in an impossible position. It is absurd to say that in a contract extending over a number of years no profit is realized until the contract is completed. It is quite possible, indeed most frequently the case, that in the year of final completion only minor adjustments have entered into the work of that year.

It may be that, owing to insufficient accounts or a lack of cost records, it will not be possible to ascertain accurately what profit, if any, has been made on the work done during the year. This is no reason why the entire cost should be treated as work in progress without further investigation. It is just as possible for a loss to have been sustained, and every effort should be made to find out the true position.

In most cases trustworthy cost accounts will have been kept. The engineers are able to calculate with considerable accuracy the value of the work done. Any profits or losses disclosed under such conditions should be shown in the current year's accounts.

An important question to be considered is that of penalties. If the contractor is subject to penalties for delay in completing the work and the work gets behind so that these penalties are accruing, effect must be given to this condition in the annual accounts of the contractor by charging penalties and crediting penalties

accrued. This must be done whether the amount of the penalties has actually been deducted from the contractor's instalment payments or not. If the work is subsequently brought up to the required state of progress the entries for these penalties may be reversed and credit taken.

COST ACCOUNTS

The all-important thing for a contractor to know is the cost per unit of the work he is doing. That knowledge is the foundation for the intelligent conduct of his business. His viewpoint is not so much that of the accountant as that of the engineer. His costs will not present the same uniformity as those of manufacturing concerns working under settled conditions. To take a simple illustration, the cost per cubic yard of excavations will fluctuate violently as the weather is fair or foul. The contractor is interested, therefore, not only in the results his cost accounts show but particularly in why these results are what they are.

The question of contractor's costs is a technical one. Any discussion of it to be satisfactory would involve the explanation of a great amount of detail which is not within the scope of the present opportunity. Suffice it to say that the objects of a contractor's costs are:

1. To show the progress of the job from day to day or from week to week and to indicate whether the work is being carried out economically or extravagantly.
2. To indicate when, where and why and by how much costs exceed or are less than the estimate.
3. To furnish information for future estimating and to draw attention to portions of work in progress that need particular attention.

To achieve the above objects not only daily unit costs but also average weekly unit costs and average unit costs of work done to date must be furnished.

The cost accounts are built up from analyses of labor and material accounts. Quantities of work done daily should be reported by the engineer in charge of the level and transit.

CONCLUSION

A comprehensive treatment of the subject of contractors' accounts in all its phases is of course impossible in such a short space. The above remarks are intended, therefore, in a broad

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and general way. An attempt has been made to bring out only such features as are peculiar to this class of business, and to give a fair indication of some of the conditions that have to be faced.

Contractors' accounts, perhaps more than most others, must be designed and fitted to meet the actual needs of each particular case. The procedure above outlined might therefore not be desirable in all cases; it might indeed be quite undesirable in some. It may often be quite inexpedient to establish a purchasing office in the field as has been here suggested. These and other matters are to be settled in accordance with the contractor's experience and judgment, the extent of his organization and the problem at hand.