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## Accounting for Brick Manufacturers

BY HERRMANN HERSKOWITZ

Webster defines brick as "a building and paving material made from clay, either pure or mixed as with sand, by molding into blocks while moist and hardening it in the sun or fire." Brick, when considered to include burned clay in all its utilitarian forms, has a history coincident with that of civilization. Its existence goes back to the time, more than three thousand years before Christ, when the Assyrians reared their terraced temples and palaces in western Asia. In Ur of the Chaldees, whence Abraham went into the land of Canaan in Nineveh in Babylon, the important buildings were made of brick. Archaeologists trace the history of ancient civilizations by means of bricks, which were used for commercial records, household utensils and the earliest expressions of art.

The boom in building construction in the United States for the past five years has focused the attention of the builders on brick. Because of being burned at such high temperature, brick has great resistance to fire and is able to withstand the elements. The city of New York alone consumes 1,000,000,000 common bricks annually, which are carried by 221 barges. In addition to this, great quantities are shipped by rail.

The past decade has witnessed the wider use of common brick, and as a result more yards have been established and old plants have been modernized. With this evolutionary phase has come the urgent problem of the accountant: how properly to control the records applicable to the brick manufacturing industry. The desideratum is an accounting system based on sound fundamental principles which will give accurate results with the least outlay of expense.

In order properly to comprehend the details of the accounting involved, a description of the manufacture of brick is necessary. Altogether there are about fifteen important operations in the transposition for raw clay in the deposits to the finished article. A brief description of the more important of these will be given.

The raw clay, dug by electric or steam shovels, is transported to a mixing pit, where it is tempered with a small quantity of sand and in some cases an even smaller amount of coal dust to

facilitate combustion in the kilns. The tempered clay then passes by gravity to the brick machines, where a certain number of bricks, usually nine, are molded at one time and discharged automatically to a cable conveyor.

In turn, the cable conveyor carries these pallets, with their load of "green brick," to the point where the bricks are dried on steam-heated pipe racks situated in what is called the dryer building. This operation changes the green brick from a plaster to a bone-dry material, in order to facilitate the handling during future operations.

The next step is the burning of the brick in huge kilns containing as many as 1,000,000 each. In the yards on the Hudson river each kiln is individually built of brick, so laid that heat introduced through "arches" running transversely through the bottom may penetrate the entire kiln. The sides and ends are covered with top soil which has been dampened to prevent the escape of heat, only the top remaining open for a vent. Practically all brick is now burned with either coal or oil.

This process requires exceptional skill, as a constant temperature must be maintained for a period of about five consecutive days. Upon completion, the kiln is allowed to cool and then is opened, displaying a product now ready for sorting previous to shipment. Each kiln contains a certain proportion of overburned or arch brick caused by the flame coming in direct contact with the brick. These bricks are sorted, leaving only the perfect product to be loaded on barges or in cars for shipment.

As certain architectural effects are obtainable only through the use of these overburned units there is a considerable demand for them, and as additional handling is necessary because of the unevenness of the surface the cost of what some might call "seconds" is more than that of the regular product.

The brick when finished measures  $2\frac{1}{4} \times 3\frac{3}{4} \times 8$  inches, and has a weight of four pounds. It has a crushing strength of 4,400 pounds per square inch when tested flat. On edge the strength is considerably greater.

Having obtained a picture of the manufacturing processes involved, let us now turn to the books and records required for recording all the necessary entries.

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**JOURNAL**

Accounts payable	Brick commission agents	General	Explanation	General	Brick commission agents	Accounts payable

**PURCHASE JOURNAL**

Date invoice	Name creditor	Accounts payable	Materials	Supplies	Repairs	General

**SALES JOURNAL**

Date	Name of brick commission agent	Name of barge or car number	Quantity	Brick sales	Freight	Commission	Unloading charges	Brick commission agent

**CASHBOOK**

**Receipts**

Date	Name—explanation	Brick commission agent	Discount	Other income	General	Net receipts	Deposit

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**Disbursements**

Date	Name— explanation	Cheque number	Amount of cheque	Ac- counts payable	Dis- count	Pay- roll	Ex- penses	Gen- eral

**PETTY CASHBOOK**

Date	Voucher number	Explana- tion	Receipts	Dis- burse- ments	Repairs	Sup- plies	Office ex- pense	Gen- eral

The ledgers used are:

1. The general ledger.
2. The regular accounts payable ledger.
3. The plant ledger record.

**PLANT LEDGER RECORD**

Sheet number	Purchased from
Description of asset	Date received
Cost	Estimated life
(Including freight, cartage and setting up)	Depreciation . . . . . %

  

				Depreciation reserve				Net asset
Date	Charges	Credits	Bal.	Date	Charges	Credits	Bal.	Value

Supporting information records employed are:

**CAR RECORD OF SHIPMENTS**

(This book is used by plants where shipments are made by rail)

Date shipped	Car number	Brick commission agent	Destination	Number brick	Date settled

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**BARGE BOOK RECORD OF SHIPMENTS**  
(Each barge listed on separate page)

Trip	Left yard	Estimate brick at yard	Brick sold	Date settled	Amount	Price received	Advances to captain

**DAILY REPORT**

Date

	Today's total	Yesterday's cumulative total	Cumulative total

**Production**

Number of bricks made  
 " of bricks set  
 " of arches burning @ . . . . to arch  
 " of bricks burned  
 " of bricks loaded

**Payroll**

Raw material	Number of men
Brick machine room	" " "
Dryers and transfer	" " "
Setting	" " "
Burning	" " "
Loading	" " "
Supplies	" " "
General overhead	" " "
<b>Total</b>	

**Car record**

Container cars received	No.
Box cars received	"
Container cars shipped	"
Box cars shipped	"
Local sales	"
<b>Total brick shipments</b>	

**Inventory**

Balance of finished brick at close of yesterday:  
 Total finished burning today:  
 Total  
 Less brick shipped:  
 Less wastage at yard:  
 Balance of finished brick on hand at close of day

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Having encompassed the field of books and records, attention should be directed to the general ledger. The accounts in the general ledger should be so planned as to facilitate the preparation of the necessary statements, which are: balance-sheet, statement of income, profit and loss, and statement of manufacturing cost.

*Exhibit "A"*

Balance-sheet

<i>Assets</i>	<i>Liabilities, capital stock and surplus</i>
Current assets:	Current liabilities:
Cash in banks	Notes payable
Cash on hand	Accounts payable
Due from brick commission agents	Federal income tax, unpaid
Loans receivable	State franchise tax, unpaid
Inventory	Loans payable
Burned brick	Accrued liabilities
Green brick	Payroll
Oil	Interest
Coal	Insurance
Ochre	Federal taxes
Sand	State taxes
Supplies	Total current liabilities
Total inventory	Long-term liabilities:
Total current assets	Bonds payable
Investments:	Mortgage payable
Stocks	Total long-term liabilities
Bonds	Net worth:
Treasury stock	Capital stock
Mortgages receivable	Preferred capital stock authorized
Total investments	<i>Less:</i> Unissued
Fixed assets:	Common capital stock authorized
Land: clay banks	<i>Less:</i> Unissued
<i>Less:</i> Reserve for depletion	Total capital stock issued and outstanding
Land: buildings	Surplus:
Plant assets (detailed in plant ledger)	Capital surplus
<i>Less:</i> Reserve for depreciation (detailed in plant ledger)	Earned surplus
Total fixed assets	Total surplus
Deferred charges to expenses:	Total capital stock and surplus
Insurance	Total liabilities, capital stock and surplus
Interest	
Other debit items	
Total deferred charges to expenses	
Total assets	

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*Exhibit "B"*

Statement of income, profit and loss

	Per M
	\$----- \$-----
Income from sales:	
Brick sales (number of bricks sold )	
Less: Cost of barge operations (detailed as follows)	
Unloading	
Crew wages	
Towing	
Charter	
Supplies	
Wharfage	
Insurance	
Depreciation on barges	
General expense	
Less: Freight (if shipments are made by rail)	
Net income from sales	
Cost of sales:	
Inventory of burned brick at beginning of period	
Cost of manufacturing (exhibit "C")	
Total	
Less: Inventory of burned brick at end of period	
Cost of brick sold	
Gross profit on brick sales	
General and administrative expenses:	
Selling expenses	
Traveling and entertainment	
Commissions	
Total selling expenses	
General expenses	
Office expenses	
Association dues	
Office salary	
Salary, officers	
Depreciation of office building	
Depreciation of furniture and fixtures	
Total general expenses	
Total general and administrative expenses	
Net income from operations	
Additions to income:	
Interest on bonds	
Dividends	
Other income	
Total additions to income	
Total income	
Deductions from income:	
Interest on bonds and mortgages	



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	\$	Per M
Interest (current financial charges)	\$	\$
Net income		
Profit-and-loss charges or credits:		
Profit or loss on sale of capital assets		
Federal income taxes		
State franchise taxes		
Total profit-and-loss charges or credits		
Net profit for the period		

*Exhibit "C"*

Statement of manufacturing cost

	\$	Per M
Production cost:	\$	\$
Cost of materials		
Depletion of clay banks		
Sand		
Inventory at beginning of period		
Purchases		
Less: Inventory at end of period		
Sand consumed		
Total material consumed		
Fuel		
Coal		
Inventory (beginning of period)		
Purchases		
Bituminous		
Screenings		
Total purchases		
Less: Inventory at end of period		
Coal consumed		
Oil		
Inventory at beginning of period		
Purchases		
Less: Inventory at end of period		
Oil consumed		
Electricity		
Total fuel cost		
Labor (classified as to —)		
Raw material		
Dryers and transfer		
Setting		
Burning		
Loading		
Supplies		
General overhead		
Total labor cost		

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	Per M
	\$ — \$ —
Manufacturing overhead	
Repairs and maintenance	
Machinery	
Shop machinery	
Auto brick machines	
Derrick hoist	
Boiler	
Dump car	
Locomotive	
Shovel	
Dryer	
Air compressor	
Oil-burning outfit	
Total repairs and maintenance	
Supplies	
Lumber and cement	
Brick molds	
Freight and expressage on supplies	
Fuel, oil tank and piping	
Brick-yard sundries	
Explosives and oils	
Red ochre	
Miscellaneous	
Total supplies	
Hauling	
Gasoline	
Operating expenses, trucks	
Stable expense	
Total hauling expense	
Insurance	
Brickyard	
Trucks	
Public liability	
Compensation	
Total insurance	
Depreciation	
Trucks	
Horses, wagons and harness	
Tools	
Brick machinery	
Railroad siding	
Total depreciation	

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	\$	Per M
Taxes on plant property	\$	\$
Total cost of manufacturing		
<i>Add:</i> Inventory of green brick at beginning of period		
<i>Less:</i> Inventory of green brick at end of period		
Cost of manufacturing burned brick (quantity)		

The most difficult phase of the accounting for the brick manufacturer relates to the cost of manufacturing. The factors requiring explanation are depletion of clay banks, labor control, wastage and depreciation of capital assets.

The engineer's report will show the estimated tonnage contained in the clay banks. This total (eliminating the land used for the plant) divided into the cost of the land will give the cost per ton of clay. The stock records will show the total number of bricks produced for the period, and using, say, 1,000 green bricks as the equivalent of two tons the total tonnage consumed will be obtained.

The laborers receive a fixed daily wage. They are required to produce a predetermined number of bricks, which in turn is based on the productive capacity of the plant. The foreman prepares a daily list of laborers employed, which in turned is checked by the superintendent. These daily lists are then recorded in the payroll book from which the payrolls are prepared.

Every brick yard has a certain wastage of brick. It is important to keep informed as to the exact amounts, in order to devise improved methods of manufacturing, and thus reduce the wastage to the lowest point possible. The following statement will show the number of bricks unaccounted for:

Inventory of burned brick at beginning of year	_____	
Total number of brick burned for year	_____	
Total to be accounted for	_____	
<i>Less:</i> Brick sold	_____	
Burned brick inventory at end of year	_____	
Wastage at yard of burned brick	_____	%

The estimated life of the machinery is based either on past experience or manufacturers' guarantee of use. The record of each machine is contained in the plant ledger, which in addition shows the depreciation deducted.

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The cost of manufacturing per thousand bricks is arrived at by dividing the total bricks produced into the following:

		Cost per M
1. Materials cost (adjusted for inventory of green brick).....	\$ _____	\$ _____
2. Fuel cost.....	_____	_____
3. Manufacturing overhead.....	_____	_____
4. Cost of manufacturing.....	_____	_____
 Total bricks produced.....	 \$ _____	 \$ _____

The value of burned bricks on hand is based on the final cost figures so obtained. Green bricks, being uncompleted, are valued on the basis of the total cost less a percentage of fuel cost and manufacturing overhead.

The marketing of brick is usually accomplished through a brick commission agent who has complete charge of the sale of the brick. All the shipments made are on a consignment basis, and when the purchaser pays for the brick the remittance goes direct to the commission agent who, in turn, makes a settlement with the manufacturer. The account rendered will show deductions for commissions and any other advances made to the captains of the barges for expenses incurred during the unloading process.

Where bricks are shipped by rail, any freight paid upon arrival at destination is deducted by the purchaser and the amount so paid is also deducted by the commission agent.

The question of statistics is of importance. For comparative purposes it is essential to determine the net profit per thousand bricks sold. The method employed is as follows:

		Per M
1. Brick sales (total number of bricks sold divided into total sales).....	\$ _____	\$ _____
2. Less freight.....	_____	_____
3. Net sales.....	_____	_____
4. Cost of bricks sold.....	_____	_____
5. Gross profit on bricks sold.....	_____	_____
6. Operating expenses.....	_____	_____
7. Net deductions from income.....	_____	_____
8. Net profit.....	\$ _____	\$ _____