1 Basic Job Casting Concepts

The previous chapters provided an introduction to product costing. You were exposed to the schedule of cost of goods manufactured and the basic cost flow of a manufacturer. In that preliminary presentation, most cost data (e.g., ending work in process inventory, etc.) were "given." In addition, the chapters showed how cost data are used in making important business decisions.

1.1 Cost Data Determination

How does one determine the cost data for products and services that are the end result of productive processes? The answer to this question is more complex than you might suspect. Multiple persons, parts, and processes may be needed to bring about a deliverable output. Think about an automobile manufacturer; what is the dollar amount of "cost" for the hundreds of cars that are in various stages of completion at the end of a month? After studying this chapter, and the next, you will have a better sense of how business information systems are used to generate these important cost data.

This chapter focuses on the job costing technique, and the next chapter will look more closely at process costing and other options. At the outset, note that job costing is best suited to those situations where goods and services are produced upon receipt of a customer order, according to customer specifications, or in separate batches (as a result, many companies will refer to this costing method as the job order costing method). For example, a ship builder would likely accumulate costs for each ship produced. An aircraft manufacturer would find this method logical. Construction companies and home builders would naturally gravitate to a job costing approach. Each job is somewhat unique. Materials and labor can be readily traced to each job, and the cost assignment logically follows.

1.2 Conceptualizing Job Costing

Begin to develop an understanding of job costing by thinking about a simple illustration. Jack Castle owns an electrical contracting company, Castle Electric. Jack provides a variety of products and services to clientele. Jack has four employees, maintains a neat (rented) shop, a broad inventory of parts and equipment, and a fleet of five service trucks. On a typical day, Jack will arrive at the shop early and line out the day's work assignments for his four electricians. Around 8:00 a.m., his electricians begin to arrive, and he gives them their assignments, as well as the necessary parts and equipment they will need. They are then dispatched to the various job sites.

One of Jack's electricians is Donnie Odom. On July 14, Donnie arrived at the shop at 8:00 a.m. He first spent thirty minutes getting his assignments and loading a service truck with necessary items to complete the day's work. His three tasks for the day included:

- Job A: Cleaning and reconnecting the electrical connections and replacing a flood light atop a billboard (materials required include one lamp at $150).
- Job B: Replacing the breakers on an old electrical distribution panel at an office building (materials required include 20 breakers at $20 each).
- Job C: Pulling wire for a new residence under construction (materials required include 500 feet of wire at $0.14 per foot).

Donnie successfully completed all three tasks on July 14. He spent 1 hour on the billboard, 2 hours on the electrical panel, and 3 hours on the residential installation. The other 2 hours of his 8-hour day were spent on indirect job administration and travel. During the day, Donnie also used a roll of electrical tape ($3) and a box of wire nuts (60 nuts at $0.05 each). Donnie is paid $18 per hour. Donnie drove the truck 100 miles on July 14, and he used a variety of tools, ladders, and other specialized equipment. Jack is paid $25 per hour, and he does not usually work on any specific job. Instead, his time is spent doing spot inspections of work, getting permits, managing inventory, and tending to the various other tasks associated with these jobs.

The "job costing" question is: How much did it "cost" to change the light on the billboard, etc.?

Obviously, the job cost included the direct costs of the job; specifically, Donnie's direct labor time (1 hour) and the direct material (one lamp at $150). But, the job could not have gotten done without the shop, equipment, trucks, indirect labor time, Jack's efforts, tape and wire nuts, and so forth. These latter items constitute the indirect costs, or overhead, for the job. How then, are we to assign costs to a specific job?

1.3 Tracking Direct Labor

A logical starting point for job costing is to track the direct labor to specific jobs. Donnie, and the other electricians, fill out a time report documenting time spent on each job, as well as the time spent on tasks that cannot be traced to a specific job:

Castle Electric Daily Time Sheet

Employee: Donnie Odom
Date: 7/14/X5

Start/Stop Time		Job Name	Task	Client	Admin Hours	Direct Labor Hours
8:00	8:30	Admin	Assignment and load	n/a	0.50	
8:30	8:45	Travel		n/a	0.25	
8:45	9:45	Job A	Service and replace bulb	Image Advertising		1.00
9:45	10:15	Travel		n/a	0.50	
10:15	12:15	Job B	Replace breakers	TechWay Office Park		2.00
12:15	1:00	Lunch	n/a	n/a		
1:00	4:00	Job C	Pull wiring	Mr./Mrs. Lybrand Home		3.00
4:00	4:45	Travel and Admin	Return to shop and unload	n/a	0.75	
				Total Hours	2.00	6.00

Not only will this time sheet form the basis for payroll, but it will also allow cost assignment to specific jobs. The direct labor for the billboard task (Job A) was one hour of Donnie's time (at $18 per hour). The "direct labor" for Job A will be compiled by reference to the time sheet on the previous page.

1.4 Tracking Direct Materials

Jack keeps detailed records of the material released to each job. When Donnie gathered up the light bulbs, breakers, wire, tape, and wire nuts on the morning of the 14th, some system needed to be in place to "check out" this material. The document that is used for this process is called a "materials request" or "materials requisition" form. This form will show what material is leaving the available raw materials stock and being put into production. Sometimes a separate form is prepared for each item, and sometimes a running list similar to the following is used:

Castle Electric — **Materials Requisition**

Employee: Donnie Odom
Date: 7/14/X5

Material	Job Name	Quantity	Per Unit Cost	Extended Cost
Light Bulbs	Job A	1 Unit	$150	$150
Breakers	Job B	20 Units	$20 each	$400
Wire	Job C	500 feet	$0.14 per foot	$70
Electrical Tape	Indirect Material	1 Roll	$3 per roll	$3
Wire Nuts	Indirect Material	60 Nuts	$0.05 each	$3

This form provides essential documentation to safeguard and track inventory; a manager that fails to control and monitor inventory does so at great peril! It also reveals that the "direct material" for the billboard task (Job A) was $150 (the light bulb). The wire nuts and tape that might have been used on the billboard will be dealt with as overhead which is discussed later.

Before moving on to overhead, you need to know one more thing about a "materials requisition" form; although the illustrated form lists the material cost, that will not always be the case. Sometimes, a business will not be particularly interested in letting employees see cost information, or cost information may not be readily available. In either case, the form will instead include a part or serial number. A subsequent clerical task will be to identify the cost of the particular parts that were put into production. Great care must always be taken to match the right cost to the right item, and in the right quantity. For example, the 500 feet of wire may be on one roll, but it is priced by the foot, and the quantity should be 500 feet, not 1 roll; the job cost calculation would be incorrect if only $0.14 were assigned to one roll of wire!

1.5 Tracking Overhead

Jack would have a huge task at hand if he tried to daily trace all items of overhead. For instance:

- How hard would it be to track the "indirect material"? How many wire nuts were used on the billboard? How many inches of electrical tape were used? What was the cost of these items?
- What about indirect labor? Donnie spent two hours on job-related administration and travel issues for the six hours of direct labor time on the 14th. Should the cost of the 2 hours be spread over the three jobs equally, pro-rata based on hours, or some other basis? On the 15th, Donnie may spend the entire day on the residential wiring job and have little administrative and travel time. How does this impact the cost per hour of output on the 15th versus the 14th? What about Jack's time? He is supervising 4 electricians. Should the cost of his time be allocated 1/4 to each, or based on some other formula?
- Then, one must consider the cost of rent, equipment, trucks, and so forth. Donnie needed a ladder to scale the billboard. A ladder will eventually wear out – but how much is the "ladder cost" for one trip up and down a billboard? Now, repeat this question for every item of cost incurred in running Castle Electric.

Tracking overhead is tricky. One way this is done is by using a predetermined overhead rate. Assume Jack sat down at the beginning of the year with his accountant. Together they carefully considered all of the production overhead that was anticipated during the year – the cost of Jack's time, the rent, the cost of vehicles, insurance, taxes, utilities, indirect labor, indirect materials, depreciation of long-lived assets, and so forth. The expected total came to about $150,000. Jack figures that his four electricians will work a total of about 7,500 direct labor hours during the year. By comparing these two numbers ($150,000 and 7,500 hours), it is now possible to "model" that overhead is $20 per direct labor hour. The "overhead application rate" is thus determined.

Now, two things should be made clear. First, overhead application is arbitrary. Jack decided to apply overhead based on direct labor hours; this is a common choice, but not the only choice. Some other systematic and rational approach could have been developed. Ordinarily, one would try to establish some correlation between the application base and overall cost incurrence. For instance, feet of wire used (instead of direct labor hours) could have been selected as the application base; but, feet of wire would be hard to defend since two of Donnie's three jobs did not use any wire and would not be assigned any of the business overhead! The point is that some logical method needs to be used to attach overhead costs to output, but no single choice is absolute. Cost allocation necessarily involves some degree of arbitrary methodology; this is neither bad nor good, it is just reality. In some ways, costing is more of an "art" than "science" – despite its outward appearance of mathematical precision.

Second, expect differences between the actual overhead and the amount applied to production. For instance, Jack will likely discover that actual overhead is more or less than $150,000. Jack will also find that his electricians will probably work more or less than the anticipated 7,500 hours. When all is said and done, Jack will need to deal with the actual cost. The difference between the amount of overhead applied to production (i.e., direct labor hours × the $20 per hour rate) and the actual amount spent must be accounted for! We will see how to deal with this later in the chapter.

1.6 Job Cost Sheets

The preceding information can be logically transferred to a job cost sheet that is a compilation of cost data for a specific job:

Castle Electric — **Job Cost Sheet**

Job: Job A - Image Advertising

	Form Reference	Direct Labor			Direct Material			Applied Overhead				Total
		Hours	Rate	Total	Qty.	Unit Cost	Total	Basis	Qty.	Rate	Total	
July 14, 20X5												
Donnie Odom	DTS.07.14.X5.DO	1.00	$18	$18.00								$ 18.00
Light Bulb	MR.07.14.X5.DO				1.00	$150	$150.00					150.00
Applied Overhead								Labor Hours	1.00	$20	$20.00	20.00
		1.00		$18.00			$150.00				$20.00	$188.00

The direct labor information found on the job cost sheet is taken from Donnie Odom's daily time sheet (a cross-reference is created of "DTS.07.14.×5.DO" to indicate "daily time sheet of July 14, 20×5, for Donnie Odom"). In similar fashion, Donnie's material requisition form was used as the source document for compiling the direct material information. Some type of cross-referencing system needs to be developed to allow one to trace specific cost allocations to their source documents. Overhead was applied directly to the job cost sheet based upon the predetermined overhead application scheme of $20 per direct labor hour.

1.7 Expanding the Illustration

The next graphic shows separate job cost sheets for all three of Donnie's jobs. All direct material and direct labor must be transferred to specific jobs. As alluded to earlier, the indirect labor (admin hours) and indirect material is not directly transferred to a specific job; its cost is instead represented through the applied overhead.

Castle Electric — Daily Time Sheet

Employee: Donnie Odom
Date: 7/14/X5

Start/Stop Time		Job Name	Task	Client	Admin Hours	Direct Labor Hours
8:00	8:30	Admin	Assignment and load	n/a	0.50	
8:30	8:45	Travel		n/a	0.25	
8:45	9:45	Job A	Service and replace bulb	Image Advertising		1.00
9:45	10:15	Travel		n/a	0.50	
10:15	12:15	Job B	Replace breakers	TechWay Office Park		2.00
12:15	1:00	Lunch	n/a	n/a		
1:00	4:00	Job C	Pull wiring	Mr./Mrs. Lybrand Home		3.00
4:00	4:45	Travel and Admin	Return to shop and unload	n/a	0.75	
				Total Hours	2.00	6.00

Castle Electric — Materials Requisition

Employee: Donnie Odom
Date: 7/14/X5

Material	Job Name	Quantity	Per Unit Cost	Extended Cost
Light Bulbs	Job A	1 Unit	$150	$150
Breakers	Job B	20 Units	$20 each	$400
Wire	Job C	500 feet	$0.14 per foot	$70
Electrical Tape	Indirect Material	1 Roll	$3 per roll	$3
Wire Nuts	Indirect Material	60 Nuts	$0.05 each	$3

Castle Electric — Job Cost Sheet

Job: Job A - Image Advertising

	Form Reference	Direct Labor			Direct Material			Applied Overhead				Total
		Hours	Rate	Total	Qty.	Unit Cost	Total	Basis	Qty.	Rate	Total	
July 14, 20X5												
Donnie Odom	DTS.07.14.X5.DO	1.00	$18	$18.00								$ 18.00
Light Bulb	MR.07.14.X5.DO				1.00	$150	$150.00					150.00
Applied Overhead								Labor Hours	1.00	$20	$20.00	20.00
		1.00		$18.00			$150.00				$20.00	$188.00

Castle Electric — Job Cost Sheet

Job: Job B - TechWay Office Park

	Form Reference	Direct Labor			Direct Material			Applied Overhead				Total
		Hours	Rate	Total	Qty.	Unit Cost	Total	Basis	Qty.	Rate	Total	
July 14, 20X5												
Donnie Odom	DTS.07.14.X5.DO	2.00	$18	$36.00								$ 36.00
Breakers	MR.07.14.X5.DO				20	$20	$400.00					400.00
Applied Overhead								Labor Hours	2.00	$20	$40.00	40.00
		2.00		$36.00			$400.00				$40.00	$476.00

Castle Electric — Job Cost Sheet

Job: Job C - Lybrand Home

	Form Reference	Direct Labor			Direct Material			Applied Overhead				Total
		Hours	Rate	Total	Qty.	Unit Cost	Total	Basis	Qty.	Rate	Total	
July 14, 20X5												
Donnie Odom	DTS.07.14.X5.DO	3.00	$18	$54.00								$ 54.00
Wire	MR.07.14.X5.DO				500	$.14	$70.00					70.00
Applied Overhead								Labor Hours	3.00	$20	$60.00	60.00
		3.00		$54.00			$70.00				$60.00	$184.00

1.8 Another Expansion of the Illustration

Thus far, the illustration has focused only on Donnie's activities. He had relatively simple assignments on the 14th and was able to complete three separate jobs by himself. But, remember that Jack has three other electricians and many other jobs. Some of these jobs may require multiple employees and extend over days and weeks. One such job was the new home of Aba Obekie. This job took two electricians (Andy Axom and Bev Bentson) three full days to complete. The resulting job cost sheet appeared as follows:

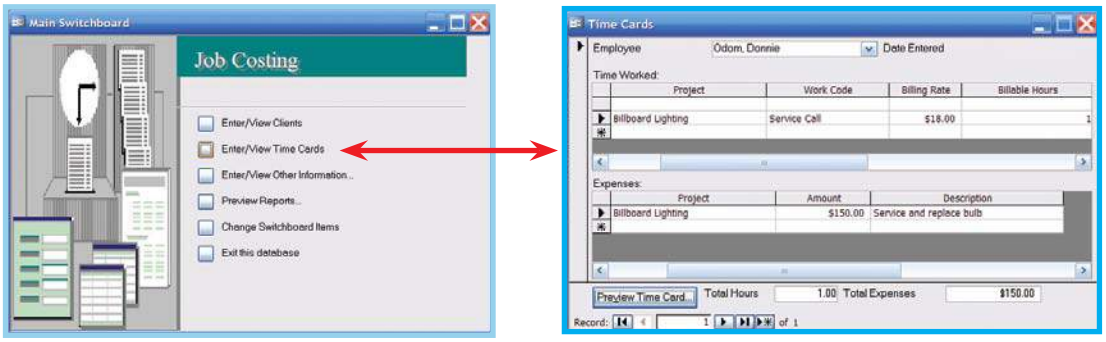
Castle Electric — Job Cost Sheet

Job: Job A - Obekie Home

	Form Reference	Direct Labor			Direct Material			Applied Overhead				Total
		Hours	Rate	Total	Qty.	Unit Cost	Total	Basis	Qty.	Rate	Total	
July 14, 20X5												
Andy Axon	DTS.07.14.X5.AA	7	$10	$ 70.00								$ 70.00
Bev Bentson	DTS.07.14.X5.BB	7	$22	154.00								154.00
Wire	MR.07.14.X5.BB				2000	$.14	$280.00					280.00
Junction Boxes	MR.07.14.X5.BB				50	$2	100.00					100.00
July 15, 20X5												
Andy Axon	DTS.07.15.X5.AA	8	$10	80.00								80.00
Bev Bentson	DTS.07.15.X5.BB	8	$22	176.00								176.00
July 16, 20X5												
Andy Axon	DTS.07.16.X5.AA	6	$10	60.00								60.00
Bev Bentson	DTS.07.16.X5.BB	8	$22	176.00								176.00
Can Lights	MR.07.16.X5.AA				25	$15	375.00					375.00
Applied Overhead								Labor Hours	44	$20	$880.00	880.00
		44		$716.00			$755.00				$880.00	$2,351.00

1.9 Database Versus Spreadsheets

Jack could maintain some or all of his job costing system manually. Or, he could use an electronic spreadsheet to prepare reports similar to those just illustrated. However, there is another more powerful tool – the electronic database. A number of commercial packages are available. Generalizing, data are entered via a user friendly input form that includes a number of predetermined "slots" for entering desired information. For instance, below is a data entry form for entering Donnie's time and material for the 14th:



The benefit of the database approach is that information is only entered once; it need not be transferred to other forms. The computer files can be queried in many ways – beyond just preparing a job cost report. For instance, Jack could use the customized reports feature to find all jobs on which billboard light bulbs were used during the past 18 months, determine the total direct labor hours of any employee for a selected time interval, identify how many jobs were performed for a selected client, and on and on! Such databases provide a powerful management tool.

1.10 Moving Beyond the Conceptual Level

Thus far, we have looked at a simple and understandable illustration of job costing. What this illustration fails to show is:

- The sophistication of the information systems that are used to track job costs in a larger organization.
- The debits and credits that are needed to track the accumulation and application of costs within a company's general ledger system.
- The ultimate disposition of the difference between applied and actual overhead.

Each of these issues will be dealt with in the following sections of this chapter. As you proceed to study this material, you may find yourself becoming consumed by the details. If so, think again about Jack Castle; consider that we are applying Jack's costing model to a more robust business environment.