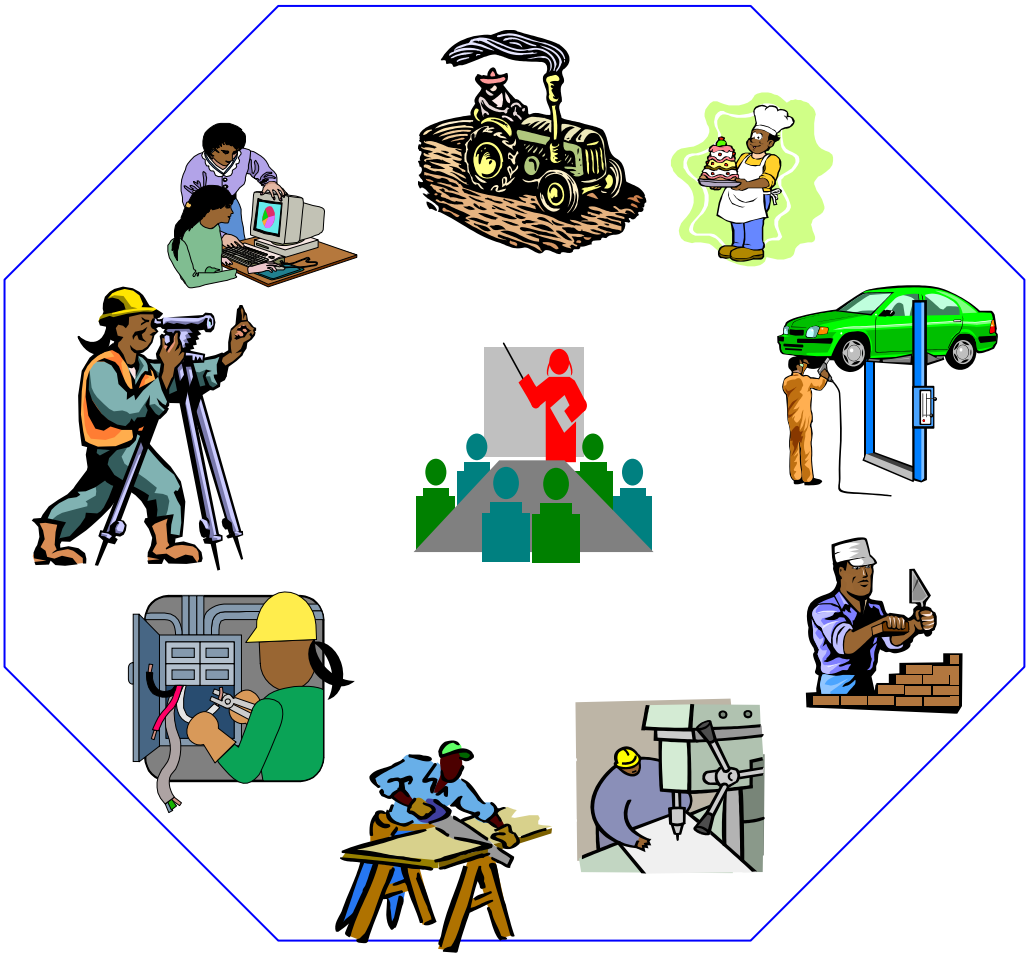
Furniture Making Operation Management Level IV

Based on October 2019, Version 2 Occupational standard



Module Title: Preparing Job Estimation and Costing

LG Code: IND FOM4 M11 LO (1-5)LG (43-47)

TTLM Code: IND FOM4 TTLM 0121V1

January 2021

Adama, Ethiopia

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LG # 43 LO #1- Gather information

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following **content coverage** and topics:

1.1 Establishing organizational framework, procedures
1.2 Reading plans and specifications and understood
1.3 Identifying plans, specifications and standards from industry practice
1.4 Obtaining Labor unit cost projections and agreed
1.5 Obtaining and analyzing supply agreements or equivalent
1.6 Distributing physical systems and related cost factors
1.7 Reading stored for retrieval and application

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to:

- Establish organizational framework, procedures
- Read plans and specifications and understood
- Identify plans, specifications and standards from industry practice
- Obtain Labor unit cost projections and agreed
- obtain and analyze supply agreements or equivalent
- Distribute physical systems and related cost factors
- Read stored for retrieval and application

Learning Instructions:

1. Read the specific objectives of this Learning Guide.
2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your

trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).

6. If you earned a satisfactory evaluation proceed to “Operation sheets
7. Perform “the Learning activity performance test” which is placed following “Operation sheets”
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Information Sheet-1 Establishing organizational framework, procedures.

1.1 Introduction

➢ The North American hard wood dimension and components industry consists of an estimated 1,200, mostly small, family owned businesses in the United States and Canada that generated shipments valued at roughly $4 billion in 2009 (Lawser 2010). Industry participants specialize in producing an array of customized wood products, such as edge-glued panels, solid and laminated squares, moldings, stair parts, cabinet doors and parts, turnings, components for bending, and other related products to meet the needs of the furniture, kitchen cabinet, building products, and other manufacturing industries. To remain profitable, the North

American hardwood dimension and components industry must continuously adapt its business model to domestic and foreign competition and changing market and customer requirements in respect to quality, styling, performance, and costs. Furthermore, the industry has to cope with a changing regulatory environment. An important component of success is accurate estimation of product costs associated with each order. Competitive bidding is complicated by the fact that many products are customized and thus each bid may involve unique products and processes. Therefore, having an accurate and up-to-date product costing system can ensure the submission of winning (e.g., competitively priced but profitable) bids to potential customers.

This product costing guide, prepared for the hardwood dimension and components industry, includes main sections:

- An introduction to product costing
- An overview of current product costing systems
- Results of a product costing survey conducted
- Establishing organizational framework, procedures
- Estimating rent for manufacturers is relatively easy. Most manufacturers boast about the size of their facilities,

- Determining how activities and resources are grouped Organizing (organizing workplace, selecting structure, assign, establishing working relationship)
- Managing is the act of getting people together to accomplish desired goals and objectives. The person who performs this activity is known as manager.
- Systematic combination of resources to achieve goals
- Determination of the number of people required to get the jobs done Managing is the act of getting people together to accomplish desired goals and objectives. The person who performs this activity is known as manager.
- Systematic combination of resources to achieve goals

Self-Check -1 Written Test

Directions: Answer all the questions. Use the Answer sheet provided in the next page:

1. The time that the labor will consume in performing on it of work varies between

   A. Labor B. Project C. climatic condition D. job supervision E. all

2. To accurately estimate productivity an estimator only need a good historical record.

   A. False B. True

Answer Sheet

Score = _____

Rating: _____

Information Sheet-2 Reading plans and specifications and understood

Introduction

This unit of competency specifies the outcomes required to read and interpret plans and specifications relevant to construction operations. It includes the identification of types of plans and drawings and their functions, the recognition of commonly used symbols and abbreviations, the identification of key features and specifications on a site plan, the comprehension of written job specifications and the recognition of document status and amendment detail. Environmental requirements and controls are identified from job plans, specifications and environmental plan..

- **Technical specification** document defines the requirements for a project, product, or system. A specification is the information on technical design, development, and procedures related to the requirements it outlines. The result is a proven, three-step process that ensures the workplace design integrates with UCSF's buildings, culture, brand and budget

Design Development

In this phase, ideas and concepts are explored and tested. Floor plans and 3D views/renderings of actual workstations (typicals) are drawn and reviewed with you. Also, can help you choose all finishes, upholsteries and materials; including some architectural finishes such as paint, wall and floor coverings; then, OWP will produce finish plans for the contractor

Project Documentation

This is the "specifications" phase. All the products you have selected are documented, and furniture installation drawings are generated; noting the type, size and placement of every piece of furniture. An audit is included, as an extra step to ensure accuracy, code compliance and exact order quantities Furniture Design, Planning and Specification. One Workplace has combined traditional design principles with our own unique approach to the workplace

Figure: 1.furniture drawing

Self-Check -2 Written Test

Directions: Answer all the questions. use the Answer sheet provided in the next page:

Answer Sheet

Score = _____

Rating: _____

Information Sheet-3 Identifying plans, specifications and standards from industry practice

Introduction of a production management information system is one of the ways that could help the management to increase its efficiency. It should enable the monitoring of the whole business of a firm through co-ordination in the process of collecting and using information.
Key words: wood processing, furniture manufacture, information system, management, planning, controlling

The market and a new way of production require fast development of modern management information system in wood processing and furniture manufacture

The business of wood processing firms and furniture manufactures can hardly function without good information systems. This refers to all business affairs and also to individual ones such as bookkeeping and finances, sales, supply, etc. The information system of a firm should be explained in terms of its division into the transaction and corporative parts, both of which form

the integral information system of a wood-processing and furniture-manufacturing firm

WORK THE PLAN

Project Preparation, we discussed the necessary process for planning a woodworking project. In Unit II, Understanding Wood, we studied the different characteristics and types of wood.

Now, it's time to begin! You have heard it said, Plan the Work, Work the Plan. Well, with the plan in place and the type of wood chosen, it's time to work the plan.

Steps to beginning a project:

1. Read your plans: If you have planned poorly, you're project will suffer. At the very least you will be frustrated. You will also waste time, energy, and materials. It cannot be overstated,

"Take the time to plan your work effectively." Before ever beginning a project ask yourself the following questions:

A Is everything you need to know about how your project will be built answered on your plans .

B Do you know what you are going to do?

C Do you know what type of wood you are going to use?

D. Do you know how to build your project?

E Do you know the exact size of each cut?

F Do you know what type of joinery you are going to use (see below)?

G. Do you know how everything is going to go together?

If you cannot say yes to each of these questions, you have not properly planned your work you should review Unit I and take the time to get this step right am constantly azedas to howam students can spend time drafting plans for their project and not know how it will go together, what size to cut something, or what joints they will be using.

Figure: 1

2. Purchase your materials: You wouldn't go to the grocery store without a shopping list, would you? Not especially if you wanted to cook a certain, special meal. Woodworking is the same. As we discussed in Unit I, you should know what you're going to buy and have an idea of how much it is going to cost BEFORE you go shopping. Cutting should not begin until all

material is purchased. Ask yourself the following questions:

A Is your List of Materials complete?

B. Do you know where to purchase everything?

C. Do you have an idea of cost?

Figure: 2

3. Work the Plan: Simply getting started is often the hardest thing forpeople to do This often occurs because people don't really understand their plans and what to do first.

A lso, inexperienced or in secure woodworkers are timid and fearful of making mistakes before they ever begin.

Mistakes happen; we'll talk about that later. For now, just think of every possible mistake that could happen as being nothing more than an opportunity to try something new.

The big mistakes only

happen if you haven't prepared properly or if you haven't asked the right questions. Don't start working the plan if you haven't properly planned the work. but, if you prepared, then just take a deep breath and get started.

To help with this, some people will make a list of things to do, or write down the steps they need to take to complete their project. Either way, ask yourself the following:

a. Do you know how to get started?

b. Do you know what you are going to do first, second, third, and so on?

c. Do you have everything necessary to get started and finish your pro

Cabinet Parts and Terminology

1 - Hanging rail - secures cabinet to the wall

2 - Corner blocks add strength and stability

3 - Drawer & drawer guides or false front

4 – Do –

5 - Cabinet floor Kick

6 - Toe

7 - Shelf

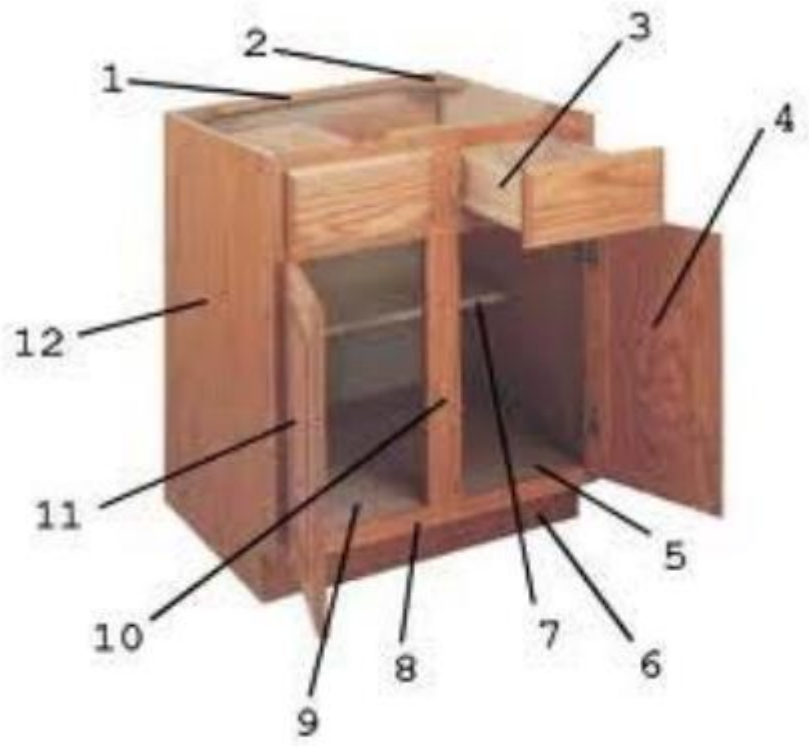
8 - Face Frame

9 - Cabinet Floor

10 - Center Stile

11 - Exterior Style

12 - Exposed Side (End or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Self-Check -3 Written Test

Directio ns: nswer all the questions. Use the Answer list sheet provided in the next page:

1.list the Steps to beginning a project

Information Sheet-4 Obtaining Labor unit cost projections and agreed

Labor costs and materials costs are completely different entities, with two common laities. Both types of costs can be deducted, and both are used to make a product or provide a service to customers. Both costs are calculated during the budgetary process and are typically considered when determining the amount to charge for the end product. Understanding the difference between labor costs and materials costs is essential to accurate budgeting and making a profit.

Materials

Raw materials include all tangible items that go into the manufacturing of the finished product, including individual parts that work together to complete the product, the adhesive that holds those parts together and the boxes in which the products are shipped. Material costs and are identified as budgetary line items. Direct materials are items that are easily tracked as part of a final product. For example, a tiny motor that drives the fan in a computer is considered a raw material as it is only part of the total product, which is the built computer. The fan is also a product, for whatever company manufactured it.

Direct Labor

Direct labor describes anyone who is directly involved with the manufacturing of a product. Assembly workers who put the products together, quality control engineers who test the products to be sure they are operational, engineers who design the product and draw up the plans for manufacturing, and warehouse workers that package and ship the products are all direct laborers.

Overhead costs are all costs of manufacturing that are not considered to be direct materials or direct labor. This includes indirect materials and indirect labor. Common overhead costs include utilities, factory rent, insurance and management costs. Because of the difficulty in assigning overhead to individual products, managerial accountants use different cost allocation methods to determine thcost of products.

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Indirect Labor

Any employee whose job is not directly involved with the development, manufacturing or shipment of the product is an indirect laborer. Company support staff such as human resources employees, administrative assistants and company security officers fall under the umbrella of indirect labor.

Adjusting

Labor expense is more adjustable than materials expense; an order for 10,000 products will require the same amount of glue and individual parts regardless of how long it takes to assemble them. Labor costs, by contrast, can be adjusted by designing more efficient assembly methods, having employees work or not work overtime and deciding how much quality control you are willing to pay for. Because labor costs are more flexible than material costs, when budget cuts become necessary labor is often targeted first

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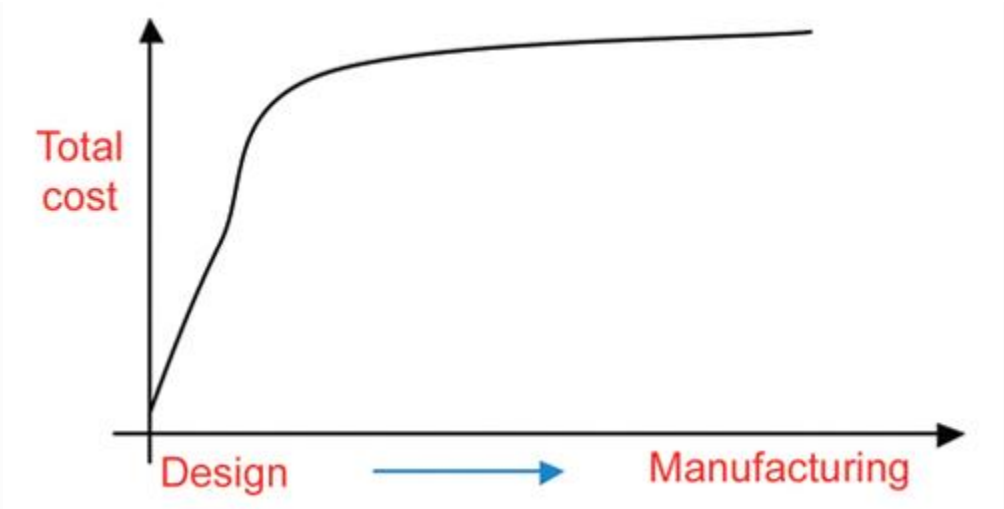

Figure 1 Product life cycle and relationship with cost

Self-Check -4 Written Test

Directions: Answer all the questions.

1._____**And**_____ costs are calculated during the budgetary process and are typically considered when determining the amount to charge for the end product.

Information Sheet-5 Obtaining and analyzed supply agreements or equivalent

Financial Analysis Firms make purchase decisions that occur at different times for different durations and schedule paybacks which also occur at different times as well. Because of these reasons, the following financial analysis tools are necessary because they allow firms, state regulators, and other users of the Manual to be able to compare the costs of different compliance strategies. Net Present Value The process through which future cash flows are translated into current dollars is called present value analysis. When the cash flows involve income and expenses, it is also commonly referred to as net present value (NPV) analysis. In either case, the calculation is the same: adjust the value of future money to values based on the same year (generally year zero of the project), employing an appropriate interest (discount) rate and then add them together, after all income and expenses have been converted into the same year dollar using appropriate price indices. Derivation of a cash flow's net present value involves the following steps: 9 U.S. Bureau of Labor Statistics. "Comparing the Consumer Price Index with the gross domestic product price index and gross domestic product implicit price deflator." Monthly Labor Review.analytical potential (and pitfalls) of currently available data

Measurement Issues A distinction is maintained here between labor cost and employee Compensation. Labor cost is viewed as the full cost to the firm of employing labor as a factor of production. Employee compensation, on the other hand, represents the stream of income (broadly defined to include nonwage forms of income) that accrues to an individual in payment for labor services. The two concepts are closely related, and parallel analytical problems are encountered in developing measures of labor cost and employee compensation manufacturing is focused on the optimized application of resources and the workforce to achieve the on-time production of high quality goods while maintaining the enterprise characteristics necessary for the company to control and quickly respond to internal and external stimul

- Challenges to data analysis systems in manufacturing

  The manufacturing ecosystem may be viewed as a multi-dimensional grouping of systems designed to support the various business, operations, engineering,

maintenance,

and training functions involved in the manufacturing process.

- A manufacturing enterprise normally employs a layered architecture that segregates its infrastructure into multiple zones of operation,

Self-Check -5 Written Test

Directions: Answer all the questions. Use the Answer sheet provided in the next page:

1. Define the term Team. (4 points

2. List out the Characteristics of a team. (4 points)

Information Sheet-6 Distributing physical systems and related cost factors

Distributing physical systems

Physical resource planning is a process focusing on natural resources. The planning process conforms to the vision and mission statement of the controlling agency.

Natural resources planning stretches across a continuum that has strict preservation at one end and complete modification at the other. As an example, a wetland can be allowed to follow natural succession or can be mitigated. Mitigated wetlands would be lands traded and developed to replace existing wetlands scheduled for a change of land use.

The majority of park and recreation managers will find themselves playing a role in the physi cal resource planning process. The substance of this role varies with the nature and extent of the work to be done and the importance of the specific project and the planning decisions to their organizations. The manager, staff, and community boards may be involved collectively with various portions of the planning process. It is crucial that the manager understands the entire planning process, the various roles of planning part icipants, and the appropriate planning chronology, in order to enhance the likelihood of bringing successful projects to fruition.

The planning process is just as important to, and relevant for, small and large public agencies and is equally applicable to the varied and unique for-profit commercial recreation sector as well. Regardless of the uniqueness of each park and recreation organization, the majority of managers will most likely encounter planning situations and experiences.

Physical resource planning is integrated with institutional planning. The institution systematically assesses the effective use of physical resources and uses the results of the evaluation as the basis for improvement.

Future cost of compliance with environmental, safety and health regulations could reduce our earnings**.**

Cost Factors

The **job order costing system** is suitable for companies producing a wide variety of products. This system is used by businesses in which the product is tailored for a particular customer, such as customized furniture, aircraft, printing, construction, law, and accounting.

Product costing is an underlying component of cost accounting. The purpose of product costing is to provide accurate and up-to-date information for management regarding the costs of a company's products. Product costing has an essential role in ensuring that the company's products generate sufficient income to achieve the company's goals. In addition, product costing provides:

- A cost control mechanism across businesses
- An optimization tool for operating and profit margin
- Information for pricing decisions
- A basis for accounting, specifically cost accounting and inventory valuation
- Information to support make or buy decisions

Competitive bidding requires reliable product cost information and a carefully set offering price. The offering price is market-driven and determined after considering customer requirements, competitive offerings, the market situation, and the company's situation. The profit margin is determined after evaluating the company's product cost information, strategy,and internal margin expectations

Best Product Costing System

In the previous sections, the array of traditional and alternative cost accounting and associated product costing systems were introduced. Further information about strengths and weaknesses, and benefits and drawbacks of each of these systems are available in the literature

Production costing

There are a number of varying methods of production costing to choose from, each with their own benefits and draw backs. The major production costing approaches employed are.

- Job Costing
- Standard Costing
- Direct Costing
- Target Costing

Self-Check -6 Written Test

Directions: Answer all the questions.

1. List the major production costing approaches employed
2. _____ is suitable for companies producing a wide variety of products.
3. _____is a process focusing on natural resources

Information Sheet-7 Reading stored for retrieval and application

Reading stored for retrieval

Information storage and retrieval, the systematic process of collecting and cataloging data so that they can be located and displayed on request. Computers and data processing techniques have made possible the high-speed, selective retrieval of large amounts of information for government, commercial, and academic purposes

There are several basic types of information-storage-and-retrieval systems.

Mattresses are an investment, one from which you can get more than a decade of use with the proper care and maintenance. There are many reasons you might put your mattress in a self storage unit, from downsizing your lifestyle to needing overflow space until you can move into a new home. Access Self Storage is here to offer several helpful tips on how to store a mattress properly until it's needed again store a Mattress in 4 Simple Steps

1 Clean your mattress by vacuuming, using cleaner, and air drying.

- Putting a dirty mattress into storage can result in mold, fungus, or at the very least a dirty mattress coming out of storage. To avoid this problem altogether, follow a few steps for a clean, ready-to-use mattress upon retrieval from storage:
- Vacuum the mattress thoroughly.
- Apply upholstery cleaner or baking soda.
- Place the mattress outside to air out and dry.
- Use a covered moving truck to transport to storage

First, vacuum thoroughly, then apply an upholstery cleaner. Use a light hand with the upholstery cleaner; it can be tricky, so read the directions carefully and don't soak the mattress to the point where it won't dry. Work the cleaner with a brush, then allow the mattress to dry completely. Even after you think it's dry, give it another day. You can use floor fans and open windows to expedite the drying process, or put it out in the sun if possible.

As a quicker and simpler alternative, you can sprinkle baking soda over the mattress, let it settle to absorb odors, and then vacuum up the powder. A steam cleaner is also a great alternative to applying upholstery cleaner by hand, as it kills all kinds of allergens. These types of vacuum cleaners are made by the major vacuum brands (Hoover, Bissell, etc.) and can be very effective in cleaning both carpets and upholstery. You can also rent these cleaners from some grocery and hardware stores—if you're storing several pieces of furniture along with the mattress, it's worth the bother. To clean your mattress, you'll need a model with a handheld attachment. Again, be sure to avoid soaking the mattress.

Transporting Your Mattress to Storage

What about keeping your mattress protected during the move? It's safest to shield the bed from filth and damage with blankets, sheets, or other fabric inside your moving vehicle—preferably a covered moving truck. Don't have one yet? We've got our tenants covered with free truck use. Tying a mattress to your car with bungee cords can be a risk to you and other drivers as well as the structural integrity of the mattress. Plus, you never know when unfavorable weather conditions might strike on moving day!

2. Wrap your mattress in a mattress storage bag or plastic.

If you have to store your mattress in a garage or storage unit, keep it covered to protect not only against dirt and dust, but also moisture. Mattress storage bags are available at many hardware stores and among Access's available on-site packing and moving supplies. If you're using plastic, be sure to thoroughly clean and dry the mattress before wrapping it. Otherwise, you could be sealing moisture in instead of keeping it out, and your mattress won't be in good shape for very long.

In addition, it's best to store your mattress in a climate-controlled environment—and you can find a storage unit with climate control at an Access Self Storage facility near you. Avoid damp basements, outdoor storage, and storage sheds. (Really, would you want to sleep on a mattress that came out of a shed?) If you live in an area with high humidity, storing a mattress in a non-temperature-controlled unit can lead to mold and bacteria breeding inside and on the mattress. Not only will your mattress smell like gym socks, but it could also be a health hazard.

3. Store your mattress flat and clear of items to protect the springs.

If you have the space to store the mattress flat, manufacturers recommend this for keeping it in good shape. It may be more convenient to store your mattress standing, but when it's stored upright, the coils and springs can shift and cause the mattress fabric to sag. Lay a tarp down on the floor before placing the mattress on top.

However, never store items on top of the mattress! It's not a steady surface, and objects can damage the springs and cause cuts or permanent dents in the cushioning. If you have large boxes or flat furniture where the mattress will be stored, you may lay the mattress on top (as long as it's steady). Check out our guide to organizing a storage unit for further advice on maximizing space

4. Freshen up your mattress with baking soda and deodorizing spray.

If, despite your efforts, the mattress comes out of storage smelling a little musty, not to worry. Here's how to freshen it up:

- Sprinkle baking soda on each side to absorb the smell.
- After 10 minutes, vacuum the entire mattress.
- Spray the mattress with a natural deodorizing spray and allow it to air-dry completely.
- To ensure it has time to air out, remove the mattress from storage at least 24 hours before you need to use it.

Self-Check -7 Written Test

Directions: Answer all the questions. Use the Answer sheet provided in the next page:

1. **Define the term Team. (4 points**
2. **List out the Characteristics of a team. (4 points)**
3. **Being a mutually evolving process,**

LG #44 LO #2- Identify and calculate labor cost

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

2.1 Identifying types and numbers of appropriate personnel estimate.

2.2 Calculating the labor work hours for non-contract elements

2.3 Estimating time requirements for work activities

2.4 Calculating the costs or rates for work required

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to

- Identify types and numbers of appropriate personnel estimate.
- Calculat the labor work hours for non-contract elements
- Estimat time requirements for work activities
- Calculat the costs or rates for work required

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1 Read the specific objectives of this Learning Guide.
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Information Sheet-1 Identifying types and numbers of appropriate personnel estimate

That number should then get multiplied by the labor burden and markup.

Always round up to the next dollar in these scenarios. Using a nice, round number always makes it easier.

Having these calculations on hand will help you determine the labor cost for a project much quicker. You can keep examples of different combinations too. Because not every project will involve all the same crew members

The pricing of the labor rate is determined by adding the hourly rates of the employees who will be working on a single project

As a contractor, calculating the value of your work comes with its challenges. You have to account for labor, materials, and equipment to name a few.

A cost estimate is the service provider's approximation of what the job is likely to cost.

The purpose of cost estimation is to predict the quantity, cost, and price of the resources required to complete a job within the project scope. Cost estimates are used to bid on new business from prospective clients and to inform your job and budget planning process.

Cost estimation is done by breaking the scope of the project down into manageable parts and using all information available (previous experience, similar jobs, expertise in the industry) to arrive at a total expected cost.

Using software (such as a job management system) to manage and track your projects enables you to automatically collect data as you complete work, which you can use to accurately estimate future jobs. For example, tracking employee time with time tracking software gives you precise information about how long employees take to complete specific tasks, so you're able to estimate those tasks in the next job more reliably. Estimating is done at the beginning of new projects to arrive at an original cost estimate, but should be

frequently reviewed and updated as new information becomes available or conditions change.

the terms ‘estimate’ and ‘quote’ are used interchangeably within an organisation, as they both serve a similar function and require a similar job costing process to complete; however, they have one key difference which is important to outline:

A quote (or a price quote/quotation) outlines the exact price that the client will pay for the job being offered. Upon acceptance, the service provider is contractually obligated to complete the work at the specified price based on the terms that are outlined in the quote (unless the scope of the work changes and a new quote is presented and agreed upon.)

An estimate, on the other hand, is not contractually binding. Clients understand that the prices outlined are subject to change as the project progresses to reflect a greater level of detail about required resources, scope, or timelines.

When should I use an estimate vs. a quote?

Whether you use an estimate or a quote will depend on your industry and the types of jobs you’re offering. Generally speaking, estimates are particularly useful when:

- The work is not yet fully defined (often in the early stages of scoping out the project, on an initial call with a prospective client, or on a preliminary site visit)
- The job is novel for your business and you don’t have previous experienceto rely on
- You’re working with uncertain conditions (new relationships with vendors/subcontractors, fluctuating prices of required materials, etc.)
- Alternatively, quotes might be preferred between you and your clients if:
- The work is routine and you’ve completed it several times before
- The work you’re quoting has clear and predictable requirements and costs (time, labour, materials, etc.)
- You’re confident that you won’t encounter unforeseen events or costs

Even though you are not contractually obligated to deliver services at the price outlined in your estimate, it's important to ensure that your estimates are as accurate as possible.

Self-Check -1 Written Test

Directions: Answer all the questions. Use the Answer sheet provided in the next page

1. Define the term Team. (4 points

2. List out the Characteristics of a team. (4 points)

3. Being a mutually evolving process, a relationship requires team members to be

Information Sheet-2 Calculating the labor work hours for non-contract elements

2.1. Identifying types and numbers of on-site personnel and estimating time required on site.

Construction labors influence every part of a project. They operate equipment and fabricate and install materials. Detailed estimate requires the breakdown of project costs into the labor, material and equipment costs. Thus type of estimate need to have a design available to get such required details.

In today's fast-paced industrialized age, where many of the products we see are increasingly being mass produced in factories by machines, a building still remains as one of the few handcrafted products put together piece by piece by craftsmen. The construction industry, to which these craftsmen belong, is one of the most labor-intensive industries in the world. The labor cost component of a building project often ranges from 30 to 50%, and can be as high as 60% of the overall project cost. Therefore, it is clear that construction labor is a vital component of a construction project.

1.2 Labor Production rates (Productivity) for required on site work.

A production rate is defined as the number of units work produced by a person in a Cost specified time.

Production rates may also specify the time in man-hours or man-days required to produce a specified number of units of work. The time that a labor will consume in performing a unit of work varies between labors and between projects and with climatic conditions, job supervision, complexities of the operation and other factors. It requires more time for erect shutters for stairs than for foundations.

Sometimes, the production rate is replaced by the term productivity. In the most general sense, productivity is the ratio of input versus the respective output. In construction, the input is often the work hours of a worker or a crew, such as the 8 hours of a bricklayer. The output is the amount of work produced, such as laying 500 bricks. Thus construction productivity is defined as the quantity of work produced in a given amount of time by a

worker or a specific crew, that is, the quantity of construction output units produced in a given amount of time or a unit time. The formula for productivity is presented in Eq.1

Construction productivity = quantity of work produced / time duration

Example 1

If a bricklayer can lay 500 bricks in 8 hours, then, the associated construction productivity is 500 bricks divided by 8 hours, which are 62 bricks per bricklayer hour.

To accurately estimate productivity, an estimator not only needs a good historical record, but a lot of experien**ce.**

1.3 Estimating time requirements for work activities (Estimating work duration)

Determining the total work duration for a task involves knowledge of the quantity of work required for the task and the production rate for the specific crew that will be performing the work. The quantity of work associated with the material quantity is determined by the quantity take off.

The duration of an activity may be estimated as given in Eq. 2.

Work duration = quantity of work / number of crews × production rate

Example 2

Find the duration of an interior and exterior painting activities with quantities of 440 m^2 and 378 m^2 respectively, using crews of 11 m^2/hours and 14 m^2/hours for the interior and exterior painting activities respectively.

Solution

Interior painting duration = 440 / 11 = 40 hours

Exterior painting duration = 378 / 14 = 27 hours

Total work hours = 67 hours

Typically, the quantity of work is determined from engineering drawings of a specific project. The number of crews working is decided by the planner. In many cases, the

number or amount of resources applied to particular activities may be modified in light of the resulting project plan and schedule.

Having defined a duration of a given work, it means that the planner have already defined the number of resources that will be employed in a particular work. Knowing duration and resources employed, it is simple to estimate the activity direct cost. Then, the three elements of an activity: duration, cost, and resources form what is called construction method. Some activities can be performed using different construction methods. Where, its method will have its own resources, cost and duration.

1.4 Calculating labor cost for non-contract elements.

Basic principle for estimating labor costs

Labor costs in construction are determined by two factors: monetary and productivity. The monetary factor is related to hourly wage rates, wage premiums, insurance and taxes.

Estimating the components of the monetary factor is more difficult in construction than in other industries. This is due to the variety of work involved in construction, as well as the many types of trades involved. The problem is further complicated by the presence of the unions with their craft structures and collective bargaining processes. Although the computational process of this component seems complex and tedious, it is only a matter of accounting as the needed numbers (such as wage rates, fringe benefits, and insurance) are readily available.

The formula for computing the total cost of labor is quite simple. It requires the knowledge of the total work hours or labor hours needed to perform all the tasks and then applying the corresponding wage rates.

The formula for calculating the total cost of labor is shown in Eq.3.

Total cost of labor = total work hour × wage rate

Example 3

An ironworker works 10hr/day, 6 days/week. A base wage of 20.97 birr/hr is paid for all straight-time work, 8 hr/day, and 5 day/week. An overtime rate of one time and one-half is paid for all hours over 8 hr/day, Monday through Friday, and double time is paid for all Saturday work. The social security tax is 7.65% and the unemployment tax is 3% of actual

wages. The rate for worker's compensation insurance is 12.5% of base wage. Calculate the average hourly cost to hire the ironworker.

Solution

Actual hours = 10 × 6 = 60 hr.

Pay hours = weekly straight time + weekly overtime + Thursday overtime

= 5 × 8 × 1 + 5 × 2 × 1.5 + 10 × 2 = 75 hr

Taxes are paid on actual wage and insurance is paid on base wage

Average hourly pay = (75/60) × 20.97birr = 26.21birr/hr.

Social security tax = 26.21 × 0.0765 = 2.01

Unemployment tax = 26.21 × 0.03 = 0.79

Compensation = 12.5/100 × 20.97 = 2.62

Then, the average hourly cost = 31.63birr/hr

Example 4

Assume that a crew for a work item includes three bricklayers and two helpers. The crew works for three days (8-hr/day) to complete the work package. The wage rate for each bricklayer is 28.55 Birr and each helper is 22.40 Birr. Find the total cost of the crew.

Solution

In this instance, the total cost of crew is calculated as follows:

Total cost = 3 × 3 × 8 × 28.55 + 2 × 3 × 8 × 22.4 = 3131birr

Example 5

If the daily production rate for a crew that works in an activity is 175 units/day and the total crew cost per day is 1800 birr. The material needed for daily work is 4.5 units at100 birr/unit.

A. Calculate the time and cost it takes the crew to finish 1400 units

b. Calculate the total unit cost. Consider an eight hour work day.

Solution

a. Duration (units of time) = Quantity / Production per unit of time x number of crews

= 1400 / 175 × 1 = 8 days

Cost (labor cost) = Duration (units of time) x crew cost per unit of time

= 8 days ×1800 birr / day = 14400 birr

Total direct cost = 14400 birr+ 4.5 units of material × 100 birr/ day × 8 days

= 18000 birr

b. Unit cost = total cost / quantity

= 18000 birr/ 1400 = 12.86birr / unit

Sometimes the productivity of a specific crew expressed in man-hours/unit not units/day. For example, if the productivity is said to be 0.5 Man-hour/cubic meters, this means howlong it will take one labor to construct one unit. This way applied to any crew formation and work hours.

Example 6

What is the duration in days to install 6000 square feet of walls shuttering if:

a. Crew of 2 carpenters is used with output of 2000 square feet/day

b. Productivity is measured as 0.008 man-hour/square feet. Number of carpenters =3, and number of working hours/day = 8 hours

a. Duration = 6000 / 2000 = 3 days

b. Total man-hours needed = 6000 × 0.008 = 48 man-hours (if one man used)

Duration = 48 / 8 = 6 days (if one man used)

Duration using 3 men = 6 / 3 = 2 days

Example 7 (use of several resources)

What is the duration of an exaction activity with a quantity of 3000 m^3 using an excavation crew consists of an excavator with a production rate of 200 m^3/day, a loader of 250 m^3/day and 3-trucks of 150 m^3/day? Comment on this crew formation. Solution

- Using the excavator: Duration = 3000 / 200 = 15 days
- using the loader: duration = 3000 / 250 = 12 days
- using the 3-trucks: duration = 3000 / 150 = 20 days

- Then, the activity duration is governed by the lowest production rate = 20 days.

This is unbalanced crew where the loader is not working with full capacity; the production rate of this crew could be adjusted by increasing the number of trucks to 4 of 5 trucks. Then, for a balanced mix of resources, use 1 loader, 1 excavator and 4-trucks. Accordingly, the activity duration = 3000 / 200 = 15 days.

Self-Check -2 Written Test

Directions: Answer all the questions.

1. Define the term Team. (4 points

2. List out the Characteristics of a team. (4 points

3. Being a mutually evolving process, a relationship requires team members

Information Sheet-3 Estimating time requirements for work activities

Estimating is the most important of the practical aspects of construction management, and the subject deserves the closest attention of one aspiring to a career in the profession. It is a comparatively simple subject to understand; however, as it brings one up against practical work, methods and procedure, knowledge of it cannot be acquired without close application. The estimating procedure used in the Manual consists of five steps:

- obtaining the facility parameters and compliance options for a given facility;
- preparing the control system design;
- sizing the control system components;
- estimating the costs of these individual components; and
- estimating the costs (capital and annual) of the entire system.

Cost estimating is a well-developed discipline. by understanding the nuances of cost estimating and using standard estimation techniques, you can improve your forecast Professional estimators use defined techniques to create cost estimates that are used to assess the financial feasibility of projects, to budget for project costs, and to monitor project spending. An accurate cost estimate is critical for deciding whether to take on a project, for determining a project's eventual scope, and for ensuring that projects remain financially feasible and avoid cost overruns.

An estimate is a calculation of the quantities of various items of work, and the expenses likely to be incurred there on. The total of these probable expenses to be incurred on the work is known as estimated cost of the work. The estimated cost of a work is a close approximation of its actual cost.

The agreement of the estimated cost with the actual cost will depend on accurate use of estimating methods and correct visualization of the work, as it will be done. Importance of correct estimating is obvious. Under-estimating may result in the client getting an unpleasant shock when tenders are opened and drastically modifying or abandoning the work at that stage. Over-estimating may lose the engineer or estimator his client or his job, or in any case his confidence.

2 .Purpose of Estimating:

An estimate is necessary to give the owner a reasonably accurate idea of the cost to help him decide whether the work can be undertaken or not as proposed or needs to be curtailed or abandoned, depending upon the availability of funds and prospective direct and indirect benefits. For government works proper sanction has to be obtained for allocating the required amount. Works are often let out on a lump sum basis, in which case the Estimator must be in a position to know exactly how much expenditure he is going to incur on them

3 How works can be estimated?

The importance of knowing the probable cost needs no emphasis, estimating materials, labor, plant and time is immensely useful in planning and execution of any work

A. Estimating Materials

From the estimate of a work it is possible to determine what materials and in what quantities will be required for the work so that the arrangements to procure them can be made.

B. Estimating Labor

The number and kind of workers of different categories who will have to be employed to complete the work in the specified time can be found out from the estimate.

C. Estimating Plant

An estimate will help in determining amount and kind of equipment needed to complete the work.

D .Estimating Time

The estimate of a work and the past experience enable one to estimate quite closely the length of time required to complete an item of work or the work as a whole.

4. Types of Construction Estimates:

There are several kinds of estimating techniques; these can be grouped into two main categories

A. Approximate estimates
B. Detailed estimates

Approximate Estimates

An approximate estimate is an approximate or rough estimate prepared to obtain an approximate cost in a short time. For certain purposes the use of such methods is justified.

When accurate cost of construction is not yet required and a rough idea is sought at some stage to help decision makers decide whether to proceed or not. The accuracy of cost estimated by approximate methods depends on the judgment, skill, and experience of the estimator and upon the correctness of the prices used.

The approximate cost estimating methods are used to serve either of the following purposes:

1. To give a rough idea of the probable expenditure: At the early stages of the development of a project it is necessary to ensure whether the project can be financed. A rough idea of the probable expenditure has to be obtained and if this appears feasible, then further details may be considered.
2. Administrative approval: In the case of government and other public works, proper sanction has to be obtained for allocating the expenditure required for the detailed investigations and preparation of plans and estimates. This sanction is given based on approximate cost estimating method.
3. Valuation and rent fixation: Sometimes it is required to estimate the cost of an existing structure, for one or more of the following reasons: for sale or purchase, for rent fixing, for framing tax schedules, or for insurance requirement. In these cases the approximate methods are adopted.

The 5 common methods of approximate or Preliminary Cost Estimates

1. Service unit

2. Square meter of floor area
3. Cubic meter of the building
4. typical bay Method
5. Comparison of Costs at relative dates

1. Service unit

Buildings are constructed to serve a specific purpose. For example hospitals are designed to accommodate certain number of beds. Each bed is then considered a service unit. Hotels are designed to accommodate certain number of guest rooms. Each guest room is considered a service unit. Same applies to offices, residential houses, etc.

Whenever a building is constructed the Engineer or the architect keeps the record of the place, actual cost, number of service units, and the year of construction. From this record, it is possible to work out the cost per service unit. This cost is then adjusted to account for inflation, and peculiarities of the project under consideration. Then the adjusted cost per service unit is simply multiplied by the number of service units in the proposed project to get an approximate cost estimate.

3. Square meter of floor area

The floor area of the proposed structure is worked out, and then multiplied by a suitable rate. This rate of construction per square meter of floor area is worked out by dividing the known cost of construction of a similar building by the floor area of that building.

There are some variations of this method:

1. One way is to add all the usable floor areas and exclude basement and roof (This method is.(This method is adopted by the tool provided below this article by Misronet)
2. Another way is to use certain rate for each floor, including roof and basement
3. Use different rate for basement floor, other floors, and roof
4. Another way is to have the unit rate of the lower floor include basement and foundations and that for the top floor include roof.

4. Cubic meter of the building

This method is more accurate than the square meter of floor area method. because the depth of foundations and the height of the structure above the ground level are the additional dimensions taken into consideration.

The American Institute of Architects recommends considering the actual cubic space enclosed within the outer surfaces of the outside walls and contained between the outer surfaces of the roof and 15 cm below the finished surface of the lowest floor.

4. Typical bay Method

This method is particularly suitable for buildings which consist of repetitive bays, such as a garage, a workshop building.

Detailed quantities are taken out of all the different items of work involved in a typical bay and finding out the cost of such items using suitable rates.

5. Comparison of Costs at relative dates

The approximate cost of the proposed structure is found out by modifying the known cost of similar existing structure with due consideration to price fluctuation between the dates of construction of the old and proposed structure.

This method gives the best results but it is only applicable to structures which are repetition of similar works

B. Detailed Estimate

A detailed estimate of the cost of a project is prepared by determining the quantities and costs of everything that a contractor is required to provide and do for the satisfactory completion of the work. It is the best and most reliable form of estimate**.**

Self-Check -3 Written Test

Directions: Answer all the questions. Use the Answer sheet provided in the next page:

1. Define the term Team. (4 points

2. List out the Characteristics of a team. (4 points)
3. Being a mutually evolving process, a relationship requires team members to be

Information Sheet-4 Calculating the costs or rates for work required

Labor s production rates (Productivity)

A production rate is defined as the number of units of work produced by a person in a

- Specified time. Production rates may also specify the time in man-hours or man-days required to produce a specified number of units of work. The time that a labor will consume in performing a unit of work varies between labors and between projects and with climatic conditions, job supervision, complexities of the operation and other factors. It requires more time for erect shutters for stairs than for foundations.

Sometimes, the production rate is replaced by the term productivity. In the most general sense, productivity is the ratio of input versus the respective output. In construction, the input is often the work hours of a worker or a crew, such as the 8 hours of a bricklayer. The output is the amount of work produced, such as laying 500 bricks. Thus construction productivity is defined as the quantity of work produced in a given amount of time by a worker or a specific crew, that is, the quantity of construction output units produced in a given amount of time or a unit time. The formula for productivity is presented in Eq. 4.1.

Construction productivity = quantity of work produced / time duration (4.1)

Example 4.1

If a bricklayer can lay 500 bricks in 8 hours, then, the associated construction productivity is 500 bricks divided by 8 hours, which is 62 bricks per bricklayer hour. Although most items associated with the monetary factor remain relatively constant over a short period of time, such as during the construction phase, productivity, on the other hand, can fluctuate wildly. To accurately estimate productivity, an estimator not only needs a good historical record, but a lot of experience.

Productivity sources

Productivity rates can be determined from published sources such as Means' Building Construction Cost Data and Walker's Building Estimator's Reference Book. Figure 4.1 illustrates an excerpt from Means.

09200 Plaster & Gypsum Board

09210	Gypsum Plaster	CREW	DAILY OUTPUT	LABOR-HOURS	UNIT	2000 BARE COSTS MAT.	LABOR	EQUIP.	TOTAL	TOTAL INCL O&P
0010	GYPSUM PLASTER 36 kg bag, less than 0.9 metric ton				Bag	14.20			14.20	15.65
0100	Over 0.9 metric ton				"	12.90			12.90	14.20
0300	2 coats, no lath included, on walls	J-1	87.79	0.456	m²	4.09	11.35	0.62	16.06	22.50
0400	On ceilings	"	76.92	0.520		4.09	12.95	0.71	17.75	25.00
0600	2 coats on and incl. 10 mm gypsum lath on steel, on walls	J-2	81.10	0.592		8.20	15.00	0.67	23.87	32.50
0700	On ceilings	"	69.40	0.692		8.20	17.55	0.79	26.54	37.00
0900	3 coats, no lath included, on walls	J-1	72.74	0.550		5.70	13.70	0.75	20.15	28.00
1000	On ceilings	"	65.22	0.613	▼	5.70	15.30	0.83	21.83	30.50

Fig. 4.1: Excerpt form Means' Building Construction Cost Data

For a line item, Means provides the crew types associated with that line as well as two forms of productivity rate: the daily output (unit/day) and labor hours (hr/unit). For example, referring to Figure 4.1, for line 09210-100-0900, the daily output is 72.74 m2 and the labor hours required for one m2 is 0.550 hours. The bare labor cost for the line item is $13.70/m2. Also, the crew type for this work is Crew J-1. With reference to Figure 4.2, the excerpt from Means' crew listing shows Crew J-1 as consisting of 3 plasterers, 2 plasterer helpers, and 1 mixing machine.

Crew No.	Bare Costs		Incl. Subs O & P		Cost Per Labor-Hour	
Crew J-1	Hr.	Daily	Hr.	Daily	Bare Costs	Incl. O&P
3 Plasterers	$26.65	$639.60	$40.85	$980.40	$24.93	$38.21
2 Plasterer Helpers	22.35	357.60	34.25	548.00		
1 Mixing Machine, 0.17 m³		54.50		59.95	1.36	1.50
40 L.H., Daily Totals		$1051.70		$1588.35	$26.29	$39.71

Fig. 4.2: Excerpt form Means' Building Construction Cost Data: Crew J-1

The labor hours per unit production are determined by dividing the total labor hours of the crew by the daily output. With reference to line 09210-100-0900 in Fig. 4.1 and Crew J-1 in Fig. 4.2, Figure 4.3 shows the computation involved in determining the weighted wage rate for the crew and bare unit labor cost for the line item.

Crew J-1 consists of 3 plasterer and 2 plasterer helper

$$\text{Weighted Wage Rate (Bare Cost)} = \frac{3(\$26.65) \times 2(\$22.35)}{3+2}$$

$$= \$\ 24.93\ /\text{hr}$$

$$\text{Bare Labor Unit Cost} = \$\ 24.93\ /\text{hr} \times 40\ \text{hr} \div 72.74\ \text{m}^2$$

$$= \$\ 13.70\ /\ \text{m}^2$$

Fig. 4.3: Calculating crew rate

It is important to note the presentation of productivity in labor hours. By keeping the productivity record in labor hours, the record is essentially normalized and is not subjected to the variability in project locations and prevailing wage rates. In this way, unit labor costs for the contractor's own operating region can be easily developed by multiplying local wage rates including burden and fringe benefits by the productivity rate.

Example 4.2

A contractor determines that the unit productivity for painting a wall is 0.55 hour per m2. If the local wage rate including burden and fringe benefits is LE30 per hour, the unit labor cost becomes LE16.50 per m2. If the wage rate is LE20 per hour, the unit labor cost becomes LE11 per m2. In addition, productivity performance between projects can also be easily compared if contractors keep cost accounting records in man-hours.

Estimating work duration

Determining the total work duration for a task involves knowledge of the quantity of work required for the task and the production rate for the specific crew that will be performing the work. The quantity of work associated with the material quantity is determined by the quantity take off discussed in Chapter 2. A straight forward approach to the estimation of activity durations is to keep historical records of particular activities and rely on the average durations from this experience in making new duration estimates. Since the scope of activities is unlikely to be identical between different projects, unit Cost Estimating 71 Dr. Emad Elbeltagi

production rates are typically employed for this purpose. The duration of an activity may be estimated as given in Eq. 4.2.

Work duration = quantity of work / number of crews × production rate (4.2)

Example 4.3

Find the duration of an interior and exterior painting activities with quantities of 440m 2 and 378 m2 respectively, using crews of 11 m2/hours and 14 m2/hours for the interior and exterior painting activities respectively. Solution

Interior painting duration = 440 / 11 = 40 hours

Exterior painting duration = 378 / 14 = 27 hours

Total work hours = 67 h

Self-Check -4 Written Test

Directions: Answer all the questions. Use the Answer sheet provided in the next page

1. Define the term Team. (4 points
2. List out the Characteristics of a team. (4 points)

LG #45 LO #3 Identify and establish physical resource requirement

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

3.1 Identifying Physical resource requirements

3. 2 Producing and Calculating materials quantities

3.3 Establishing Quantities against project construction contracts

3.4 Obtaining supplier prices for material consumables

3.5 Identifying and costing plant or equipment requirements.

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to

- Identify Physical resource requirements
- Produce and Calculate materials quantities
- Establish Quantities against project construction contracts
- Obtain supplier prices for material consumables
- Identify and cost plant or equipment requirements

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Learning Instructions:

Read the specific objectives of this Learning Guide.

2. Follow the instructions described below.

3 Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.

Accomplish the “Self-checks” which are placed following all information sheets.

5 Ask from your trainer the key to correction (key answers) or you can request your trainer

to correct your work. (You are to get the key answer only after you finished answering the Self-checks).

10 If you earned a satisfactory evaluation proceed to “Operation sheets

11 Perform “the Learning activity performance test” which is placed following “Operation sheets”

12 If your performance is satisfactory proceed to the next learning guide,

If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

Information Sheet-1 Identifying Physical resource requirements

Physical Resources . Physical resources, which include facilities, equipment, land, and other assets, support student learning programs and services and improve institutional effectiveness. Physical resource planning is integrated with institutional planning.. The institution provides safe and sufficient physical resources that support and assure the integrity and quality of its programs and services, regardless of location or means of delivery. 1. Against what criteria and by what processes does the institutePhysical resource planning. is integrated with institutional planning. The institution systematically assesses the effective use of physical resources and uses the results of the evaluation as the basis for improvement.

The Physical Resources Planning Process

The purpose of the physical resources plan is to guide
the development of land use and facilities for community parks and recreation. It provides th e basis for both immediate and long-range decision

For appropriate physical resources planning, a manager must be knowledgeable about property rights and modes of acquisition.Natural resources planning stretches across a conti nuum that has strict preservation at one
end and complete modification at the other. As an example, a wetland can be allowed to foll ow natural succession or can be mitigated. Mitigated wetlands would be lands traded and developed to replace existing wetlands scheduled for a change of land use. The majority of park and recreation managers will
find themselves playing a role in the physical resource planning process.

The substance of this role varies with the nature and extent of the work to be done and the importance of the specific project and the planning decisions to their organizations. The manager, staff, and community boards may be involved collectively with various portions of the planning process.

A manager needs to be generally knowledgeable about the legal basics of land and facilities acquisition, dis- posal, and encroachment. There are many alternative

development scenarios. Legal counsel should help a specific organization determine what is possible and best.

Physical resources, which include facilities, equipment, land, and other assets, support student learning programs and services and improve institutional effectiveness. Physical resource planning is integrated with institutional planning.. The institution provides safe and sufficient physical resources that support and assure the integrity and quality of its programs and services, regardless of location or means of delivery. 1. Against what criteria and by what processes does the institute

Linear Measure

1 inch	= 2.54 centimeters	
12 inches	= 1 foot	= 0.3048 meter
3 feet	= 1 yard	= 0.9144 meter
5 1/2 yards 16 1/2 feet	= 1 rod (or pole or perch)	= 5.029 meters
40 rods	= 1 furlong	= 201.17 meters
8 furlongs 1,760 yards 5,280 feet	= 1 (statute) mile	= 1,609.3 meters
3 miles	= 1 (land) league	= 4.83 kilometers

Square Measure

1 square inch	= 6.452 square centimeters	
144 square inches	= 1 square foot	= 929 square centimeters
9 square feet	= 1 square yard	= 0.8361 square meter
30 1/4 square yards	= 1 square rod = square pole = square perch	= 25.29 square meters
160 square rods 4,840 sq yards 43,560 sq ft	= 1 acre	= 0.4047 hectare

640 acres	= 1 square mile	= 259 hectares = 2.59 sq kilometers

Cubic Measure

1 cubic inch	= 16,387 cubic centimeters	
1,728 cubic inches	= 1 cubic foot	= 0.0283 cubic meter
27 cubic feet	= 1 cubic yard	= 0.7646 cubic meter
16 cubic feet	= 1cord foot	
8 cord feet	= 1 cord	= 3.625 cubic meters

Dry Measure

1 pint	= 33.60 cubic inches	= 0.5505 liter	
2 pints	= 1 quart	= 67.20 cubic inches	= 1.1012 liters
8 quarts	= 1 peck	= 537.61 cubic inches	= 8.8096 liters
4 pecks	= 1 bushel	= 2,150.42 cubic inches	= 35.2383 liters

1 British dry quart	= 1.032 U.S. dry quarts

Liquid Measure

1 gill	= 4 fluid ounces	= 7.219 cubic inches	= 0.1183 liter
4 gills	= 1 pint	= 28.875 cubic inches	= 0.4732 liter
2 pints	= 1 quart	= 57.75 cubic inches	= 0.9463 liter
4 quarts	= 1 gallon	= 231 cubic inches	= 3.7853 liters

The British imperial gallon (4 imperial quarts) = 277.42 cubic inches = 4.546 liters.

The barrel in Great Britain equals 36 imperial gallons, in the United States, usually 31 1/2 gallons

Avoirdupois Weight

1 dram or 27.34 grains	= 1.772 grams	
16 drams or 437.5 grains	= 1 ounce	= 28.3495 grams
16 ounces or 7,000	= 1 pound	= 453.59 grams

grains		
100 pounds	= 1 hundredweight	= 45.36 kilograms
2,000 pounds	= 1 ton	= 907.18 kilograms

The grain is equal to 0.0648 gram

In Great Britain, 14 pounds (6.35 kilograms) = 1 stone, 112 pounds (50.80 kilograms) = 1 hundred weight, and 2,240 pounds (1,016.05 kilograms) = 1 long ton.

THE METRIC SYSTEM

Linear Measure

10 millimeter	= 1 centimeter	= 0.3937 inch
10 centimeters	= 1 decimeter	= 3.937 inches
10 decimeters	= 1 meter	= 39.37 inches or 3.28 feet
10 meters	= 1 decameter	= 393.7 inches
10 decameters	= 1 hectometer	= 328 feet 1 inch
10 hectometers	= 1 kilometer	= 0.621 mile
10 kilometers	= 1 myriameter	= 6.21 miles

Square Measure

100 square millimeters	= 1 square centimeter	= 0.15499 square inch
100 square centimeters	= 1 square decimeter	= 15.499 square inches
100 square decimeters	= 1 square meter	= 1,549.9 square inches = 1.196 square yards
100 square meters	= 1 square decameter	= 119.6 square yards

100 square decameters	= 1 square hectometer	= 2.471 acres
100 square hectometers	= 1 square kilometer	= 0.386 square mile

Land Measure

1 square meter	= 1 centiare	= 1,549.9 square inches
100 centiares	= 1 are	= 119.6 square yards
100 ares	= 1 hectare	= 2.471 acres
100 hectares	= 1 square kilometer	= 0.386 square mile

Volume Measure

1,000 cubic millimeters	= 1 cubic centimeter	= .06102 cubic inch
1,000 cubic centimeters	= 1 cubic decimeter	= 61.02 cubic inches
1,000 cubic decimeters	= 1 cubic meter	= 35.314 cubic feet

Weights

10 kilograms	= 1 myriagram	= 22.046 pounds
10 myriagrams	= 1 quintal	= 220.46 pounds
10 quintals	= 1 metric ton	= 2,204.6 pounds

Property descriptions, rights of way, easements, and liens can affect the development or disposal of property. Before purchase, development, or acceptance of a property, the property rights such as water, mineral, and air rights should be determined and understood.

The physical resources plan is an integral part of the comprehensive system plan (see Chapter 5, Organization Structure and Administrative Operations). Physical resource plan- ning is an essential function of management.

Self-Check -1 Written Test

Directions: Answer all the questions. Use the Answer sheet provided in the next page:

1. Define the term Team. (4 points

2. List out the Characteristics of a team. (4 points)

Information Sheet-2 Producing and Calculating materials quantities

There are many methods used for calculating quantities of materials. Which one goes with your plan depends on the design and shape of the building. Each method is characteristically different from other.

Calculation of quantities of material needs a proper technical understanding of materials and construction. The five major methods are described here for you and they come up with the right measurement of materials you need.

1. Centre Line Method: Centre line method is applicable to the square building with symmetrical offsets. To calculate the quantities of materials, you need to multiply the total centre line length with breadth and depth of the construction.

The centre line length will be reduced by half of breadth of every junction where the main wall is joined with the cross walls, partitions or verandah. The junctions must be taken into consideration while calculating the centre line length of a wall. The quantity estimation brought out by this method is accurate and fast.

2. Crossing method: Crossing method is designed for calculating materials needed for masonry walls. In this method, the lengths and breadths of walls at plinth level (the base on which a column is raised) are included. The internal dimension of the room and the thickness of the walls are also important to calculate the quantities. Symmetrical offsets should be counted as they play a major role in the calculation of quantity of materials.

3. Out to out and in to in method: This method follows P.W.D system for computing materials and this seems to be the most accurate method among all.

4. Bay method: This bay method is applicable in garages, factory, and railway platform where identical structures are visible. Bay in a construction term means a compartment of a building. The cost of one room is calculated first and it is multiplied by the number of bays.

5. Service unit method: The term service unit method is designed for building with identical rooms. This method is applicable in the construction of college, hospital, cinemas, prison, and more. When it is a construction of a hospital, the service unit will be a bed. Likewise, for cinema/stadium, it is seats.

Calculating quantities of materials follow the above-mentioned methods. Each of which shows a different perspective of calculation and they are also concentrated on different construction types.

Estimating quantities of materials

To estimate how much of each type of material you need for a job, follow these steps.

Step 1 — Work out areas of boards

Start by working out the area of each of the boards that is needed. If more than one kind of board is needed, work out each type separately.

To work out the area of the boards, write the measurements in metres, then multiply them together as shown in the table below.

Veneer board **(18 mm)**

Component	Quantity and size	Calculation to work out area	Area (m^2)
Ends	**2 x 1800 x 450**	**2 x 1.8 x 0.45**	**1.62**
Top, bottom and shelves	**5 x 900 x 450**	**5 x 0.9 x 0.45**	**2.025**
Kicker	**900 x 70**	**0.9 x 0.07**	**0.063**
Back	**900 x 1800**	**0.9 x 1.8**	**1.62**
Doors	**2 x 400 x 450**	**2 x 0.4 x 0.45**	**0.36**

Step 2 - Work out total area of boards

Find the total area of board needed. Note that in this example, only one kind of board is needed. If more than one kind is needed, do a separate calculation for each type.

Veneer board (18 mm)

Component	Quantity and size	Calculation to work out area	Area (m^2)
Ends	**2 x 1800 x 450**	**2 x 1.8 x 0.45**	**1.62**
Top, bottom and shelves	**5 x 900 x 450**	**5 x 0.9 x 0.45**	**2.025**
Kicker	**900 x 70**	**0.9 x 0.07**	**0.063**

Back	**900 x 1800**	**0.9 x 1.8**	**1.62**
Doors	**2 x 400 x 450**	**2 x 0.4 x 0.45**	**0.36**
		Total:	**5.618**

Step 3 - Consider the standard sheet size

Veneer board comes in a standard sheet size of 1200 x 2400 or 2.88 m².

Divide the total area of board by 2.88 to work out the number of sheets needed.

5.618 ÷ 2.88 = 1.975

This is very close to 2 sheets. Round this up to 3 sheets to allow for waste.

Step 4 - Work out other quantities needed

Now work out the quantities of other materials you will need.

Solid edging

4 x 1800	**7200**
6 x 900	**5400**
2 x 450	**900**
3400	**3400**
Total:	**16900**

This is 16.9 Lm. Add 10% to allow for waste.

16.9 + 10% = 16.9 + 1.69 = 18.59

Round this up to 19 Lm.

Step 5 - Write out your list of materials

Your list of materials needed now looks like this:

Item	Quantity needed
Veneer board	**3 sheets**
Solid edging	**19 Lm**
Door handles	**2**
Hinges	**4**

Step 6 - Work out costs of each material

Find out the unit cost of each item and multiply this by the quantity needed.

Item	Quantity needed	Unit cost	Cost (Quantity x Unit cost)
Veneer board	3 sheets	$120	$360
Solid edging	19 Lm	$0.70	13.30
Door handles	2	$5	$10
Hinges	4	$3	$12

Step 7 - Work out total cost

Add up the costs to find the total cost.

Item	Quantity needed	Unit cost	Cost (Quantity x Unit cost)
Veneer board	3 sheets	$120	$360
Solid edging	19 Lm	$0.70	13.30
Door handles	2	$5	$10
Hinges	4	$3	$12
		Total:	$395.30

Self-Check -2 Written Test

Directions: Answer all the questions.

1. **Define the term Team. (4 points**

2. **List out the Characteristics of a team. (4 points)**

Information Sheet-3 Establishing Quantities against project construction contracts

Project implementation under Investment Project financing (IPF) normally includes procurement activities needed to attain the project development objectives. The Borrower should be mindful that the precontract award processes (such as comprehensiveness of project documents, proper planning, choice of contract, appropriateness and quality of Procurement Documents, evaluation of bids/proposals etc.) all contribute to the success of a contract. The Bank has other guidance in place to support Borrowers in the pre-contract award processes. Procurement, including contract management, is a critical component of budget implementation/execution – as defined within the public financial management cycle. Financial controls should be in place to ensure that funds are available in a timely manner and are used only for the intended purposes. If there are issues in the budget planning and approval process, such issues should be identified well in advance (e.g. during Project preparation) and appropriate arrangements put in place. Undue delays in making contractual payments puts the Borrower at contractual default, potentially also affecting contractor cash flow, resulting in contract implementation delays and other complications. Effective contract management is essential to the delivery of the intended outcomes. This guidance assists Borrowers in managing contracts (post- contract award) under IPF operations. Purpose The purpose of this guidance on Contract Management: Practice (guidance) is to support Borrowers' contract management practice by illustrating some of the key aspects and issues. It should be kept in mind that contracts shall be managed in accordance with the contract. Scope Contract management is part of the Procurement Process. The processes preceding contract award (such as procurement planning, selection of contractors etc.) are described in detail in the various procurement guidance. This guidance focuses on the contract management activities undertaken during the period from the award of contract to contract completion. Where applicable, this period includes the defects liability period and/or warranty period. Structure of the guidance This guidance starts from the general and relevant aspects of contract management (such as Contract Management Plan (CMP), relationship management etc.). It then presents the contract

management aspects of selected categories (such as Works, Goods etc.) to try to support teams involved in managing one or more of those categories. There is also a section on managing ESHS risks in Works contracts. Teams Introduction Contract Management

Practice 2 managing one or more of these categories may prefer to refer to the general provisions followed by the category/ies of interest. This guidance comprises of practical short case studies to illustrate relevant contract management aspects. The guidance also comprises of some templates such as for CMP, which may be modified to suit the needs of a contract. There is also a separate excel based Contract Price Adjustment Computation Workbook to support Borrowers in applying contractual price adjustments. Contract management in Procurement Regulations. The contract management requirements detailed in the Bank's Procurement Regulations for IPF Borrowers (Procurement Regulations) set out the framework for contract management, as summarized in the following table. Section Para Topic Provision Section V. General Procurement Provisions 5.97 Aim of contract management The aim of contract management is to ensure that all parties meet their obligations. In addition, contracts shall be actively managed by the Borrower throughout their life to ensure that contractor performance is satisfactory, appropriate stakeholders are informed and all contract requirements are met.
Annex I. Value for Money 2.1 Value for money Value for Money (VfM) is to be considered at all stages of the Procurement Process, including during contract management. 2.3 h. Effective contract management VfM is achieved through the application of effective contract management to ensure successful execution of the contract and ensure that the deliverables are met as agreed in the contract 3.6 Contract management activities As part of the contract management activities, the Borrower determines the appropriate contract type and contract terms, taking into account the nature, risk, and complexity of the activity, fit-for-purpose considerations, optimal allocation of risk and liabilities, and the roles and responsibilities of the contracting parties. 3.7 Requirement to develop a CMP To effectively manage a contract, for contracts identified in the PPSD, the Borrower shall develop a Contract Management Plan with key performance indicators and milestone events.
The Borrower shall monitor the performance and progress of contracts, in accordance with the Contract Management Plan, and provide timely

Section Para Topic Provision reports to the Bank. The Bank may use the information gathered to benchmark performance. Annex II. Procurement Oversight 7.1 j. Bank's prior review States that for contracts subject to prior review, if requested by the Bank, the Contract Management plan including the KPIs will be subject to Bank's prior review. **Annex V**. Project Procurement Strategy for Development 3.1 PPSD The Project Procurement Strategy for Development (PPSD) provides the basis for the Borrower to prepare the Procurement Plan and the Contract Management Plan. 3.4 resources The factors to be considered for assessing the Borrowers resources needs to implement a procurement include contract management capacity. 3.8 Risk mitigation plan The likelihood and impact of each risk shall be assessed, and a prioritized Risk Mitigation Plan developed and maintained throughout the life of the project, including during the contract management phase. 3.11 PPSD specifies requirement for CMP The PPSD will identify those contracts requiring a Contract Management Plan. Annex XI. Contract Management whole Annex Content of CMP This Annex outlines the requirements for Contract Management and for monitoring through the Contract Management Plan (CMP). Annex XIV. Public-Private Partnership (PPP) 2.1 CMP and PPP Contract management is one of the phases in PPP arrangements. 2.2 Resources The Borrower needs to demonstrate that there is adequate institutional capacity to prepare, structure, procure and manage the PPP project 4.1 Roles The Borrower shall ensure that the output specifications include how performance will be monitored, including roles for the government's contract management team. Table I – Contract management provisions in the Bank's Procurement Regulations Contract Management Practice 4 The fundamentals Upstream and downstream phases of a contract Contract management is the process of actively managing contract implementation to ensure the efficient and effective delivery of the contracted outputs and/or outcomes. Effective contract management enables Borrowers to maximize value for money (VfM) in delivering development outcomes. The focus of contract management is on the activities that are undertaken during the contract execution/implementation phase, following the award of contract (downstream activities). However, the success of contract management is strongly influenced by upstream activities such as those undertaken during the procurement planning, choice of contract, and contractor selection phase. The fundamentals Figure I- Upstream and downstream phases of contract

Preparing a Contract Management Plan

Why plan

Planning how, when, where and by whom a contract will be implemented, monitored, managed and administered is an important step to ensure that what is procured will be delivered. A Contract Management Plan (CMP) provides a structured and systematic approach. An example CMP is provided in Annex 3.

When to plan

The Borrower begins development of the CMP as early as possible in the procurement process. Preferably, the plan is expected to be completed when signing the contract. In practice, it may be promptly thereafter.

How to plan

The CMP should be fit-for-purpose. This means that the level of detail and length of the document should be proportionate to the scope, value, risk, complexity and duration of the contract. Typically, a CMP will cover some, if not all of the following:

1. contract management roles and responsibilities (ensure that each party has established the necessary authorizations and delegations for its personnel at the beginning of the contract as this is an important prerequisite to ensuring that all contracting decisions are valid and enforceable);
2. List of key contacts (e.g. the names and contact details of the key contacts for the Borrower and the contractor);
3. Contract management system;
4. Governance structure;
5. Contract documents (including key contractual terms and conditions);
6. Key milestones (including the critical path);
7. Key Performance Indicators (KPIs) and a description of the standards or measurement process, if relevant;
8. Key contract deliverables (identified and properly described, and updated to account for change orders during the execution of the contract);

9. Reporting requirements (types of reports, times, contents etc.) and lines of reporting;
10. Payment procedures consistent with contractual provisions;
11. Record keeping requirements and procedures;
12. Audit or independent assurance requirements;
13. Change management or contract variation procedures; Preparing a Contract Management Plan Contract Management Practice 23
14. Issues management and escalation;
15. Key contractual remedies;
16. Risk management plan (see risk register below);
17. Stakeholder engagement plan;
18. Communication plan;
19. Insurance coverage, if required;
20. Guarantees and/or securities, if applicable;
21. Price adjustment formula and circumstances, if applicable;
22. Interface management (between contractors), if applicable;
23. Contract closure procedures.

If requested by the Bank, the CMP, including the KPIs, should be submitted for prior review. The CMP should be shared with the contractor and all parties involved in contract implementation, management, administration and governance. The Borrower is advised to discuss the plan with the contractor (face-to-face) to ensure that it is fully understood, especially the allocation of risks and responsibilities.

Risk register

A risk register may be initiated in the initial stages of Project preparation (such as the environmental and social risks identified in the Environmental and Social Commitment Plan) and developed further at key milestones such as design finalization and preparation of Procurement Documents. The risk register should be reviewed and updated (with contractor's input) during contract award/signing of contracts and included within the CMP as a practical tool to support effective contract management

Self-Check -3 Written Test

Directions: Answer all the questions. Use the Answer sheet provided in the next page

Information Sheet-4 Obtaining supplier prices for material consumables

Cost of material consumed is the sum of all the cost spent to procure a raw material , store it and till it consumed . All such costs are added with the actual cost of raw material purchased to arrive at the cost of materials consumed

The furniture industry is a business still being depended upon by Central Java province, along with its textile products. However, lately the furniture industry has experienced some deterioration as a result of several factors, among them the difficulty in obtaining quality raw materials, especially teakwood, and the increasingly stiff competition from international markets. Linked to the problems experienced by Small to Medium Enterprises in Central Java within the furniture industry, The Forum for Economic and Natural Resource Development (FPESD), Central Java chapter, through dialogues among the Government and Private stakeholders, is developing various programmes in support of the efforts for the recovery of the furniture industry. In the future, the direction and development of the furniture sector will be focused on the production of furniture better oriented towards the interests of the broader society through the participation of Private and Community Stakeholders in conjunction with the Government, to draw up furniture sector developmental policies more attuned to the environmental sustainability aspect. The Forum for Economic and Natural Resource Development (FPESD), Central Java chapter, expresses the hope that this volume can provide benefits to the furniture industry participants, the decision makers, and the teakwood user community in the endeavour to overcome the crisis in teakwood as a raw material. The cooperation among various parties, namely the Government, Private Sector, and the Community itself in the framework of disseminating information through this book is extremely significant, and hopefully this volume may truly be beneficial to all the competent parties involved

The International Labour Office (ILO) has produced this book to serve as a practical tool that will help small to medium enterprises working in the Indonesian Wood Furniture industry to cope with the difficulties they face in terms of obtaining good quality raw materials. The majority of small and medium scale businesses are unable to obtain sufficient information on procedures of using wood raw materials correctly and wisely. Given the high cost and

increased scarcity of precious woods such as teak and mahogany, it is important that firms use these materials efficiently, in order to maintain competitiveness. This book gives these enterprises practical information to enhance the quality of work and their productivity. This book, for small and medium scale entrepreneurs, provides useful advice on how to utilize raw wood materials correctly and wisely and how to develop positive work and business attitudes. Through this book, it is hoped that the reader will acquire ideas to improve each phase of the furniture production process and consequently the quality of their products.
Due to illegal logging and diminishing areas of teak forest, furniture industry players are finding it increasingly difficult to obtain high quality teakwood raw materials. Indonesia's Furniture Industry is lagging behind those of China, Vietnam, Thailand, Malaysia and the Philippines in global industry competition. Low productivity and poor quality products are the main reason. At present, Indonesian furniture is able to survive by virtue of wood raw materials, superior design and cultural content. The majority of small and medium scale business players are unable to obtain sufficient information on procedures of utilizing wood raw materials correctly and wisely. These are some serious threats to the sustainability of our furniture industry.
The supply of teak wood increasingly declines, global competition is tighter, actual steps should be taken to overcome this pressure. Furniture industry players must be willing to change, carefully study each phase of the furniture production process. Beginning with using officially sanctioned good-quality raw materials, practicing correct methods of wood-processing, wisely utilizing quality materials, developing creativity and skills in producing side products, market knowledge and business development. This book contains a brief guide for small and medium scale entrepreneurs on how to utilize and manage raw wood materials correctly and wisely. Through this book, it is hoped that the reader will acquire ideas to improve each phase of the furniture production process. At the end of this book are the addresses and names of agencies related to the furniture industry. They may be utilized as a source of information, consultation as well as a network in efforts to improve our furniture industry
Wood as raw material may be bought in the form of logs/lumber or boards, purchase may be done individually or by groups or cooperatives. Purchasing in groups is more profitable. Bargaining position at auctions is stronger, enabling good quality official wood to be bought

at better prices compared with purchasing singly. In addition, when buying in groups, transport costs, cost of cutting wood and other processes may also be shared.

Self-Check -4 Written Test

Directions: Answer all the questions. Use the Answer sheet provided in the next page

Information Sheet-5 Identifying and costing plant or equipment requirements.

Property, plant, and equipment (PP&E) are a company's physical or tangible long-term assets that typically have a life of more than one year. Examples of PP&E include buildings, machinery, land, office equipment, furniture, and vehicle

The cost of an item of property, plant and equipment is recognised as an asset if,

and only if: it is probable that future economic benefits associated with the item will flow to the entity; and.the cost of the item can be measured reliably.

Property, plant and equipment make up a major part of many companies' assets. You'll find PP&E on your company's balance sheet as non-current assets. This asset category includes land, buildings, machinery, office equipment, vehicles, furniture and fixtures. It's also called fixed assets

Property, plant, and equipment (PP&E) are a company's physical or tangible long-term assets that typically have a life of more than one year. Examples of PP&E include buildings, machinery, land, office equipment, furniture, and vehicles

1. The major characteristics of plant assets are

(1) That they are acquired for use in operations and not for resale,

(2) That they are long-term in nature and usually subject to depreciation, and

(3) That they have physical substance.

The cost of property, plant, and equipment includes the purchase price of the asset and all expenditures necessary to prepare the asset for its intended use.

- Land. ...
- Land improvements. ...
- Buildings. ...
- Equipment, vehicles, and furniture

Property, plant and equipment make up a major part of many companies' assets. You'll find PP&E on your company's balance sheet as non-current assets.

This asset category includes

land, buildings, machinery, office equipment, vehicles, furniture and fixtures. It's also called fixed assets. Net PP&E is what's left after you apply depreciation on the various assets.

The cost of property, plant, and equipment includes the purchase price of the asset ... Estimating Inventories · Determining Inventory Levels · The Cost of Inventory ... The cost of land improvements includes all expenditures associated with making ...
The cost of equipment, vehicles, and furniture includes the purchase price

Property, plant, and equipment assets are also called fixed assets, ... Examples of PP&E include buildings, machinery, land, office equipment, furniture

All Furniture and Equipment that meet the five criteria for capitalization mentioned under the Property Plant and Equipment Policy (see recognition criteria) must be ... Should they identify any discrepancies (i.e. not see the assets that they ... who will make a determination on whether attributable costs should be capitalized.

To calculate PP&E, add the amount of gross property, plant, and equipment, listed on the balance sheet, to capital expenditures. Next, subtract accumulated depreciation from the result.

Property, Plant, and Equipment (PP&E) is a non-current, tangible capital asset shown on the balance sheet. These statements are key to both financial modeling and accounting of a business and is used to generate revenues and profits. ... The PP&E account is often denoted as net of accumulated depreciation.Property, plant, and equipment (fixed assets or operating assets) compose more than one-half of total assets in many corporations. These resources are necessary for the companies to operate and ultimately make a profit. It is the efficient use of these resources that in many cases determines the amount of profit corporations will earn.On a classified balance sheet, the asset section contains:(1) current assets;(2) property, plant, and equipment; and(3) other categories such as intangible assets

and long-term investments. Previous chapters discussed current assets. Property, plant, and equipment are often called plant and equipment or simply plant assets. Plant assets are long-lived assets because they are expected to last for more than one year. Long-lived assets consist of tangible assets and intangible assets. Tangible assets have physical characteristics that we can see and touch; they include plant assets such as buildings and furniture, and natural resources such as gas and oil. Intangible assets have no physical characteristics that we can see and touch but represent exclusive privileges and rights to their owner.To be classified as a plant asset, an asset must: (1) be tangible, that is, capable of being seen and touched; (2) have a useful service life of more than one year; and (3) be used in business operations rather than held for resale. Common plant assets are buildings, machines, tools, and office equipment. On the balance sheet, these assets appear under the heading “Property, plant, and equipment”

Self-Check -5 Written Test

Directions: Answer all the questions. Use the Answer sheet provided in the next page

Instruction sheet LG #46 LO #4 -Develop estimated product/project costs

This learning guide is developed to provide you the necessary information regarding the following content

4.1 Costing labor rates and material appropriate

4.2 Estimating unit costs

4.3 Identifying additional costs

4.4 Applying company overhead recovery

4.5 Estimating project costs

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to

- . Cost labor rates and material appropriate
- Estimate unit costs
- Identify additional costs
- Apply company overhead recovery
- Estimate project costs

Learning Instructions:

1 Read the specific objectives of this Learning Guide.

2. Follow the instructions described below.

3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.

4. Accomplish the “Self-checks” which are placed following all information sheets.

5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).

6. If you earned a satisfactory evaluation proceed to “Operation sheets

7. Perform “the Learning activity performance test” which is placed following “Operation sheets”

8. If your performance is satisfactory proceed to the next learning guide,

9. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

Information Sheet-1 Obtaining supplier prices for material consumables

In accounting, a consumable is a small, everyday item that is bought, ‘used up’, and then replaced. Consumables can also be referred to as ‘consumable goods’, ‘soft products’ or ‘non-durable products’.

When running a business, it's essential to keep track of your consumable expenses. Read more about how to manage expenses with Debitoor invoicing software.

We use consumables every day; for example, we consume food and water. In the same way, a business can consume goods. Within an office, consumable products such as notebooks, pens, highlighters and ink cartridges are commonly ordered, used up and replaced. Within businesses, a small amount of these consumables are kept available for immediate use, referred to as ‘supplies on hand’.

Some consumable goods can be used up after a single use and may be referred to as disposable products. Examples may include disposable towels, hygiene products or single-use batteries.

Consumable goods vs. durable goods

In contrast to consumables, durable goods (also known as capital goods) do not need to be purchased frequently as they are designed to last for a long time. Items like bricks or metal poles are great examples of durable goods because in theory, they should never wear out. They are 'hard goods' and have a long lifespan.

Durable goods are usually classified as items that have a long time lapse between successive purchases of these products. Offices commonly possess many durable goods, such as furniture, computers or other business machines. Naturally, these are purchased far less frequently than other office supplies.

As part of Connect 2 Cleanrooms, we have a unique insight into the process, people and product demands of a cleanroom, laboratory or aseptic production facility. We use this data to help plan the most efficient layout to organise the flow of people, material and product through your cleanroom.

For internal fit-outs, we provide high-quality furniture in a range of materials to suit your process and budget. Whether you are looking to furnish a new clearnoom facility or upgrade the furniture in an existing facility, we can help.

Raw **materials and consumables** are purchases of all commodities used as inputs in the production process. Purchases of raw **materials and consumables** purchased for resale are excluded from this heading and are included under 'purchases of goods and services purchased for resale in the same condition as received'.

Consumables are goods used by individuals and businesses that must be replaced regularly because they wear out or are used up. They can also be defined as the components of an end product that is used up or permanently altered in the process of manufacturing such as semiconductor wafers and basic chemicals.

Examples of consumable items:

Computer cables, batteries. Calculators, envelopes, whiteboard markers.&**printer** paper.

Consumables are products that consumers buy recurrently, i.e., items which "get used up" or discarded. ... "**Non-consumable**" objects also includes capital goods:

(**Consumable** products) : Not included capital goods such as computers, fax machines, and other business machines or office furniture.

Raw materials that are a traceable component of a manufactured product. For example, the direct material of a baseball bat is the **wood**. Flour, sugar, and **vegetable oil** are direct materials of a company that manufactures dessert products.

The mains **difference between raw materials and consumables** is that become components or are transformed to give ways to the final product or service, whilst the **consumables** are needed for productions but are not incorporated **in the** product or service.

A **consumable** good or service: supplies of food, **fuel**, spare parts, and other **consumables**.

A **consumable asset** is one that is purchased in quantity and distributed. It is assigned to the **consumable** model category, and the **asset** record tracks the quantity that is available and total cost. When **consumable assets** are received, they are merged into an existing **consumable** record, if available.

Examples of **direct materials** include the following: Wood used to make tables. Glass used to make windows. **Fabric** used to make furniture. ... **Direct materials** are those **materials** and supplies that are consumed during the manufacture of a product, and which are directly identified with that product

Self-Check -1 Written Test

Directions: Answer all the questions. Use the Answer sheet provided in the next page

Information Sheet-2 Estimating unit costs

The **cost** of each of the project's components or elements are assessed and their **cost estimation** is calculated. Sum of **costs** of each project elements gives the total construction **cost** of the project. The **unit cost** method of **estimation** can be used for project design **estimates** as well as for bid **estimates**.

For a typical manufacturing environment, however, the **unit cost formula** is: **Unit Cost** = Variable **Costs** + Fixed **Costs** / Total **Units** Produced.

Nonetheless, there are **three types of cost estimation** classified according to their scope and accuracy. These are

(1) order of magnitude **estimate**;

(2) budget **estimate**; and

(3) definitive **estimate**.

A **unit** of production for which the management of an organization wishes to collect the **costs** incurred. In some cases the **cost unit** may be the final item produced, for **example** a chair or a light bulb, but in other more complex products the **cost unit** may be a sub-assembly, for **example** an aircraft wing or a gear box.

A **unit cost** is a total expenditure incurred by a company to produce, store, and sell **one unit** of a particular product or service. **Unit costs** are synonymous with **cost** of goods sold (COGS). This accounting measure includes all of the fixed and variable **costs** associated with the production of a good or service.

1 **Unit** = 1kWh. So the Total kWh = 1000 Watts x 24 Hrs x 30 Days = 720000 … Watts / hour. We want to convert it into electric **units**, Where 1 **Unit** = 1kWh

There are **two types of estimates**: point and interval. A point **estimate** is a value of a sample statistic that is used as a single **estimate** of a population parameter.

Total product **costs** can be determined by adding together the total direct materials and labor **costs** as well as the total manufacturing overhead **costs**. To **determine** the product **cost** per unit of product, divide this sum by the number of units manufactured in the period covered by those **costs**.

To **calculate** this **cost**, you start with production expenses that include all overheads incurred, materials, staff, and incidentals. You then add to this the shipping **costs** from the warehouse to the client's premises as well as your profit margin to arrive at landed **cost per unit**

Project costs are funds required to perform a planned business endeavor, and they are a key subject in **project** budgeting and **cost** management. When estimating **costs** that your **project** may incur, you gain a higher chance to keep it profitable and achieve the desired performance outcomes.

Employers generally prefer candidates who have a bachelor's degree. Construction **cost estimators** typically need a bachelor's degree in an industry-related field, such as construction management or engineering. Manufacturing **cost estimators** typically need a bachelor's degree in engineering, business, or finance

Self-Check -2 Written Test

Information Sheet-3 Identifying additional cost

Identify the **Cost** Elements Related to Service/Product · Measurable Units · Operating **Costs** · Non-Recoverable **Costs** · **Other** Job Costing/Rate Development

Costs recovered by a service activity may include only those costs which are directly related and allocable to the activity, allowable under applicable regulations, and reasonable in relation to the service performed. These costs must be expenditures of the service activity fund, except for equipment and subsidies as explained below. Note that costs must be segregated by individual service provided, and cannot be aggregated.

Typical costs include:

- Salaries and wages of individuals providing the service, or those administering the service center
- Materials and supplies used in providing the service, or in administering the service center
- Maintenance and repair of equipment assigned to the service activity
- Equipment depreciation expense
- Over- or under-recovery of the previous year's costs

Other costs may include:

Cost of goods sold

Other inventory-related costs

Improvements such as site preparation for equipment installation which are not capitalized in the Banner Fixed Assets system. See 12 Property Accounting for additional details.

Fixed costs. Fixed costs are costs that do not vary with the level of output in the short term.

Variable costs. A variable cost varies in direct proportion with the level of output. ...

variable costs. ...

Total costs. ...

Direct costs. ...

Indirect costs.

Cost behavior is an indicator of how a cost will change in total when there is a change in some activity. ... The total amount of a variable cost will also decrease in proportion to the

decrease in an activity. Fixed costs. The total amount of a fixed cost will not change when an activity increases or decreases.

In manufacturing firms such as the furniture industries, raw materials and labor might be ... based on concerns from furniture producers that more training in cost ... Under this classification, managers will have to clearly identify

Now that we have identified the three key types of businesses, let's identify cost behaviors ... Because fixed and variable costs are the foundation of all other cost classifications,

Furniture manufacturer, Recliners, Wood, fabric, cotton batting

made in currencies other than the currency of the borrower for goods and ...

When determining how to structure and present project cost estimates, it is necessary to ...

Office furniture and equipment (desks, cabinets, computers, copiers, and.

Furniture

1. Cost is calculated per sq. ft.
2. Cost will differ with type of handle, hinges and channels.
3. **Cost** varies with type of plywood and its thickness.
4. **Cost** of Decorative Laminate ranges from Rs.1100 to Rs.4000 & above.

Job costing method of costing can be **used in furniture** manufacture **industry**. A job card is made for each work or job. This method of costing is **used** in the factories which produce the machine tool and other engineering products, **furniture** projects, hardware and interior decoration.

The three major elements of product costs in a manufacturing company are direct **materials**, direct **labor**, and **manufacturing overhead**.

Well, a **budget** can be based upon the materials to be used for selection irrespective of the **design**. So, I would say for a very minimal **design** with **budget** materials to be used, one can keep in mind of **calculating** a **budget** of **interiors** like say INR 900 / sq. ft rate for the same approximate

Plinth area **estimate** is calculated by finding the plinth area of the building and multiplying by the plinth area rate. The plinth area should be calculated for the covered area by taking external dimensions of the building at the floor level. Courtyard and open spaces should not be included in thi

Production system consists of three main components viz., Inputs, Conversion Process and Output.

Inputs include raw-materials, machines, man-hours, components or parts, drawing, instructions and other paper works.

Conversion process includes operations (actual production process)

Self-Check -3 Written Test

Information Sheet-4 Applying company overhead recovery

Take the total cost of goods and multiply it by the **overhead recovery** rate of 50 percent to get the break-even price for the job. By **applying** the **overhead recovery** rate, all of the **overhead** expense can be covered in the bid. Next, to determine the selling price, **apply** the desired profit.

In a business that is performing well, an **overhead percentage** that does not exceed 35% of total revenue is considered favorable. In small or growing firms, the **overhead percentage** is usually the critical figure that is of concern.

Project your annual **overhead** and annual labor **hours**. Divide the **overhead cost** by the labor **hours**. Add the quotient, your **hourly overhead recovery rate**, to the **hourly** labor **rate** you charge the client

To make a **profit**, you must add your **overhead** costs plus a **profit** margin to your bids. Your **overhead** margin is easy to **calculate**. It is the total sum of your annual **overhead** costs divided by the sales you anticipate for the year.

Are you pricing your products high enough to make a profit? You probably know the direct labor and materials costs that go into your product or service, but what about all those other costs, such as rent, insurance, licenses, office wages and accounting fees? Are you recovering those expenses?

Direct Labor Cost. A direct labor cost is any labor cost that can be identified specifically with a final cost objective (e.g., a particular contract).o Labor costs identified specifically with a particular contract are direct costs of the contract and must be charged to that contract.

o Labor costs must not be charged to a contract as a direct cost if other labor costs incurred for the same purpose in like circumstances have been charged as an indirect cost to that contract or any other contract.

All labor costs specifically identified with other contracts are direct costs for those **Indirect Labor Cost.** An indirect labor cost is any labor cost not directly identified with a single final cost objective, but identified with two or more final cost objectives or an intermediate cost objective. For reasons of practicality, any **direct labor cost of minor dollar amount** may be treated as an indirect cost if the accounting treatment:

- Is consistently applied to all final objectives, and
- Produces substantially the same results as treating the cost as a direct co st.

Common Direct Labor Categories. While each of feror will have different terminology and different ways of categorizing its labor force, the two most common and largest types of direct labor in manufacturing contracts are engineering and manufacturing labor. The labor categories in service contracts are much more diverse.

Engineering Labor. Engineering involves a variety of activities associated with product research, product design, and the development of manufacturing methods and procedures. Most engineering activity is typically charged as a direct labor cost. However, the efforts of supervisors and many engineering support personnel may be charged as indirect costs.

Assure that the of feror is consistent in charging these costs as direct or indirect. If you have any question about proper cost treatment, contact the cognizant Government auditor for advice and assistance.

Self-Check -4 Written Test

Information Sheet-5 Estimating project costs

Project cost estimation is the process of predicting the quantity, **cost**, and price of the resources **required by the scope of a project. Since cost estimation is about the prediction of costs rather than** counting the actual **cost**, a certain degree of uncertainty is involved.

Cost estimating is the practice of forecasting the cost of completing a project with a defined scope. It is the primary element of project cost management, a knowledge area that involves planning, monitoring, and controlling a project's monetary costs. (Project cost management has been practiced since the 1950s.) The approximate total project cost, called the cost estimate, is used to authorize a project's budget and manage its costs.

Professional estimators use defined techniques to create cost estimates that are used to assess the financial feasibility of projects, to budget for project costs, and to monitor project spending. An accurate cost estimate is critical for deciding whether to take on a project, for determining a project's eventual scope, and for ensuring that projects remain financially feasible and avoid cost overruns.

Cost estimates are typically revised and updated as the project's scope becomes more precise and as project risks are realized — as the Project Management Body of Knowledge (PMBOK) notes, cost estimating is an iterative process. A cost estimate may also be used to prepare a project cost baseline, which is the milestone-based point of comparison for assessing a project's actual cost performance

A cost estimate is a summation of all the costs involved in successfully finishing a project, from inception to completion (project duration). These project costs can be categorized in a number of ways and levels of detail, but the simplest classification divides costs into two main categories: direct costs and indirect costs.

To use parametric **estimating**, first divide a **project** into units of work. Then, you must determine the **cost** per unit, and then multiply the number of units by the **cost** per unit to **estimate** the total **cost**

Cost estimation in **project management** is the process of forecasting the financial and other resources needed to complete a **project** within a defined scope. **Cost estimation** accounts for each element required for the **project**—from materials to labor—and calculates a total amount that determines a **project's** budget.

Etimating at Project Stages

In theory, the unknowns (i.e. the risk associated with the project) can be shown to diminish as the project progresses until at the project completion the final cost is known with certainty. In practice, this situation corresponds with a better appreciation of project requirements that frequently lead to additional project cost. The subject of accuracy is often raised as an exact estimate is never possible and the best possible estimate will always contain a number of key risks. The aim of the estimator is to produce a practical level of accuracy.

It is crucial to think about the project stages at which estimates can practically and usefully be produced so that there is a reliable basis for deciding whether or not to proceed to the next stage of the project or a basis on which to manage that stage. This management activity will need to provide cost reviews, risk assessments and the monitoring of progress and expenditure.

The number of stages in a project is influenced by the procurement strategy adopted. Typical ERA projects can be divided into six stages:

- identification
- preparation (feasibility study)
- appraisal(evaluation)
- negotiation and approval
- implementation

- operation

These stages may not be appropriate for every project but they do offer a rational and structured approach which is appropriate for the majority of ERA projects. Fig. 4.1 shows the sequence of these project stages and indicates the types of estimate used in each stage. At the implementation stage there can be two types of estimate - pre-tender and post-contract - which take into account the changes of scope during the tendering and award processes.

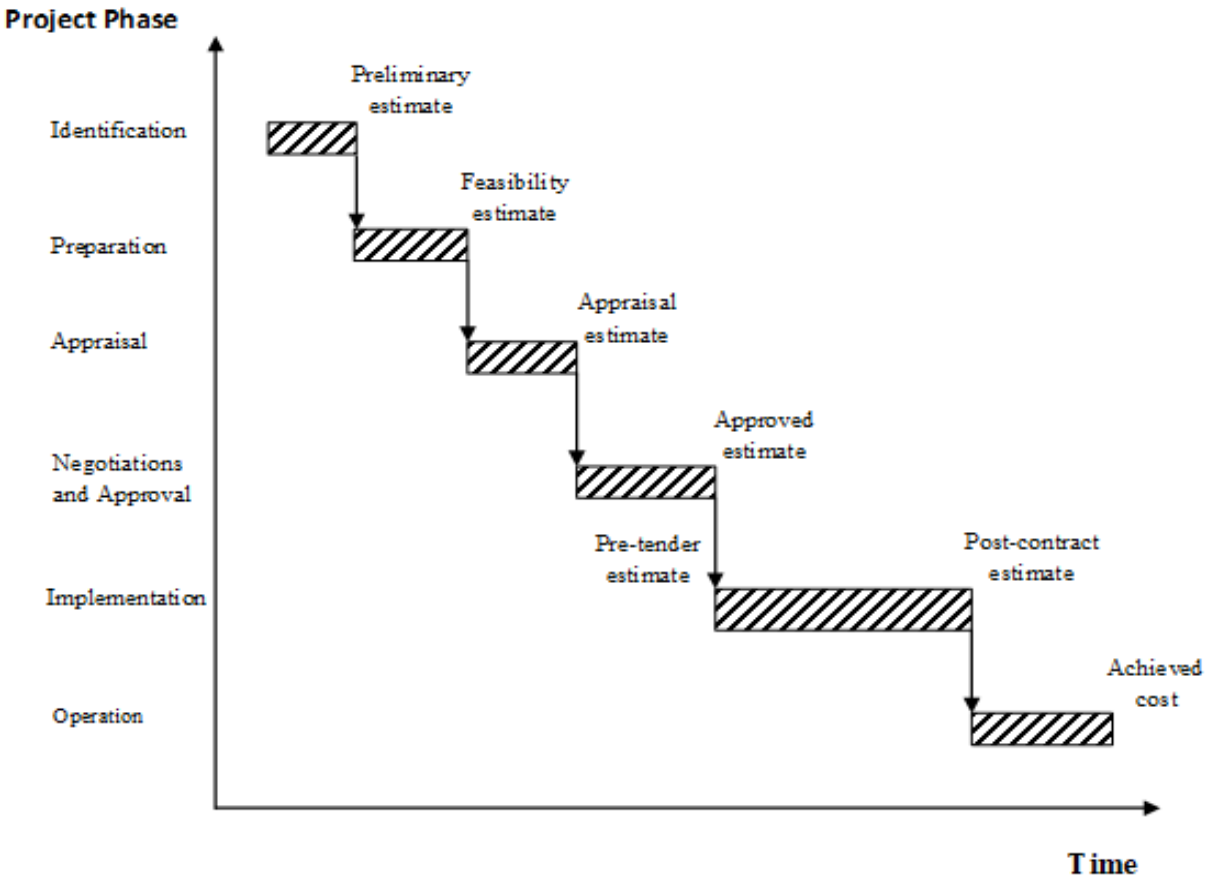

Figure 2.1: Variation in Type of Estimate with Project Phases

Types of Cost Estimates

Cost estimates can be considered to fall into six basic classes based on the purpose the estimate serves during the project's life cycle. The names of the estimates may differ across and within the various types of disciplines dealing with capital project execution. Those that we shall briefly consider are as stated in Section 2 above listed in Table 3.l below.

In addition to the differences in the names of the six classes of estimates, one can expect a good deal of variation in the expected accuracy figures. That is why a range of expected accuracies for each type of estimate is shown (Table 3.1) except for the achieved estimate. The exact percentage used depends on estimating entities policy and the degree of project definition available at the time of the estimate

LG #47 LO #5 – Verify cost estimate

This learning guide is developed to provide you the necessary information regarding the following conten

5.1 Estimating product/project tender/cost

5.2 Identifying deviations cost.

5.3 Establishing organizational procedures and routines framework

5.4 Obtaining management assistance/approval

This guide will also assist you to attain the learning outcome stated in the cover page. Specifically, upon completion of this Learning Guide, you will be able to

- Estimate product/project tender/cost
- Identify deviations cost.
- Establish organizational procedures and routines framework
- Obtain management assistance/approval

Learning Instructions:

2 Read the specific objectives of this Learning Guide.

2. Follow the instructions described below.
3. Read the information written in the “Information Sheets”. Try to understand what are being discussed. Ask your trainer for assistance if you have hard time understanding them.
4. Accomplish the “Self-checks” which are placed following all information sheets.
5. Ask from your trainer the key to correction (key answers) or you can request your trainer to correct your work. (You are to get the key answer only after you finished answering the Self-checks).
6. If you earned a satisfactory evaluation proceed to “Operation sheets
7. Perform “the Learning activity performance test” which is placed following “Operation sheets”
8. If your performance is satisfactory proceed to the next learning guide,
9. If your performance is unsatisfactory, see your trainer for further instructions or go back to “Operation sheets”.

Information Sheet-1 Estimating product/project tender/cost

There are two categories of project cost estimates: project planning cost estimates and project design cost estimates. Project planning cost estimates are used for project justification, programming, analysis of alternatives, and approval. Project design cost estimates are used to summarize the cost of a project's contract items of work and are used for the bid item list in the construction contract documents.

Consistent and Comprehensive Methodology

Estimating cost is not an exact science. However, Caltrans must strive for reliable project cost estimates, so that projects can be delivered within budget. Caltrans requires that project cost estimates be prepared using a consistent and comprehensive methodology. Careful attention is needed to ensure a quality estimate. The cost estimator needs to research costs, compare costs, and use professional judgment to prepare a quality cost estimate. Consideration of project scope, schedule, and level of design details is required to develop accurate cost estimates.

Cost Estimates are Not Static

Cost estimates, in a sense, are never completed. They must be reviewed continually to keep them current. The project engineer (PE) is responsible for keeping the project cost estimates updated throughout the project development process, while the project manager (PM) is responsible for reviewing and approving all project cost estimates. The current project cost estimate is the most recent project cost estimate available during either the planning phase or the design phase, regardless of whether it is approved as the "approved cost."

Estimation of bid **price** or **tender cost** of a construction **project** is calculated as the sum of the total **cost** of construction and mark-up **price**. Total **cost** of construction **project** consists of direct **cost** and indirect **costs** for the construction works.

Tender Price means the amount indicated by a Bidder as the lowest amount for which that Bidder is prepared to perform the Contract.

The **price** quoted for future production is called Quotation **Price** or **Tender Price**. This **price** is ascertained on the basis of previous **cost** sheet or production account. In ascertaining

expected **cost** in the future, the items of previous elements of **cost** are considered with due regard to expected changes in the future.

A **tender** is a submission made by a contractor in response to an invitation to **tender**. It makes an offer for the supply of goods or services. **Tenders** documents may include: ... A letter of invitation to **tender**.

Below are steps you can take to ensure expert preparation of your tender documents.

1. Step 1: Development of Content. ...
2. Step 2: Formatting. ...
3. Step 3: Case studies. ...
4. Step 4: Boilerplate responses. ...
5. Step 5: Design.

The following are the 'nuts and bolts' of writing a good tender response.

1. Use the templates or formats provided. ...
2. Structure your **tender** document clearly. ...
3. Provide all relevant details. ...
4. Address the selection criteria. ...
5. Choose the right referees. ...
6. Proofread your **tender**. ...
7. Submit your **tender** in time. ...
8. Also consider...

Price lists, estimates, quotations and tenders

1. **Prepare** a price list.
2. The difference between a **quotation** and an estimate.
3. **Prepare** a written estimate.
4. **Prepare** a written **quotation**.
5. **Prepare** a price for a **tender**.
6. Win contracts at the right price.

The various types of tenders generally used are: open tender, selective tender, negotiated tender, serial tender and term tendering.

- Open **Tendering**. ...
- Selective **Tendering**. ...

- Negotiation **Tendering**. ...
- Term **Tender**. ...
- The **Tender** Process is Determined. ...
- Request for **Tender** is Prepared. ...
- **Tenders** are Invited. ...
- Suppliers Respond

The term '**tender**' means an invitation to trade under the terms on offer. '**Contract**' refers to any agreement entered into **between** the buyer and another party. This could also be on behalf of the buyer and another party. This is for the execution of any work for the supply of goods, works or services.

The contractor is given directive of what is required of tenders. It includes:

- Tendering procedures, bid bond, data, space, time
- Commercial requirements
- Information in what shall be submitted with the tender (alternative proposals, etc.)
- Scope of work
- Tender basis
- Tender bond (possible)

Form of Tender

This is a document where the contractor:

- Confirms that he has examined all the tender documents
- Confirms that he will perform the work
- Promises that the validity of the tender is open for certain period
- Shows his understanding that the lowest bid or any after may be rejected
- States that part of the work may only be accepted
- Confirms that he will enter into an agreement if awarded.

Information Sheet-2 Identifying deviations cost

Usually, **verifying** the person standing in front of you is the quickest, **easiest**, and **most effective** means of **verifying identity**. The most common **method** is to require at least one government-issued, photo ID card (e.g., driver's license, state ID card, or Passport) to be presented.

Information Sheet- 3 Establishing organizational procedures and routines framework

1. Introduction1

Applying Organizational Routines in Analyzing the Behavior of Organizations

The concept of organizational routine can foster our understanding of the behaviour of organizations and of organizational change (Nelson and Winter 1982, March and Simon 1958, Cyert and March 1963), but since empirical studies employing organizational routines as analytical perspective are still relatively rare, how to conduct such an analysis and what are its benefits is not yet fully evident. We wish to shed light on how employing routines contributes to understanding the behavior of organizations and to demonstrate the potential of such analysis. The empirical analysis of the product development process at an engineering centre shows that using organizational routines presents advantages over alternative analytical approaches. The paper also contributes to shed light on how to fruitfully employ an organizational routines perspective in analysing the behaviour of organizations, providing the foundation for further empirical work.

Keywords: Organizational routines, organization behaviour, innovation processes, new product development

Understanding the behavior and change of organizations was one of the key motivations in introducing the concept of organizational routines (Simon 1947, March and Simon 1958, Cyert and March 1963, Nelson and Winter 1982). More recently, organizational routines have also been posited as a useful focus in analyzing how work is carried out in organizations (Hutchins 1991, Pentland 1995, Orlikowski 2000, Barley and Kunda 2001, Pentland 2003a and 2003b) and in showing how organizations change their operations (Feldman 2000, Feldman and Pentland 2003, Winter and Szulanski 2001, Zollo and Winter 2002). Other theoretical frameworks and approaches to empirical analysis of organizational behavior and change do, of course, exist, so why choose organizational routines as analytical perspective? To start with, routines are ubiquitous in organizations (see the empirical literature reviewed in Becker 2004), as well as an integral part of their daily

operation. A large part of the work carried out in organizations is accomplished in routinized ways. Thus, its routines can be considered 'typical' for an organization. In order to understand an organization and its behavior, analysing its routines thus seems an appropriate starting point since they capture systematic and endogenous (rather than exogenous or one-off) performance drivers. Moreover, routines play an important role in organizational learning and memory, and contribute to efficiency induced by such learning (Argote and Epple 1990). Accordingly, 1 Authors' names are in alphabetical order because they have contributed to the paper equally. For purposes of

2. Organizational routines

Three definitions of organizational routines can be found in the literature: (i) behavior patterns (recurrent interaction patterns), (ii) rules (standard operating procedures, heuristics, etc.), and (iii) dispositions. (i) Currently, most scholars think of organizational routines as repeated behavior patterns for accomplishing tasks. For example, consider the task of taking an order by phone, which is often accomplished by using a particular sequence of phrases in a phone conversation between a call center agent and a customer (Pentland and Rueter 1994). It has now become standard practice to use the term 'routines' for collective (multi-person) and the term 'habits' for individual (single-person) behavior patterns (Dosi et al. 2000). The term 'recurrent interaction patterns' provides a more precise term for referring to stability on the level of behavior that involves multiple actors. (ii) Viewing organizational routines as rules (standard operating procedures), on the other hand, captures a different phenomenon. At least implicitly, rules and standard operating procedures (such as codified 'best practices' and process handbooks like McDonald's processes for providing fast food; Leidner 1993) give rise to recurrent interaction patterns. Note that rules do not necessarily, however, fully specify the causal mechanism, that is, precisely how rules contribute to generating recurrent patterns of behavior. As Feldman and Pentland (2003) have recently argued, the role of human agency in rule-following, and probably also the governance mechanisms that provide incentives and constraints for following rules would at least need to be considered. (iii) Some recent articles argue that organizational routines should be understood as dispositions to engage in previously adopted or acquired behavior, triggered by an appropriate stimulus or context (Hodgson and Knudsen 2004a and 2004b). Rather

than patterns of behavior, routines are ‘stored behavioral capacities or capabilities. These capacities involve knowledge and memory. They involve organisational structures and individual habits which, when triggered, lead to sequential behaviors’ (Hodgson and Knudsen 2004a, 9). Routines are Page 6 of 37 Accepted Manuscript 6 therefore repertoires of potential behavior that can be triggered (Hodgson 2004, 652), such as the capacity to take and process an order from a customer in a call center. In our analysis, we use these different defi

Information Sheet- 4 Obtaining management assistance/approval

Managing approvals can be difficult when it's handled by emails, spreadsheets, paper, or other old-school methods. Emails get missed, spreadsheets are cumbersome, paper is...well, paper. Yet many businesses still handle approvals with these methods. Approval Management (also known Approval Management Engines or AME) seeks to replace these tired, manual approval processes with workflow automation.

When an approval is for how much to spend on a cake for the next office party, the risk is low. When the approval is for a **critical piece of production equipment or a new hire**, the risk is very high. When does approval management make sense? Any of these situations requires a dedicated approval management system:

- Risk is significant.
- Speed is critical.
- Transparency is required.
- Approvals may be audited.
- Approval structure is complex.

Consider Your Current Approval Management "System"

Consider how you currently manage approvals and how it impacts you, your department and the rest of your organization.

- Are critical deadlines missed or put in jeopardy because a critical approval is sitting on someone's desk?
- Do people spend an inordinate amount of time trying to find the status of an approval?
- Do people even know what the approval process is and who needs to approve various requests?
- If needed, could you provide a complete audit trail of every approval?
- Are requests sometimes approved improperly?

Integrify's approval management software provides a system to **manage approval workflow transparently, effectively and accurately**. Approval requests are submitted through a self-service portal, routed based on preset business rules and tracked every step of the way. Tracking means submitters can see where approvals are and auditors can see a full history of who approved what and when.

In simple terms, **approval management** refers to the workflows involved in getting a document, order or invoice authenticated and **approved** before it can be carried out by the concerned part of the firm responsible for it

An **approval process** is the method an organization uses to **approve** anything from documents, invoices, budgets, and purchase orders, to a new **process** that a company wants to institute. ... As a result, many organizations have transitioned to automated **approval processes** and work fellows

How to Create a Streamlined Approval Process

1. Make sure you have all the basic elements. ...
2. Ask the right questions. ...
3. Separate your internal and client-focused **approval processes**. ...
4. Focus on user workflows. ...
5. Think in terms of conditional logic

proven ways to make your approval process better

1. Involve the right people. All too often, the chain of reviewers and approvers is far longer than it needs to be. ...
2. Create a clear **process**. ...
3. Communicate how you want to receive feedback. ...
4. Make it easy to provide feedback. ...
5. Cut the number of reviews needed. ...
6. Build an audit trail.

Approval workflows help automate business processes by making them automatic, consistent, and more efficient. They allow organizations to easily and automatically route documents and other items through one or more people for their **approval**.

How to Approve Invoices For Payment

1. Check the **Invoice** for Accuracy. ...
2. Cross-Reference **Invoice** Dates. ...
3. Confirm the Work with the Project Manager. ...
4. Check the Vendor Details. ...
5. Record the **Invoice** Due Date. ...
6. Schedule a Payment. ...
7. Streamline Decision Making. ...
8. Save Money.

These five simple steps will ensure that decision makers will say “yes” to your project.

1. Share your “Big Idea” Every **project** should have a big idea that gets people excited and drives the whole working process. ...
2. Define benefits. ...
3. Create a roadmap. ...
4. Make the pitch. ...
5. Keep your presentation simple

Create an Approval Process

1. From Setup, enter **Approval Processes** in the Quick Find box and select **Approval Processes**.
2. Select Position from the Manage **Approval Processes** For picklist.
3. Click Create New **Approval Process** and select Use Standard Setup Wizard from the picklist, then fill in the details.
4. For **Process** Name, enter New Position **Approval**

If you want that your **approval process will** be **automatically called** only when your record is created than you must use only insert action in your trigger. Remember that this trigger **will** only fire when a record is created. It **will** not fire on update

The trainers who develop this outcome based curriculum

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