Ch 5 - Defining and Evaluating Work Design For Contract Performance

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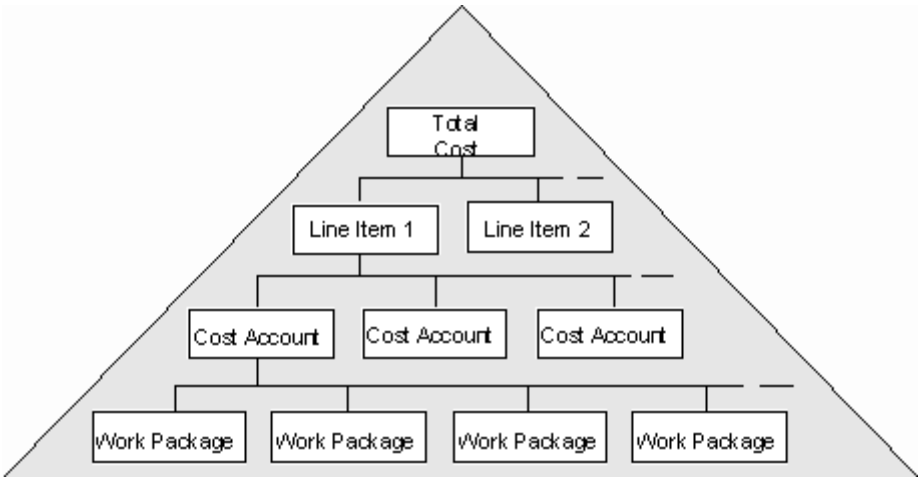
5.0 Chapter Introduction

As you perform your cost analysis, develop Government pricing objectives based on what the price of the contract should be if the firm operates efficiently and effectively. Scrutinize the offeror's assumptions and related work design, considering the factors identified in this chapter.

Proposal Structure (FAR Table 15-2). To understand and evaluate work design, you first need to break total cost into its basic elements. The proposal should include a description of the structure used in preparing the proposal. This description should resemble a pyramid, with total contract cost at the top. Each lower level of the pyramid should further break total cost into its component costs until the foundation for proposal development is reached -- the work package.



Work Package. A proposal work package should:

- Serve as the foundation for proposal development;
- Describe a detailed short-term task that can be identified and controlled by the contractor in assigning contract effort;
- Distinguish the task to be performed from the work identified in all other work packages;
- Assign responsibility for work package completion to a single operating organization of the firm;
- Identify objective start and completion events which:
  - Are associated with physical accomplishments;
  - Can be scheduled to calendar dates; and
  - Can be objectively measured;
- Include a budget expressed in terms of dollars, work hours, or other measurable units.
- Minimize work in progress.

Work Breakdown Structure (MIL-HDBK 881). The request for proposal (RFP) for a large complex system may require the offeror to provide cost information based on a Work Breakdown Structure (WBS) identified in the solicitation. This concept can be used in acquiring any large system, but it is most commonly used in acquiring large DoD systems.

The WBS is a product-oriented family-tree division of hardware, software, services, and other work required to complete the contract. It organizes, defines, and graphically displays contract requirements and the work

required to meet those requirements. The multiple levels of the WBS "explode" the work required down to identifiable work packages. In a common WBS:

- Level 1 is the entire system;
- Level 2 identifies the major elements of Level 1;
- Level 3 identifies the major elements of Level 2;
- Level 4 and later levels provide increasingly detailed information.

The number of levels of detail that you require in the solicitation, should depend on the complexity of the system and the perceived need for in-depth visibility.

The following table provides an example of a WBS structure for a missile system. For other large systems, the elements will change, but the concept will remain the same.

Missile System Work Breakdown Structure, Levels 1-3		
Level 1	**Level 2**	**Level 3**
Missile System	Air Vehicle	Vehicle Integration and Assembly Propulsion Vehicle Stages (each stage included in system design) Guidance and Control Equipment Airborne Test Equipment Auxiliary Equipment
	Command and Launch Equipment	Integration and Assembly Surveillance, Identification, and Tracking Sensors Launch and Guidance Control Communications Data Processing Launcher Equipment Auxiliary Equipment
	Training	Equipment Services Facilities

	Peculiar Support Equipment	Organizational Level Intermediate Level Depot Level
	System Test and Evaluation	Development of Test and Evaluation Operational Test and Evaluation Mock-ups Test and Evaluation Support Test Facilities
	Systems/Project Management	Systems Engineering Project Management
	Data	Technical Publications Engineering Data Management Data Support Data Data Depository
	Operational/Site Activation	Contractor Technical Support Site Construction Site/Ship/Vehicle Conversion On-site System Assembly, Installation, and Checkout
	Common Support Equipment	Organizational Level Intermediate Level Depot Level
	Industrial Facilities	Construction Conversion/Expansion
	Initial Spares and Repair Parts	Identified Spares Allowance List (by system grouping or element)

5.1 Identifying The Offeror's Planning Assumptions

This section will identify points to consider as you identify and analyze offeror planning assumptions.

- 5.1.1 - Identifying Basic Planning Assumptions

- 5.1.2 - Analyzing Specific Assumptions
- 5.1.3 - Determining Proper Contingency Cost Treatment

5.1.1 Identifying Basic Planning Assumptions

Basic Planning Assumptions, Each proposal cost estimate is based on certain planning assumptions. Most good proposals specifically identify key assumptions at the beginning of the proposal. Whether the assumptions are identified or not, they exist. Because these assumptions are basic to cost estimate development, you should begin your cost analysis by identifying the offeror's assumptions.

You should be able to classify each of the offeror's assumptions into one of two basic perceptions of the future:

- **The future will be the same as the past.**

If the offeror assumes that the future will be the same as the past, the proposal should explain the reason for that belief. Then the estimator should rely on data gathered from past performance in estimating future contract costs.

For example: An offeror is estimating the cost for a contract to manufacture 100 units of Product A. The firm has recently completed a contract to produce 100 units of Product A. The recent contract required 125 units of a key component. Based on that assumption, they would estimate that 125 units of that key component will be required to complete the proposed contract.

- **The future will be different from the past.**

If the offeror assumes that the future will be different than the past, the offeror should rely less on historical data in proposal development. The offeror may estimate contract costs using a factor to adjust historical data or the offeror may rely on an estimating technique that is not based on historical data. In either case, the proposal should explain why the estimate provided is more reasonable than an estimate based on historical data.

For example: An offeror is estimating the cost for a contract to manufacture 200 units of **Product B**. The firm

recently completed a contract to produce 200 units of **Product B.** The recent contract required 40,000 direct labor hours. However, the offeror believes that experience gained on the completed contract will make labor more efficient on the proposed contract. The estimator might adjust the historical labor hours using a quantitative technique (e.g., an improvement curve). Alternatively, the estimator might use an entirely different basis for estimate development (e.g., an industry labor standard).

Identify and Evaluate Planning Assumptions. As you begin your cost analysis:

- **Identify the planning assumptions used by the offeror in proposal development.**

The offeror's proposal may have a single overall statement of the assumptions used in planning. However, if the assumptions are not presented in one place, you must carefully review the proposal to find them. Often individual estimates will include statements about the assumptions and factors used in preparing that estimate.

- **Develop a position on whether assumptions are realistic and consistent, and how they affect the proposal.**

Request technical assistance in developing your position on technical assumptions (e.g., labor efficiency) and audit assistance in developing your position on financial assumptions (e.g., labor rate increases). For each assumption, you should ask specific questions based on the following:

  - ***Is the proposal assumption realistic?***
  - ***Is the assumption consistent with the rest of the proposal?***
  - ***How does the proposal assumption affect contract cost?***

5.1.2 Analyzing Specific Assumptions

Common Assumptions, Cost proposals typically involve many assumptions. The details of these assumptions will vary depending on the acquisition situation. However, you will

find that most assumptions will involve the effect of one of the following on contract performance:

- General performance problems;
- Technology changes;
- Interruptions and shortages; or
- Inflation/deflation.

Because assumptions involving these topics are so common, you must be prepared to identify and evaluate them in your analysis.

Identifying Assumptions Regarding General Performance Problems. When calculating the estimated cost of a proposal, an offeror will try to anticipate problems in the project that will affect contract cost. Problems may be related to any of the wide variety of factors affecting contract performance (e.g., technical, managerial, financial, environmental, etc.).

The proposal should estimate the likelihood that the problem will occur and the cost involved. As you develop your pricing position, you must evaluate the reasonableness of the offeror's proposal and develop your own estimate of contract costs.

For example: Consider the assumptions and associated costs that an offeror might include in a proposal to produce rocket fuel using highly toxic and explosive chemicals. The proposal might include assumptions related to:

- Locating a plant site;
- Higher wages and employee benefit costs due to the danger associated with an untested and explosive product;
- Meeting Occupational Safety and Health Administration (OSHA) and Environmental Protection Agency (EPA) regulatory requirements;
- Waste disposal; or
- Hazardous product storage.

Evaluating Assumptions Regarding General Performance Problems. When analyzing the offeror's assumption of an anticipated problem, answer the following questions:

- ***Is the proposal assumption realistic?***

If answering this question is beyond your technical expertise, request a technical analysis. In your request for technical analysis assistance, specifically ask for an assessment of the likelihood of the problem occurring and the probable effect of the problem on contract performance.

- ***Is the assumption consistent with the rest of the proposal?***

Sometimes a proposal will project a problem in one area of contract performance, but not in other areas that should be affected by the same problem. With assistance from technical experts, identify and resolve any apparent inconsistencies.

- ***How much should it reasonably cost to handle the problem?***

Cost estimates should consider the likelihood that the problem will occur and the cost to resolve the problem if it does occur. Advice from technical personnel is generally invaluable in estimating a reasonable cost associated with a potential problem.

Identifying Assumptions Regarding Technological Changes. Technological change can affect the product, the production process, or both. In this time of rapid technological advancement and the often long lead times for awarding Government contracts, an offeror has to anticipate the effect technological change will have on contract performance and cost. The contract itself may require the offeror to assume the risk associated with developing new state-of-the-art technology.

In any case, the offeror must assess the likelihood of technological change and the effect of the change on contract cost. Assuming that an anticipated technological advancement will reduce contract costs may be risky. After all, many advancements that appear to be just around the corner do not actually happen, or if they occur do not bring the expected benefits.

As you develop your pricing position, you must evaluate the reasonableness of the offeror's proposal and develop your own estimate of contract costs. You cannot allow an offeror to ignore expected advancements that will lower contract cost, and you cannot automatically assume that

every contract requiring an advance in the state-of-the-art will require an awesome effort with costs to match.

For example: An offeror is preparing a proposal to produce a new control subsystem that will replace and improve the existing control subsystem in an automated material handling system. The existing control subsystem has had significant problems because current technology does not permit the production of equipment that meets required reliability and maintainability standards. In preparing the proposal, the offeror should consider the:

- Costs associated with each method that might be used to advance the product state-of-the-art to meet Government requirements and the probability that method will succeed; and
- Costs associated with each method that might be used to advance the production process state-of-the-art to produce the new product and the probability that method will succeed.

Evaluating Assumptions Regarding Technological Changes. When analyzing the effect of anticipated technological changes on contract cost, consider the following questions:

- ***Are proposal assumptions about technological change realistic?***

If answering this question is beyond your technical expertise, request a technical analysis. Remember that the offeror may have been overly optimistic or overly pessimistic in developing assumptions about technological change.

- ***Is the assumption consistent with the rest of the proposal?***

Look for inconsistencies in the proposal assumptions about technological change. It is not uncommon for one part of a proposal to state that technology already exists, while another indicates that substantial effort will be required to obtain the same technology.

- ***What will be the cost/benefit of the indicated technological change to the proposed contract?***

There may be ways of completing the contract that do not require technological change. Existing products and methods may be quite satisfactory. The required technology may already be available.

Identifying Assumptions Regarding Interruptions and Shortages. There are many factors that might affect a contractor's ability to complete the contract on schedule, including:

- Reasonable interruptions by the Government under the terms of the contract (e.g., delays required to obtain required security clearances);
- Conflicts with other contractors performing related tasks; and
- Material shortages

Interruptions or shortages, will result in a cost to the offeror, so the offeror will try to anticipate the likelihood of interruptions and include them in the total proposed cost. You will need to determine what interruptions may reasonably occur and the costs that would be incurred by the contractor as a result of those interruptions.

For example: An offeror is proposing to perform a contract for electrical rewiring on five reserve cargo ships. On a similar contract, the offeror experienced numerous delays because of scheduling conflicts with other contractors performing related work on the same ships. The firm expects similar working conditions on the proposed contract, so it has estimated costs based on the firm's experience on the earlier contract.

Evaluating Assumptions Regarding Interruptions and Shortages. When analyzing the effect of projected interruptions or shortages, consider the following questions:

- ***Are proposal assumptions about interruptions and shortages realistic?***

In particular, remember that if the contractor can prevent the interruption or shortage without additional cost, you should not include additional cost in your position on contract price.

- ***Are proposal assumptions about interruptions and shortages consistent with the rest of the proposal?***

Be particularly careful to assure that the effects of potential interruptions and shortages are only considered once in a proposal. For example, an estimate based on the actual cost of previous contracts may already include costs of interruptions (e.g., security requirements) that are a common part of contract performance.

- ***Is the proposal estimate of the effect of an interruption or shortage reasonable?***

Examine the reasonableness of the estimate prepared by the offeror based on the offeror's approach to the interruption or shortage. In addition, you should consider other approaches. If the Government customer can tolerate a delay in contract performance, it may be wiser to delay contract award until the danger of interruption or shortage is eliminated.

Identifying Assumptions Regarding Inflation/ Deflation. Offerors commonly consider inflation/deflation when making contract cost estimates based on historical contract costs. When the contract performance is expected to extend beyond a few months, an offeror may also include assumptions about inflation/deflation during contract performance.

For example: An offeror is preparing a proposal to manufacture 500 units of equipment to meet Government contract requirements. The firm completed a similar contract just nine months ago. Because the cost data are so recent, the firm has decided to estimate contract costs based on cost data from the recent contract plus five percent to allow for inflation since the last contract.

Evaluating Assumptions Regarding Inflation/ Deflation. When analyzing the effect of projected inflation/deflation, consider the following questions:

- ***Is the proposal assumption realistic?***

There are numerous price indexes that you can use in evaluating the offerors assumed inflation/deflation. Be sure that any index numbers are appropriate for your analysis situation. Two of the most common index sources are the:

- Producer Price Index (PPI); and
- DRI/McGraw (DRI) Cost Information Services.

- ***Is the assumption consistent with the rest of the proposal?***

Assure that it is appropriate to use an adjustment for inflation. For example, do not add an inflation factor to current quotes when contract material will be ordered and delivered immediately after contract award.

- ***How does the proposal assumption affect contract cost?***

Remember that some prices are actually decreasing. Make sure that you consider potential price decreases as well as potential price increases

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5.1.3 Determining Proper Contingency Cost Treatment

Contingencies (FAR 31.205-7). Most estimates of the cost of future contract performance involve contingencies. A contingency is a possible future event or condition arising from presently known or unknown causes, the outcome of which cannot be precisely determined at the present time.

For cost estimating purposes, contingencies fall into two categories:

- **Contingencies that arise from presently known and existing conditions, with effects on contract cost that can be forecast within reasonable limits of accuracy.**

In other words, the contracting parties are aware of the conditions that will affect future costs and they are able to reasonably estimate the related affect on contract cost.

For example: An offeror is preparing an estimate of material cost. One material item is sheet metal that will be used to produce parts of different shapes. The offeror knows that some part of the metal will eventually become scrap. Using scrap records from similar contracts and an understanding of the proposed contract requirements, the

offeror can develop a reasonably good estimate of proposed contract costs.

- **Contingencies that arise from presently known or unknown conditions, with effects on contract cost that cannot be forecast precisely enough to provide equitable results to the contractor and the Government.**

In other words, the contracting parties cannot reasonably estimate contract costs for one of the following reasons.

  - The contracting parties are aware of conditions that will affect future costs but they are unable to reasonably estimate the related affect on contract cost.
  - The contracting parties are not aware of all the conditions that will affect future contract cost and are therefore unable to reasonably estimate contract cost.

For example: A firm is involved in litigation concerning the proper interpretation of an apparent conflict between Government contract cost principles and state tax law. If the court accepts the state's position, contract costs will increase substantially. If the court accepts the contractor's (and the Government's) position, costs will remain unchanged. The case may not be resolved for several years. Right now there is no way to forecast how the case will end, and there is no way to estimate the final effect of the litigation on contract cost.

Contingencies, Contract Costs, and Separate Agreements (FAR 15.402(c), 31.205-7(c), and 31.109).

If you can reasonably estimate the cost associated with a particular contingency, include that estimated cost in the contract total cost estimate.

If you cannot reasonably estimate the cost associated with a particular contingency, exclude all costs related to that contingency from the contract cost estimate. Instead, the cost should be disclosed separately to facilitate the negotiation of appropriate contract coverage. Normally, that contract coverage will be based on a formal agreement about how the cost will be treated once the cost is known or can be equitably estimated. That agreement may apply to

a single contract, group of contracts, or all contracts with the contractor.

- Before you begin negotiation of an agreement that is likely to affect more than one contract:
  - Identify contracts and contracting activities that might be affected;
  - Inform each contracting activity or agency of the matters that you intend to negotiate; and (as appropriate)
  - Invite the affected contracting activities or agencies and the cognizant audit agency to participate in prenegotiation discussions and/or subsequent negotiations.
- After you reach an agreement that is likely to affect more than one contracting activity or agency, distribute a copy of the executed agreement to other interested parties, including the cognizant audit agency.

Contingencies and Historical Costs (FAR 31.205-7). As stated above, a contingency is a possible future event or condition arising from presently known or unknown causes, the outcome of which cannot be precisely determined at the present time. Therefore, you should not include contingency-related costs in pricing positions based on actual incurred costs. If all contract costs are known, future events will no longer have any affect on contract cost.

For example: An offeror normally estimates direct labor hours for engineering support as five percent of manufacturing direct labor hours. The purpose of this contingency for engineering support is to estimate the hours required to resolve product design problems identified during product production. If you are analyzing a contract modification proposal after all manufacturing work is completed there will be no need for additional engineering support on that contract, because there will no more production design problems that require resolution. In that situation, concentrate on evaluating the reasonableness of actual costs. Do not simply calculate engineering support direct labor hours as five percent of actual manufacturing direct labor hours.

Note: In some cases (e.g. contract termination), you may need to use a contingency factor to recognize minor

unsettled contract factors. Make sure that the contingency factor does not duplicate costs already specifically included in available actual costs.

5.2 Applying Should-Cost Principles In Objective Development

This section identifies principles that you should consider as you attempt to determine what a contract should cost.

- 5.2.1 - Identifying Causes Of Inefficient Or Uneconomical Performance
- 5.2.2 - Performing A Formal Should-Cost Review

5.2.1 Identifying Causes Of Inefficient Or Uneconomical Performance

Key Areas for Cost Analysis (FAR 15.404-1(c)(1)). Once you have identified and evaluated offeror planning assumptions, you are ready to continue your cost analysis. As you do, remember that the objective of cost analysis is to review and evaluate the separate elements of cost to form an opinion on whether proposed costs represent what the cost of the contract should be, assuming reasonable economy and efficiency. Put another way, the objective of cost analysis is to develop a position on what the contract should cost, assuming reasonable economy and efficiency.

To attain this objective, you must understand where to look and what to look for. Key areas to check for possible improvements in economy and efficiency include:

- Contract task and subtask contribution to meeting contract requirements;
- Methods used in contract performance;
- Facilities used in contract performance;
- Equipment used in contract performance;
- Computer hardware and software used to support contract performance;
- Contractor management and operating systems; and
- Other aspects of contract performance.

Contract Task and Subtask Contribution to Meeting Contract Requirements. Examine the tasks and subtasks within the work packages of the contractor's proposal to see if they are necessary and if they really add value to the final product.

For example: A manufacturer's proposal may include repetitive tests of the same product performed by workers, line managers, and various quality assurance personnel. Even with all of this repetitive testing, the number of defective units is still projected to be a large percentage of total production. Likely many of the these tests can be eliminated by greater reliance on worker application of statistical process control techniques. The result could be improved quality and reduced cost.

Methods Used in Contract Performance. With the assistance of technical personnel, examine offeror-proposed methods for possible improvement. Consider both different methods and improvements to existing methods. Question any methods that appear inefficient or uneconomic.

For example: Some tasks can be performed manually, but they can be performed more efficiently and effectively using automated equipment.

Facilities Used in Contract Performance. Examine facilities and facility layout for possible changes that might reduce costs and improve contract performance. When appropriate, complete a cost-benefit analysis as part of your examination. In simple terms, a cost-benefit analysis compares the savings from the change with the cost of making the change. If the costs are less than the savings, then the change is worth pursuing.

For example: The cost of fabricating a system component could be reduced by $150,000 per unit if a new $1,000,000 facility were placed in operation. The current proposal is for six systems and the facility would not be operational until the fourth system. However, the total program calls for production of 38 systems over the next five years.

- ***Is it cost effective to invest in the new facility considering only the current contract?***

If you only consider the six remaining systems under the current contract, the new facility would increase costs by $100,000.

Net Benefit = (Savings per Unit * Units) - (Cost of Change)

= ($150,000 * 6) - $1,000,000

= $900,000 - $1,000,000

= - $100,000

- ***Is it cost effective to invest in the new facility considering projected requirements?***

If you consider the projected 38 system requirement, the new facility would decrease costs by $4,700,000.

Net Benefit = (Savings per Unit * Units) - (Cost of Change)

= ($150,000 * 38) - $1,000,000

= $5,700,000 - $1,000,000

= $4,700,000

- ***Should you only consider the current contract, or should you consider projected requirements.?***

In the example above, if you only consider the current contract, the investment would not be cost effective. If you consider all 38 systems, the savings would substantially outweigh the cost of the investment. When evaluating which results to use in your analysis, you should consider the viability and direction of the entire program

Note: To simplify the examples above, the concept of present value analysis and cost of money adjustments were not considered. You should include both in any contract-related cost-benefit analysis.

Equipment Used in Contract Performance. Examine equipment and contract requirements for possible inefficient or uneconomical performance. Equipment may be inefficient, out of tolerance, or expensive and time consuming to maintain. The projected production rate may be significantly greater

or less than the optimum rate for the equipment. In any case, you should review the total shop loading for a machine or work station, not just the current proposal.

For example: The offeror proposes to use a large piece of automated equipment to meet contract subsystem requirements. The capacity of this equipment is 20,000 units per day, but the contractor is currently producing only 2,800 units per day. A cost benefit analysis shows that the cost of producing the small number of units required is about twice the cost of using a system designed to produce 4,000 units per day.

Computer Hardware and Software used to Support Contract Performance. The cost of computer resources used to support the contract could be categorized as a direct cost (specific to the program), or indirect cost (general purpose). Both categories are worth attention. Check both categories for inefficient and uneconomical use. In particular, look for duplications in computer resources, because duplications are commonly found at all types of contractors.

For example: An offeror's Data Automation Department has the capability to perform program planning analysis. Department A uses its own, non-networked personal computers for its program planning analysis. Department B uses computers on a local area network for the same tasks but with software that is not compatible with Department A or the Data Automation Department. This duplication is costly and there are substantial opportunities for cost reduction.

Contractor Management and Operating Systems. Examine the effect of management systems on contract performance and contract cost. In particular, look for inefficient or unnecessary systems. Since business automation has reduced the need for many clerical and mid-level management functions, these functions are good targets for improvement. Look for ways to eliminate nonvalue-added functions and shorten the line of communication and authority.

For example: A contractor is producing a large system to meet unique Government requirements. Effective scheduling of the firm's vast resources is essential to efficient contract performance. Over the past year, the firm has had several lay-offs in key production areas. Later the

employees were recalled and put on substantial overtime to meet production requirements. Experts estimate that an effective scheduling system could have reduced the cost of these operations by 25 percent.

Other Aspects of Contract Performance. Depending on the type of contract effort involved, the specific circumstances of the acquisition, and contractor's particular practices, other aspects of the total environment may deserve attention. While these aspects differ greatly from contract to contract, some of the possible candidates include:

- Business forecasting,
- Staff planing,
- Capital investment planning,
- Test planning, and
- Anything else that has the potential of significantly affecting contract cost.

5.2.2 Performing A Formal Should-Cost Review

Should-Cost Review Concept (FAR 7.105(a)(3)(iii) and 15.407-4). You can use should-cost techniques in any proposal cost analysis. However, for a major program involving large costs, consider using a formal should-cost review. A formal should-cost review is a multifunctional team evaluation of the economy and efficiency of the contractor's existing work force, methods, materials, facilities, operating systems, and management.

There are two types: the program should-cost review and the overhead should-cost review. These analyses may be performed together or independently. The scope of a should-cost review can range from a large-scale review examining the contractor's entire operation (including plant-wide overhead and selected major subcontractors) to a small-scale tailored review examining specific portions of a contractor's operation.

Each should-cost team should be tailored to the required analysis, but it is not uncommon for a should-cost team to include 50 - 60 analysts. Team members typically include representatives from contracting, contract administration, pricing, audit, engineering, and other

technical specialties. Most will be Government personnel, but some may be technical specialists contracted to support the should-cost review.

The decision on conducting a should-cost should be a part of acquisition planning. Before initiating a should-cost review, consider the potential benefits and the cost of the analysis. A large-scale should-cost will be expensive, but savings can be substantial. Management support is vital to an effective should-cost review. The information and findings produced by formal should-cost analyses have historically attracted a great deal of attention and support from upper levels of both contractor and Government management.

Should-Cost Objective (FAR 15.407-4(a)(1)). The should-cost objective is not restricted to optimizing costs on a single contract. The should-cost objective is to promote both **short and long-range improvements in the contractor's economy and efficiency** in order to reduce the cost of performing Government contracts. By providing a rationale for any recommendations and quantifying their impact on cost, the Government will be better able to develop realistic price objectives for use in contract negotiations.

Program Should-Cost Review (FAR 15.407-4(b) and DFARS 215.407-4(b)(2)). A program should-cost review is an evaluation of significant direct cost elements (e.g., material, labor, and associated indirect costs) usually incurred in the production of major systems (e.g., DoD definitive major systems contracts exceeding $100 million). Consider initiating a program should-cost review (particularly in the case of a major system acquisition) in the following circumstances:

- Some initial production has already taken place;
- The contract will be awarded on a sole-source basis;
- There are future year production requirements for substantial quantities of like items;
- The items being acquired have a history of increasing costs;
- The work is sufficiently defined to permit an effective analysis and major changes are unlikely;
- Sufficient time is available to adequately plan and conduct the should-cost review; and

- Personnel with the required skills are available or can be assigned for the duration of the should-cost review.

Program Should-Cost Team Organization (FAR 15.407-4(b)(3)). A program should-cost facilitates a comprehensive review by bringing together an integrated team of experts. The breadth and depth of available experience permits the team to identify and pursue problems in much greater depth than would be possible using a traditional review format.

Select team members after determining which elements of the contractor's operation have the greatest potential for cost savings. Use the experience of on-site Government personnel when appropriate. If the team is large, consider dividing team members into subteams. Each subteam will then be able to concentrate on a specific area of contractor performance, such as:

- Manufacturing;
- Pricing and accounting;
- Management and organization; and
- Subcontract and vendor management.

Program Should-Cost Report (FAR 15.407-4(b)(4)). When you conduct a program should-cost review, you must prepare a should-cost report in accordance with agency procedures. That report should clearly identify any uneconomical or inefficient practices identified during the review.

When the should-cost team is divided into subteams, you might request each subteam to contribute its findings and recommendations. Then you can review subteam findings for consistency and combine them to produce a comprehensive final report.

Normally, you should formally review significant team findings with the contractor before the should-cost report is finalized and distributed. Provide the contractor an overview of major areas of team concern, but do not make specific recommendations on how the contractor should correct identified deficiencies.

Government Action Based on Program Should-Cost Review Results (FAR 15.407-4(b)(4)).

Consider the findings and recommendations contained in the program should-cost report when negotiating the contract price. After completing the negotiation, provide the administrative contracting officer (ACO) a report of any identified uneconomical or inefficient practices, together with a report of correction or disposition agreements reached with the contractor. Then establish a follow-up plan to monitor contractor correction of identified uneconomical or inefficient practices.

Overhead Should-Cost Review (FAR 15.407-4(c)). An overhead should-cost review is an evaluation of contractor indirect costs, such as fringe benefits, shipping and receiving, facilities and equipment, depreciation, plant maintenance and security, taxes, and general and administrative activities. An overhead should-cost review is normally used to support evaluation and negotiation of a forward pricing rate agreement (FPRA) with the contractor.

Consider the following factors whenever you evaluate a contractor site for possible overhead should-cost review:

- Dollar amount of Government business;
- Level of Government participation;
- Level of noncompetitive Government contracts;
- Volume of proposal activity;
- Major system or program;
- Corporate reorganizations, mergers, acquisitions, or takeovers; and
- Other conditions (e.g., changes in accounting systems, management, or business activity).

Also consider any additional criteria established by your agency. For example, in the DoD, the head of the contracting activity may request an overhead should-cost review for any business unit. However, the DoD does not normally consider a contractor business unit for a should-cost review unless it meets all of the following criteria:

- Projected annual sales to the DoD exceed $1 billion;
- Projected DoD business exceeds 30 percent of total business;
- Level of sole-source DoD contracts is high;
- Significant volume of proposal activity is anticipated;
- Production or development of a major weapon system or program is anticipated;

- Contractor cost control/reduction initiatives appear inadequate, and
- No overhead should-cost has been conducted at the business unit in the last three years.

Overhead Should-Cost Team Organization. Like the program should-cost review, the overhead should-cost review requires an integrated team of experts. The breadth and depth of available experience permits the team to identify and pursue problems in much greater depth than would be possible using a traditional review format.

Select team members after determining which elements of the contractor's areas affecting indirect costs have the greatest potential for cost savings. If the team is large, consider dividing team members into subteams. Each subteam will then be able to concentrate on a specific area, such as:

- Sales volume and indirect cost allocation bases;
- Indirect labor cost ; and
- Non-labor indirect cost.

Overhead Should-Cost Report (FAR 15.407-4(c)(3)). If an overhead should-cost review is conducted in conjunction with a program should-cost review, a separate overhead should-cost report is not required. However, the findings and recommendations of the overhead should-cost team, or any separate overhead should-cost review report, must be provided to the ACO responsible for negotiating indirect cost rates.

Government Action Based on Overhead Should-Cost Results (FAR 15.407-4(c)(3)). The ACO should use the results of the should-cost review as the basis for the Government position in negotiating an FPRA with the contractor. In addition, the ACO must establish a follow-up plan to monitor the correction of the contractor's uneconomical or inefficient practices.

5.3 Recognizing Cost Risk

In this section, you will learn to identify the types of risks inherent in an offeror's cost estimate and how these risks affect the offeror's estimate.

- 5.3.1 - Identifying Principal Sources Of Cost Risk
- 5.3.2 - Assessing The Level Of Risk
- 5.3.3 - Using Contract Type To Mitigate Risk
- 5.3.4 - Using Clear Technical Requirements To Mitigate Risk
- 5.3.5 - Using Government Furnished Property To Mitigate Risk
- 5.3.6 - Using Contract Terms And Conditions To Mitigate Risk

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5.3.1 Identifying Principal Sources Of Cost Risk

When the offeror considers entering into a contract with the Government, the offeror must consider the risk of the various contract obligations.

The risk to the offeror can be viewed from several perspectives:

- **Investment risk** -- the risk in recovering the money invested by the offeror to perform the job.
- **Economic risk** -- the risk in earning a reasonable profit on the investment, especially when compared to other possible investments.
- **Performance risk** -- the risk in successfully performing the work required by the contract.

You can be assured that, as long as there is a reasonable expectation of success and the profit or other payoff is great enough to warrant taking the risk, there will be contractors available to take on the work. However, if the outcome is too uncertain and the rewards too little for the risk involved, you might NOT find a responsible contractor willing to submit an offer.

Investment Risk. In order to perform on a contract, the offeror may have to plan to make costly investments for such things as facilities, equipment, and materials. The offeror will need a reasonable assurance that these investments will be recouped from contract performance. If the offeror feels that the investments are for facilities, equipment, and materials that can only be used for a specific Government product, then the offeror may conclude that the investment risk is too great. Or, the offeror may choose to avoid such investment risk by proposing a less

efficient use of manual labor, instead of investing in more efficient-and more expensive-facilities and equipment. (One of the reasons frequently given for the high proportion of manual labor in Government contracts, compared tct are well established and the costs can be reasonably estimated. You should not use a fixed-price contract when the methods required to complete the contract are not well established and costs cannot be reasonably estimated. If you do, the uncertainty will likely have one of two results:

  - Competition will decrease, because potential offerors will decline to submit a proposal rather than accept the risk, or
  - Costs will increase, because offerors will "pad" their estimates to cover the uncertainties.

Cost-Reimbursement Contracts. Cost-reimbursement contracts provide for reimbursement of all allowable contract costs whether or not the contractor completes all contract requirements.

- Consider a cost-reimbursement contract when cost risk is high and the contractor cannot estimate cost with reliable accuracy.
  - These conditions commonly exist when the contract requirements are only generally defined and the amount of work needed to complete the contract is uncertain.
  - Cost-reimbursement contracts deal with this uncertainty by only requiring the contractor to deliver its "best effort" to provide the product.
- You should not use a cost-reimbursement contract when contract risk is low, because cost-reimbursement contracts require substantial administration and do not provide the same motivation to control costs that is provided by fixed-price contracts.

Most Frequently Use Contract Types. There are different types of contracts within both the fixed-price and cost-reimbursement categories. Each type deals differently with cost risk. You will want to select the contract type best suited to each requirement.

Consider all available contract types, but the most commonly used are:

- Firm fixed-price (FFP);

- Fixed-price economic price adjustment (FPEPA);
- Fixed-price incentive firm (FPIF);
- Cost-plus-incentive-fee (CPIF);
- Cost-plus-award-fee (CPAF); and
- Cost-plus-fixed-fee (CPFF).

Cost Risk and Contract Type. The following figure uses the stages of a major system acquisition to demonstrate how contract type alternatives typically change as contract requirements become better defined and the amount of work needed to complete the contract more certain.

COST RISK AND CONTRACT TYPE						
Cost Risk	High <==========>Low					
Requirement Definition	Poorly-defined Requirement <==========>Well-defined Requirement					
Production Stages	Concept Studies & Basic Research	Exploratory Development	Text/ Demonstration	Full-scale Development	Full Production	Follow-on Production
Contract Type	Varied types of cost-reimbursement contracts	CPFF	CPIF or FPIF	CPIF, FPIF, or FFP	FFP, FPIF, or FPEPA	FFP, FPIF, or FPEPA

Firm Fixed-Price (FFP) (FAR 16.202). When the contractor is able to accurately estimate the cost of the work called for in the contract and the cost risk to the offeror is therefore very low, use an FFP contract.

An FFP contract places ALL cost risk on the contractor. It requires the Government to pay a specific price when the contract items have been delivered and accepted. Unless there are contract modifications, the price for the original work is NOT adjusted after contract award regardless of the contractor's actual cost experience.

Fixed-Price-Economic Price Adjustment (FPEPA) (FAR 16.203 and DFARS 216.203). When there are volatile economic conditions (e.g., an unstable labor or material market) outside of the contractor's control that could affect contract cost, a FFP contract may not cover the offeror's cost risk sufficiently. In this situation, you should consider a contract that allows for price adjustments due to changes in economic conditions.

FPEPA contracts are designed to cope with economic uncertainties that would threaten long-term, fixed-price arrangements. Economic price adjustment clauses provide for both price increases and decreases to protect the Government and the contractor from the effects of economic changes.

If you use an FFP contract instead of an FPEPA contract, you can expect offeror's to include contingency allowances in their proposals to eliminate or reduce the risk of loss. Including such contingency allowances in contract prices is not a good solution for either the contractor or the Government. The contractor may be hurt if the changes exceed the estimate and the Government may pay unreasonably high prices if the contingency does not materialize.

Fixed-Price Incentive Firm (FPIF) (FAR 16.204 and 16.403-1). In circumstances where contract requirements are largely defined but major performance uncertainty still exists (e.g., the first production run of a completely designed and tested prototype product), there will still be major cost risk but much of that risk can be limited by effective contract performance. Consider using a fixed-price incentive firm (FPIF) contract to give the contractor an incentive to effectively control costs.

The basic structure of the FPIF contract includes the following elements:

- Target cost;
- Target profit;
- Ceiling price; and
- Under-target and over-target sharing formulas.

Costs under target are shared according to the share ratio established in the under-target sharing formula. Costs over target are shared according to the over-target sharing formula until the sum of incurred costs and profit equal the ceiling price -- the point of total assumption (PTA). At the PTA, cost risk responsibility shifts completely to the contractor. Each additional dollar of cost will reduce the contractor's profit or increase the contractor's loss by one dollar.

Cost-Plus-Incentive-Fee (CPIF) (FAR 16.304, 16.405-1, and DFARS 216.405-1). When the contract calls for such risky

ventures as the development and testing of a new system, the offeror's risk may be too high for any fixed-price type contract. However, you may still want to motivate the contractor to control costs. If you can negotiate a target cost and a fee adjustment formula that will motivate the contractor, consider using a CPIF contract.

The basic structure of a CPIF contract includes the following elements:

- Target cost;
- Target fee;
- Maximum fee;
- Minimum fee; and
- Under-target and over-target sharing formulas.

The cost risk on this type of contract is shared by the Government and the contractor according to "sharing formulas" with limits that assure the minimum fee is large enough to motivate effective contract performance but the maximum fee is not unreasonably large for the risk involved. These limits create a range of incentive effectiveness around the target cost.

- If the costs fall within the limits, they are shared by the contractor and the Government using the under-target or over-target sharing formula.
- If the costs go above the upper limit, the Government is responsible for contract costs and the contractor receives the minimum fee identified in the contract.
- If the costs fall below the lower limit, the Government is responsible for contract costs but the contractor's fee is limited to the maximum fee identified in the contract.

Cost-Plus-Award-Fee (CPAF) (FAR 16.305, 16.405-2, and DFARS 216.405-2). When the required contract level of effort is uncertain and it is neither feasible nor effective to devise predetermined incentive targets based on cost, technical, or schedule, consider the use of a CPAF contract if:

- The likelihood of meeting acquisition objectives can be enhanced by a flexible plan that awards fee after an evaluation of both performance and the conditions under which it was achieved; and

- The expected benefits justify the additional cost and effort required to monitor and evaluate performance.

The CPAF contract provides for a fee consisting of two parts:

- Base fee agreed to at the time of contract award; and
- Award fee that the contractor may earn in whole or in part during contract performance based on such criteria as quality, timelines, technical ingenuity, and cost effective management.

CPAF contracts MUST provide for fee evaluations at stated points during contract performance. The points may be at stated intervals (e.g., quarterly) or at stated milestones of contract performance (e.g., completion of a product design test).

The amount of award fee is judgmental determination made by the Government fee determining official (FDO) and is not subject to dispute under the contract Disputes clause. The U.S. Court of Appeals for the Federal Circuit found in 1997 that a Board of Contract Appeals may not reverse an FDO's discretionary decision on fee **unless the discretion employed in making the decision is abused** -- for example if the decision was arbitrary and capricious (US-CT-APP-FC, 41 CCF ¶ 77,043).

Cost-Plus-Fixed-Fee (CPFF) (FAR 16.306). When the work required to complete a contract is so uncertain (e.g., a development or maintenance contract) that establishment of predetermined targets and incentive sharing arrangements could result in a final fee out of line with the actual work performed, you should consider a cost-plus-fixed-fee contract.

This type of contract is designed chiefly for use in research or exploratory development or operation and maintenance types of contracts where the level of contractor effort CANNOT be accurately estimated. The Government agrees to reimburse the contractor for all allowable costs incurred during the performance of the contract up to the contract cost or funding limits. Moreover, the Government agrees to pay the contractor a fixed number of dollars above the cost as a fee for doing the work. Fee dollars are fixed at time of contract award and change only if the scope of work changes.

Contract Type Selection. The following table describes five acquisition situations and the appropriate contract type for each situation.

When ...	**Select a ...**
The offeror can accurately estimate cost.	Firm Fixed-Price Contract
Economic conditions that will likely affect cost significantly are outside of the offeror's control, but otherwise the offeror can accurately estimate cost.	Fixed-Price Economic Price Adjustment Contract
There are substantial cost uncertainties, but it should be possible to reasonably estimate maximum cost and effective contractor management should be able to assure that final costs will not exceed the estimated maximum cost.	Fixed-Price Incentive Firm Contract
The cost uncertainties are so great that any fixed-price contract would force the contractor to accept an unreasonable risk, but you can negotiate reasonable targets and formulas for sharing costs.	Cost-Plus-Incentive-Fee Contract
The contract level of effort is uncertain and it is NOT feasible or effective to negotiate an adjustment formula but the likelihood of meeting objectives can be enhanced by a clear subjective fee plan.	Cost-Plus-Award-Fee Contract
Cost uncertainty is so great that establishment of predetermined targets and incentive sharing arrangements could result in a final fee out of line with the actual work	Cost-Plus-Fixed-Fee Contract

Cost-Plus-Percentage-Cost (CPPC).

BEWARE! The CPPC contract is illegal in Government contracting. A CPPC contract can occur in any situation where the contractor is allowed to increase fee by increasing cost, thereby creating a negative cost control incentive. If the answers to the following four questions are yes, you have a CPPC contract.

- Will fee be paid based on a predetermined percentage fee rate instead of an identified dollar value?
- Will the predetermined percentage fee rate be applied to actual future performance costs?
- Is the contractor's fee entitlement uncertain at the time of contract pricing?
- Will the contractor's fee entitlement increase as performance costs increase?

5.3.4 Using Clear Technical Requirements To Mitigate Risk

Requirements and Risk. You can influence the inherent risk of a project by using clear contract technical requirements. If the requirements are actually impossible to perform, conflict, or are open to interpretation, the Government and the contractor are at risk of unacceptable or substandard contract performance.

Government and contractor technical personnel must understand, however, that if any technical problems are identified, they MUST be brought to the attention of the contracting officer **immediately**. The longer the problems exist without resolution, the greater the risk to both the Government and the contractor. Costly legal actions can result from defective technical requirements.

Impossible Requirements. The writer of the contract requirements is responsible for their accuracy. If technical requirements are impossible to meet (e.g., a set of drawings has mistakes that make the product impossible to build), the writer of the requirements is the responsible party and liable for any related additional costs. Since the Government writes contract requirements, the Government is liable for reasonable additional costs related to those requirements.

Conflicting Areas Within Requirements. Contract technical requirements do NOT have to be written so poorly that they are impossible to perform for them to have a detrimental effect on contract performance. If requirements conflict with each other, changes and rework can cause costly delays. Again, the Government, as writer of the contract requirements, is responsible and liable for reasonable additional costs.

Requirement Ambiguity. Make sure the contract requirements are written as clearly as possible. Ambiguities can lead to misinterpretation. The Government will be held liable, as writer of the contract, for any ambiguity resulting in additional costs.

5.3.5 Using Government Furnished Property To Mitigate Risk

Government Furnished Property and Risk. Government furnished property (GFP) is one way you can reduce the risk to the contractor and thus make a contract more attractive. GFP, including Government-owned equipment, facilities, and materials, provided to the contractor can lower contract costs by shifting investment risk from the contractor to the Government.

Risks Assumed with GFP. By providing GFP to the contractor, the Government accepts risk in one of several ways:

- **Investment Risk.** GFP will shift the risk of NOT recouping the initial capital expense for the property to the Government.
- **Property Loss Risk:** If the property might be destroyed or be a hazard during or after contract performance (e.g. high explosives or rocket fuel production), the Government assumes the risk of property loss.
- **Market Risk.** The Government may reduce the risk to the contractor on production materials by providing them as GFP. Using its buying power, the Government may be able to purchase materials at lower prices than are available to the individual contractor and less risk of changes in market prices (e.g., special purpose fuels that are often supplied to contractors).

Positive Effects of GFP. GFP has positive effects for the contractor and for the Government:

- The **contractor** avoids risky investment, high liability costs, and the need to include contingencies in its proposal.
- The **Government** has lower cost on the current contract and reduced risk on future contracts, because the Government has the option of moving the GFP from one contractor to another, thus avoiding a high-cost, sole-source situation.

Negative Effects. The largest negative effect of using GFP is the large amount of administrative effort required on the part of both the Government and the contractor to track, maintain, and dispose of GFP. Large companies have entire departments dedicated to property administration. Smaller firms can easily be overwhelmed by the administrative burden.

If GFP is not properly administered, it could be lost or used inappropriately on non-Government work allowing a contractor a competitive advantage over other competitors at Government expense.\

5.3.6 Using Contract Terms and Conditions To Mitigate Risk

Contract Terms and Conditions and Risk. Contract terms and conditions can provide an avenue for tailoring requirements to specific contract cost risk concerns. Consider the needs of the Government, commercial practice, the capabilities of the offerors, and elements of risk identified in the offeror(s) proposal. It may be possible to reduce contractor risk and contract cost while still meeting the needs of the Government. The following are examples of how contract terms may be used to reduce cost risk:

Example 1: When a contract specifically requires the contractor to obtain a portion of contract performance from firms in other nations, accepting defined risks associated with that requirement can substantially reduce contractor cost risk (e.g., currency fluctuation risk or performance risk associated with international production).

Example 2: Allowing variations in delivery schedules can reduce contract cost risk by allowing for optimal production and shipping schedules.

Example 3: Obligating the Government to provide existing Government data can eliminate the cost and risk associated with the contractor obtaining the data from other sources.

Example 4: Permitting variations in delivery quantities can reduce risk by allowing for standard lot shipments and the elimination of excessive administrative work related to insignificant shipment shortages or overages.

Example 5: Unusual contract financing in lieu of customary contract financing can reduce contractor cost risk on a long-term contract requiring significant capital investment.