

CLB 029

Cost Estimation Rates

Lesson



Defense Acquisition University

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Rates

Cost Estimation Rates

Introduction

Approximate Length: 45 Minutes

Welcome to the **Cost Estimation Rates** lesson of the **Rates** module. This lesson includes the following topics:

- Intro
- Wrap Rate
- Direct Labor Wage Rate
- Overhead Costs
- Other Costs
- Recovery Rate
- Overhead Allocation
- Summary

Introduction—Scenario

Contractor A's wrap rate is \$175 on a 3-year contract to maintain guided missiles for the U.S. Navy. Is this wrap rate reasonable? If the contract is extended another 3 years, should the wrap rate be adjusted?

Cost analysts assess the validity of contractors' **fully burdened labor rates (FBLRs)**, also known as **wrap rates**. In addition, you will sometimes have to adjust the wrap rate to predict future costs.

The **Cost Estimation Rates** lesson describes, in detail, the three rates that are typically included in a **wrap rate**. It includes influential factors that you need to consider when making projections over time. It also describes how each of the three wrap rate's rates is calculated and



applied.

Learning Objectives

Upon completion of this lesson you will be able to:

- Identify the three components commonly included in a wrap rate.
- Recognize factors that influence wage rates.
- Describe the overhead costs component of a wrap rate, including common examples and how it is calculated.
- Describe the other costs component of a wrap rate, including common examples and how it is calculated.



Wrap Rate

The **wrap rate** is used to allocate overhead and other costs to actual labor costs. Another common name for the wrap rate is the **fully burdened labor rate (FBLR)**.

It is called "**fully burdened**" because it attempts to include all contractor costs necessary to convert the estimated contractor hours to contractor dollars.

There is **no** universal definition of FBLR or wrap rate in the estimating profession because contractors are **not** required to assign costs exactly the same way. Contractors assign costs based on their production processes and the accounting systems which work best for them.

As long as the accounting system is in accordance with Generally Accepted Account Principles (GAAP) and meets with Defense Contract Management Agency (DCMA) approval, it can be used.

Despite these differences, we can confidently state that the **wrap rate** typically includes three rates:

- **Direct labor wage rate**
- **Overhead costs rate**
- **Other costs rate**



Challenge—Wrap Rate Components

List the three components that are commonly included in the **wrap rate**.

Answer

The three components that are typically included in the wrap rate are:

- Direct labor wage rate
- Overhead costs rate
- Other costs rate

Direct Labor Wage Rate

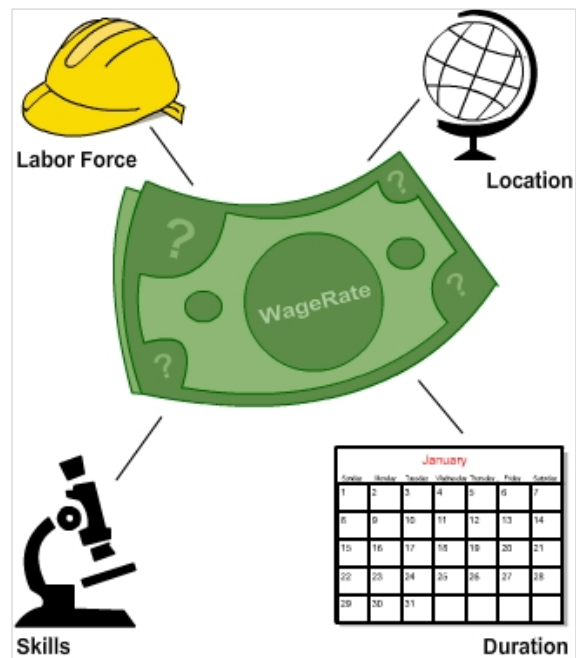
Wage Rate

Direct labor hours are those hours which can be explicitly attributed to a particular task, work order, contract, or program.

The **direct labor wage rate** is the composite hourly wage rate of those employees who can be charged directly to a specific task, work order, program, or contract.

Four general factors have significant impact on the direct labor wage rate—variations in:

- Geographical location
- Skills
- Labor force
- Duration (Time period of the contract)



Location

When assessing or estimating direct labor hours, you need to consider variations in **geographical location**.

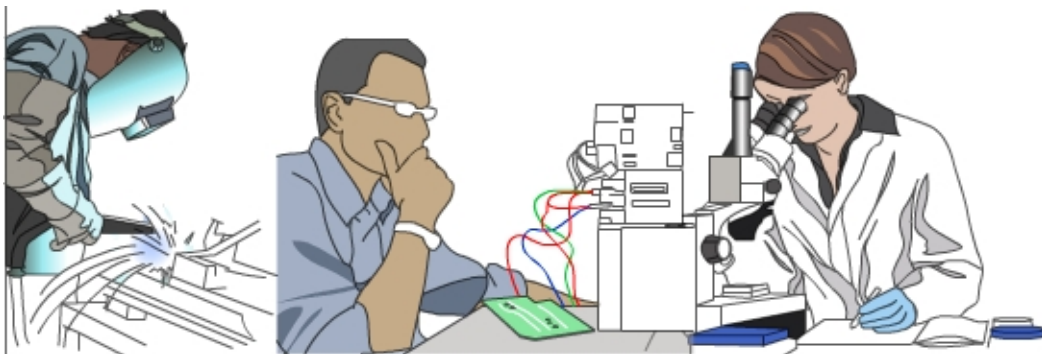
Direct labor wage rates for the same work vary widely by location due to:

- Supply of and demand for workers in a particular trade
- Strength of the applicable trade organizations
- Cost of living in the area(s)



Skills

Both the nature and degree of the skill(s) required have substantial influence on the direct labor wage rate. Generally, as the required skill level increases, the period of training is longer, and the wage is higher. This consideration applies particularly to trades involving similar work but varying degrees of skill, such as mechanic, fitter, and toolmaker.



Labor Force

Another factor that can have a significant effect on wage rates is either a reduction or an increase in the contractor's **labor force**.

If a firm has a larger labor force than it can profitably employ, it may, during an acute labor shortage, keep the surplus on the payroll in anticipation of future orders.



However, no firm can continue to pay people indefinitely that it cannot profitably employ. If orders do not pick up at some point, the firm has to lay off the surplus to avoid bankruptcy.

When compelled to lay off employees, the firm naturally tries to lay off those of least value. These are normally the employees with the lowest skill levels or those who have been with the firm for the shortest period of time.

These employees usually have the lowest pay rates. Their elimination from the payroll results in an **increase in the average wage rate** of those who remain, even though no one is actually paid a penny more.

If the firm's orders increase and they hire additional workers, the reverse effect is likely to occur—the average wage rate will fall.

Duration

It is a familiar fact that wage rates typically increase over time due to:

- **Increased productivity**, and what the employees regard as their fair share of the resulting increase in profits.
- **Cost of living increases** to counter the effects of inflation on the purchasing power of the employees' income.

Another factor that can have significant impact on direct labor wages is how soon the contractor's **labor contract** with the union comes up for renegotiation.

If the work under the government contract will be completed before the labor contract with the union is renegotiated, the contractor knows what the wage rates will be.

On many government contracts, however, the work is likely to go on for several years. In this case there is a good chance that some or all of the labor union contracts will expire before the contract with the government has been completed.



Challenge—Wage Rate Factors

You're assessing the validity of wage rates cited by a contractor to maintain a data processing center over the next five years. In the box below list at least three factors that may influence the wage rates.

Answer

Some of the factors that may influence wage rates are:

- Supply and demand of workers
- Cost of living in the area
- Required skill levels
- Stability of the contractor's labor force
- How soon the contractor's labor contract with the union comes up for renegotiation

Overhead Costs

Overhead

Recall that the second component of the **wrap rate** is **overhead costs**. Overhead costs are also called **burden**. They are **indirect costs** that cannot be practically attributed directly to a specific cost objective. A **cost objective** is an accounting term for a particular task, work order, product, program, or contract.

Overhead costs are costs that benefit **multiple** cost objectives and cannot feasibly be charged directly to just one. There are two distinct types of overhead costs:

General—The first type of overhead includes costs that are so **general**, they cannot be assigned directly to a specific cost objective. Examples include plant maintenance and rent.

Inconsequential—The second type of overhead includes items that are so **inconsequential** that the cost of accounting for them as direct costs outweighs the benefits. A direct cost of a minor dollar amount may be treated as an indirect cost for reasons of practicality. Examples include common hardware items, such as washers and sandpaper, and minor lubricants, such as grease and oils.

Overhead Pools

Most firms collect indirect costs in aggregate cost accounts called **overhead pools**.

Generally, the **overhead pools** fall into one of three broad categories:

- Manufacturing overhead pools
- Engineering overhead pools
- Material overhead pools

Within each of these broad categories, a contractor may have one or more pools, depending on the cost accounting system being used.



Manufacturing

Manufacturing overhead, also known as manufacturing expense or **factory burden**, includes all production costs except direct materials, direct labor, and other costs (explained in the next section).

Manufacturing overhead typically includes:

- **Indirect labor**—supervision, inspection, maintenance, and custodial labor—that is **not** charged directly to a particular cost objective (i.e., a task, work order, product, contract or program).
- **Costs associated with labor**, such as social security and unemployment taxes, vacation pay, shift and overtime premiums, and group insurance.
- **Indirect supplies**, such as washers, sandpaper, and minor lubricants (grease and oils).
- **Fixed charges**, such as depreciation, insurance, rent, and property taxes.



Engineering

Engineering overhead includes the cost of directing and supporting the activities of the engineering department.

Not all companies departmentalize engineering. Some use a single, plant-wide overhead rate that includes both manufacturing and engineering.



In those companies that account for engineering overhead separately, the types of overhead costs are usually similar to the manufacturing overhead costs:

- Indirect labor—both supervisory and support
- Costs associated with labor
- Indirect supplies
- Fixed charges

Material

Material overhead includes costs related to the acquisition, transportation, receiving, inspection, handling, and storage of materials.

In many firms, the indirect costs related to material are **not** segregated from other indirect cost pools.



Challenge—Overhead Costs

Describe overhead costs and list at least four common examples.

Answer

Overhead costs are **indirect costs** that benefit multiple programs or contracts. Common examples include:

- Indirect labor—supervision, inspection, and maintenance—that is **not** charged directly to a program or contract
- Indirect supplies
- Fixed charges
- Indirect costs related to the acquisition, transportation, inspection, handling, and storage of materials

Other Costs

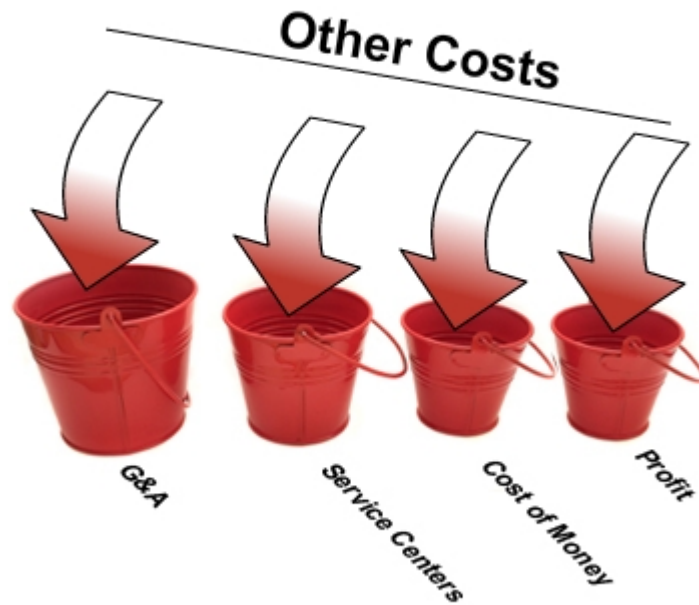
So far we've examined the **direct labor wage rate** and **overhead costs**. The final consideration when building an FBLR or wrap rate is **other costs**.

The definition of **other costs** varies from one firm to another. It depends on what has **not** been captured in the direct and overhead cost categories.

Other costs may include:

- General and administrative (G&A) expenses
- Service centers
- Profit
- Cost of money

In some firms, **G&A** and **service center** pools are included as **overhead costs** rather than **other costs**. Regardless of what the cost is called, the important thing is that it is factored into the FBLR.



G&A

General and administrative (G&A) expenses include:

- Expenses of a company's general and executive offices
- Cost of staff services such as:
 - Legal
 - Accounting
 - Public Relations
 - Financial
- Other miscellaneous activities related to the overall business



Service Centers

A firm may use **service center** cost pools to account for such services as:

- Scientific computer operations
- Reproduction services (copying, not fertility)
- Technical typing services
- Facility services
- Company aircraft services
- Business data processing
- Photographic services
- Art services
- Communication services
- Auto pool services
- Wind tunnels



Profit

Some acquisition contracts allow the contractor to include an agreed-upon amount of **profit** in addition to their costs.

This is usually in return for taking on a difficult, high risk project that requires a long-term commitment of time and capital.



Cost of Money

Other costs may include the **cost of money**. The cost of money is the cost of capital committed to facilities as an element of contract cost.

In other words, the Department of Defense (DoD) pays additional money for the contractor to maintain the production facilities, operating lines, etc., for the duration of the contract.



Challenge—Other Costs

Describe **other costs** and cite **four** examples.

Answer

Other costs include costs that are not already captured as either direct costs or overhead. The exact content of **other costs** varies from firm to firm. Examples may include:

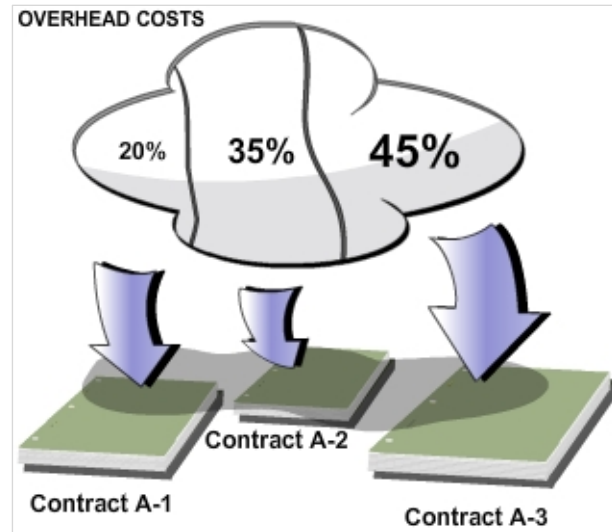
- Expenses of the company's G&A offices
- Service center costs
- Profit, depending on the contractual agreement with the government
- Cost of money

Recovery Rate

Now that you have a solid understanding of **overhead** and **other costs**, we can focus on how these costs are divided among the firm's various cost objectives.

In order to **recover** indirect costs, it is necessary to allocate them to each cost objective they benefit.

Recall that a **cost objective** is an accounting term for a task, work order, product, program, or contract. In government acquisition, the cost objective is normally the program or contract.



We want to ensure that each program or contract is charged its fair share of the indirect costs. We do this by calculating a **recovery rate** for each indirect cost pool.

Formula

The **recovery rate** for each cost pool is established by:

1. Selecting an appropriate base on which to prorate the total cost pool dollars
2. Calculating the ratio of the cost pool dollars to the base

$$\frac{\text{Total cost pool dollars}}{\text{Base}} = \text{Recovery Rate}$$

The following example illustrates how one firm allocates **engineering overhead costs**. In this case, they use **engineering direct labor dollars** as the base.

$$\frac{\text{Engineering overhead dollars}}{\text{Engineering direct labor dollars}} = \frac{\$5,000,000}{\$1,000,000} = \$5.00 \text{ per engineering direct labor dollar}$$

Question

Based on the firm's engineering overhead cost rate of **\$5** per engineering direct labor dollar, if **Contract A** had **\$30,000 direct labor cost**, what is Contract A's share of the engineering overhead costs?

Answer

\$30,000 engineering direct labor x \$5 = **\$150,000** engineering overhead costs

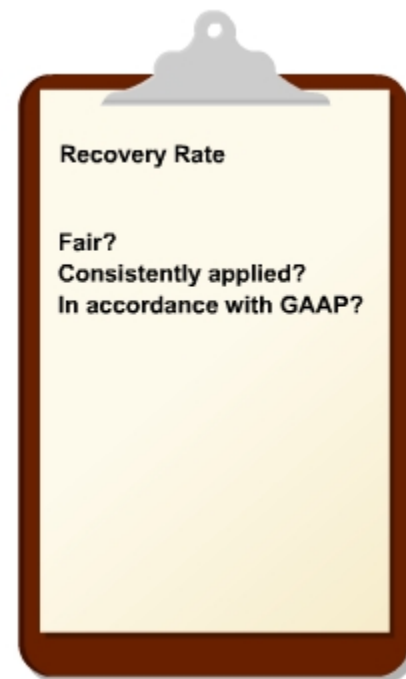
Contract A's share of the \$5,000,000 engineering overhead costs is **\$150,000**.

Criteria

The **bases** used for allocating indirect costs differ between firms, depending on each firm's accounting system and operations.

The base used for allocating indirect costs should:

- Produce a rate that will result in an **equitable** allocation of the indirect costs among the various cost objectives.
- Be applied **consistently** from year to year and from cost objective to cost objective.
- Adhere to generally accepted accounting standards.



Bases

In calculating the **recovery rate**, the numerator in the equation is always the indirect cost pool dollars, and the denominator is always the applicable base.

$$\frac{\text{Total cost pool dollars}}{\text{Base}} = \text{Recovery rate}$$

The Cost Accounting Standards Board cites several **bases** which may be used. The objective is for each firm to select those bases which result in equitable distribution of each of their cost pools. Therefore different firms use different bases. And, within the same firm, they often use different bases for different cost pools.

For example, Firm A allocates **manufacturing overhead** dollars using this formula:

$$\frac{\text{Manufacturing overhead pool dollars}}{\text{Direct labor hours}} = \text{Dollars per direct labor hour}$$

For the **G&A** cost pool, Firm A uses this formula:

$$\frac{\text{G\&A cost pool dollars}}{\text{Cost of goods manufactured (COGM)}} \times \text{Percentage of G\&A per dollar of manufacturing cost}$$

Overhead Allocation

Challenge—Manufacturing Overhead Allocation

Contractor B uses a recovery rate based on direct labor costs to allocate **manufacturing overhead** costs. Listed below are a few of the amounts from last month:

Total direct labor hours	6,750 hrs.
Total direct labor cost	\$400,000
Total manufacturing overhead	\$250,000
Total G&A overhead	\$ 80,000
Contract B-17 direct labor hours	1,266 hrs.
Contract B-17 direct labor costs	\$ 75,000

1. Calculate Contractor B's **manufacturing overhead recovery rate**.
2. Use the recovery rate to allocate a portion of the total **manufacturing overhead** costs to **Contract B-17**.

Answer

Step 1: Calculate the manufacturing overhead recovery rate. Since Contractor B allocates manufacturing overhead costs on the basis of direct labor costs, we calculate their manufacturing overhead recovery rate as:

$$\frac{\$250,000 \text{ Total manu. overhead}}{\$400,000 \text{ Total direct labor cost}} \times 100 = 62.5\% \text{ Manu. overhead recovery rate}$$

Step 2: Apply the manufacturing overhead recovery rate to Contract B-17's direct labor cost.

$$62.5\% \times \$75,000 \text{ Contract B-17's direct labor cost} = \$46,857 \text{ Contract B-17's share of manufacturing overhead}$$

Challenge—G&A Overhead Allocation

Contractor B uses a recovery rate based on direct labor costs to allocate **G&A** costs. Listed below are a few of the amounts from last month:

Total direct labor hours	6,750 hrs.
Total direct labor cost	\$400,000
Total manufacturing overhead	\$250,000
Total G&A overhead	\$ 80,000
Contract B-17 direct labor hours	1,266 hrs.
Contract B-17 direct labor costs	\$ 75,000

1. Calculate Contractor B's manufacturing **G&A** recovery rate.
2. Use the recovery rate to allocate a portion of the total **G&A costs** to **Contract B-17**.

Answer

Step 1: Calculate the G&A recovery rate. Since Contractor B allocates G&A on the basis of direct labor hours, we calculate their G&A recovery rate as:

$$\frac{\$80,000 \text{ Total G\&A}}{6,750 \text{ Direct labor hours}} = \$11.85 \text{ G\&A dollars per direct labor hour}$$

Step 2: Apply the G&A recovery rate to Contract B-17's direct labor cost.

$$\begin{array}{rcl} \$11.85 & \times & 1,266 \text{ Contract B-17's} \\ & & \text{direct labor hours} \end{array} = \begin{array}{r} \$15,002 \\ \text{Contract B-17's share} \\ \text{of G\&A costs} \end{array}$$

Assessing Overhead Rates

Now that you understand what is included in overhead and other costs and how they are allocated, let's conclude this topic with a warning.

When you see contractors' overhead rates, be careful **not** to make a rash judgment about the magnitude of a particular rate.

You will hear cost analysts say: "That rate is too high." This conclusion can be dangerous.

Remember, the rate merely represents the relationship between one number and another. It has relevance only when considered in context with the other number.

An overhead rate of 90% may be too high; while one of 200% may be too low. The question is **not** if the rate is too high or too low **but if the fully burdened labor cost is reasonable**.

Summary

Congratulations! You have completed the **Cost Estimation Rates** lesson. Please take a moment to review the key information in this lesson.

Wrap Rate

The **wrap rate**, also called **fully burdened labor rate**, begins with the direct labor rate but also includes the **overhead rate** and **other costs rate**. Cost analysts assess the validity of competing contractors' wrap rates during the source selection process.

Direct Labor Hours

The **direct labor wage rate** is the composite hourly wage rate of those employees who can be charged directly to a specific task, work order, program, or contract. When assessing wage rates, cost analysts need to consider several factors:

- Geographic location
- Skill level required
- Size and stability of the workforce
- Duration of the contract

Overhead Costs

Overhead costs are **indirect costs**—costs that cannot be practically charged directly to a specific program or contract. Overhead costs generally fall into one of three overhead pools: **manufacturing** overhead, **engineering** overhead, and **material** overhead.

Manufacturing and engineering overhead include indirect labor, costs associated with labor, indirect supplies, and fixed charges.

Material overhead includes costs associated with the acquisition, transportation, handling, and storage of materials.

Other Costs

Other costs typically include such things as general and administrative (G&A) expenses, centralized service centers, profit (depending on the contractual agreement with the government), and the cost of money (if the contractor has significant capital assets dedicated to a particular government program).

Other costs vary from firm to firm—what one company categorizes as **overhead** may be categorized as **other costs** by another company. As long as it is in accordance with Generally Accepted Accounting Principles (GAAP), companies are free to use the accounting system that is best for their particular circumstances.

G&A expenses are a good example. While many companies categorize G&A as overhead, many others categorize G&A as other costs. Regardless of the category, the important thing is that G&A expenses are included when calculating the wrap rate.

Recovery Rate

In order to **recover** indirect costs, contractors need to allocate **overhead** and **other costs** to each program or contract they benefit. This is done by calculating the **recovery rate**—the total cost pool dollars divided by the relevant base.

Overhead Allocation

After the **recovery rate** is calculated for each indirect cost pool, the contractor applies each recovery rate to allocate a portion of the applicable indirect cost pool to each of the contractor's programs or contracts.

Rates

Glossary

Term	Definition
Assembly	Assembly involves the effort to combine parts into subassemblies and assemblies.
Cost Objective	Cost objective is an accounting term for a task, work order, product, program, or contract. In government acquisition the cost objective is normally the program or contract.
Cost of Money	Cost of money is sometimes an allowable other cost, depending on the contractual agreement the contractor has with the government. The cost of money is the cost of capital committed to facilities as an element of contract cost. Department of Defense (DoD) pays additional money for the contractor to maintain the production facilities, operating lines, etc., for the duration of the contract.
Delay Allowance	Delay allowance is an adjustment applied when formulating a labor standard to allow time for unavoidable predictable and unpredictable delays.
Design Engineering	Design engineering involves delineating the characteristics and specifications of the end product.
Direct Labor Hours	Direct labor hours are hours that can be explicitly attributed to a particular task, work order, program, or contract.
Direct Labor Wage Rate	Direct labor wage rate is the composite hourly wage rate of those employees who can be charged directly to a specific program or contract.
Efficiency Rate	Efficiency rate indicates a contractor's productivity and can be used to estimate direct labor hours on future projects. Efficiency rate is calculated by dividing a task's standard hours by the actual hours the contractor required to complete the task, and then multiplying the quotient by 100. Higher efficiency rates (closer to 100%) indicate greater productivity.
Engineering Overhead	Engineering overhead includes the cost of directing and supporting the activities of the engineering department.

Term	Definition
Exponential Moving Average	Exponential moving average, when applied to time series data, is the average of the last X number of observations but with varying weights assigned to each observation. The most recent observation is assigned the greatest weight and each preceding observation is given an exponentially smaller weight. It is applied to smooth out short-term fluctuations in time series data and amplify long-term trends or cycles.
Fabricating	Fabrication involves the fashioning of parts from raw materials or purchased materials.
Fatigue Allowance	Fatigue allowance is an adjustment applied when formulating a labor standard to allow time for workers to recuperate from work conditions and health concerns.
Forward Pricing Rate Agreements (FPRAs)	Forward pricing rate agreements (FPRAs) are negotiated by the government with contractors to set the pay standard for a variety of skill sets within a specified geographical region.
Fully Burdened Labor Cost	Fully burdened labor cost includes direct labor, overhead, and other costs. It is calculated by multiplying the contractor's wrap rate by the direct labor hours.
Fully Burdened Labor Rate (FBLR)	Fully burdened labor rate, also called "wrap rate," includes the contractor's direct labor wage rate, overhead costs rate, and other costs rate. It is used when assessing contractors' proposals and making cost estimates.
General and Administrative Costs	General and administrative expenses typically include the expenses of a company's general and executive offices, staff services, and other miscellaneous activities related to the overall business.
Labor Standard	Labor standards are used to make realistic estimations of how long it should take to complete a job. A labor standard includes leveled time—the amount of time it takes an average worker under average conditions to complete a specified task. After leveled time is established, it needs to be adjusted to allow for personal time, fatigue, and unavoidable delays. The resulting metric is the labor standard.
Leveled Time	Leveled time is one component of a labor standard. Leveled time is the time that a worker of average skill, making an average effort, under average conditions takes to complete a required task.
Manufacturing Engineering	Manufacturing engineering involves planning the manufacturing process, developing process instructions and work methods, shop loading, organizing work stations, and matching shop capabilities to contractual requirements.
Manufacturing Overhead	Manufacturing overhead, also known as "manufacturing expense" or "factory burden," includes all production costs except direct materials, direct labor, and other costs.

Term	Definition
Material Overhead	Material overhead includes costs related to the acquisition, transportation, receiving, inspection, handling, and storage of materials.
Other Costs	Other costs are any other costs the firm incurs but has not accounted for as either direct or overhead costs.
Overhead Costs	Overhead costs, also called "burden," are indirect costs that benefit multiple programs or contracts, and therefore cannot feasibly be charged directly to just one.
Personal Allowance	Personal allowance is an adjustment applied when formulating a labor standard to allow time for workers to take care of personal needs.
Predetermined Leveled Time	Predetermined leveled times are based on basic motion standard data which capture basic body motions, such as reach, move, turn, grasp, position, release, disengage, and apply pressure.
Profit	Profit is sometimes an allowable other cost, depending on the contractual agreement the contractor has with the government. Some acquisition contracts allow the contractor to include an agreed-upon amount of profit in addition to their costs. This is usually in return for taking on a difficult, high risk project that requires a long-term commitment of time and capital.
Quality Assurance Engineering	Quality assurance engineering involves the formulation of standards and specifications for tests and inspections.
Quality Control	Quality control involves the act of testing or inspecting the product during the manufacturing process and prior to final acceptance.
Recovery Rates	The recovery rate is used by contractors to allocate overhead and other costs to each program or contract they benefit. Recovery rates are calculated by dividing the total indirect cost pool dollars by a relevant base.
Regression Analysis	Regression analysis is a statistical technique that illuminates how the value of a dependent variable, such as direct labor wage rates, changes in response to changes in one or more independent variables, such as time.
Reliability and Maintainability Engineering	Reliability and maintainability engineering involves designing and manufacturing products to meet longevity and repair requirements.
Service Centers	Service centers are included in many firms to provide company-wide services such as scientific computer operation, data processing, copying, technical typing, photographing, etc.

Term	Definition
Simple Moving Average	Simple moving average, when applied to time series data, is the average of the last X number of observations. It is applied to smooth out short-term fluctuations in time series data and amplify long-term trends or cycles.
Special Allowance	Special allowance is an adjustment applied when formulating a labor standard to allow time for infrequent, unpredictable occurrences, such as power failures, machine breakdowns, and minor repairs.
Standard Hour	Standard hour is defined as the number of hours a skilled worker will use to complete a given job under ideal or perfect conditions.
Standard Time Data	Standard time data is based on groups of motions (drilling a hole or painting a square foot of surface area) that are estimated as a single element.
Sustaining Engineering	Sustaining engineering involves as needed support as problems arise throughout the life of the contract.
Time Study	During time studies, industrial engineers observe and record the time that a selected worker requires to perform each of the subtasks in the work design. Several observations are required to average out random variations and assure that all elements of the work have been considered.
Weighted Moving Average	Weighted moving average, when applied to time series data, is the average of the last X number of observations but with varying weights assigned to each observation. Usually the most recent is given the greatest weight, and each preceding observation is given a progressively smaller weight. It is applied to smooth out short-term fluctuations in time series data and amplify long-term trends or cycles.
Work Sampling	Work sampling is commonly used to develop non-engineering standards. Estimates are based on the proportion of time spent by one or more persons on a given activity.
Wrap Rate	Wrap rate, also called "fully burdened labor rate," includes the contractor's direct labor wage rate, overhead costs rate, and other costs rate. It is used when assessing contractors' proposals and making cost estimates.