

Organizing for Project Success

Special Publication 12-2

February 1991



Construction Industry Institute



Documents

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CII was founded in 1983 to improve the cost effectiveness of the nation's largest industry. The members, who represent a broad cross-section of owners and contractors, believe that many of the problems that limit cost effectiveness are common ones, and that real improvements can be best accomplished in a cooperative environment with the benefits being shared by the construction industry at large.

CII uses the acronym TOPICS to describe the research effort. TOPICS signifies the six research thrust areas: Technology, Organization, People, Information, Controls and Sigma (meaning others). The task forces for each area are listed below.

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Computer Integrated Design & Construction
Constructability
Electronic Data Management
EPC Flexibility
Modularization
Technology

Organization

Constructability Implementation
Partnering
Project Organization
Project Team Building
Project Team Risk/Reward Allocation

People

Construction Work Force
Education and Training
Employee Effectiveness
Safety
Zero Accidents

Information

CICE Impact Evaluation
Industry Data & Statistics
International Construction
Model Plant
Owner Engineering Organization
Project Management Assessment Survey

Controls

ASCE Quality Manual
Change Order Impacts
Claims
Contracts
Contracts, Phase II
Cost/Schedule Controls
Design
Materials Management
Overtime
Overtime, Phase II
Productivity Measurement
Quality Management
Quality Performance Measurement
Total Quality Management

Sigma

Construction 2000
Insurance
Retrofit Projects
U.S. Navy Demonstration Project

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Construction Industry Institute*

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Man's long-time dream of traveling to the moon became history on July 20, 1969, when astronaut Neil Armstrong of the United States took "one small step for man, and one giant leap for mankind." Few human endeavors could rival this accomplishment, and few humans fully understand the massive planning, task execution, coordination, and teamwork required to make such a journey possible. It is an historical testimony to the principle of channeling the efforts of a large number of people toward the accomplishment of a single goal—a feat that could not have been realized by any other method.

Construction projects rarely have historical significance, yet must be planned, organized, and executed by teams of people dedicated to the accomplishment of a complex task, just as in the case of a space exploration project.

The working environment and culture of a construction project is unique when compared to most work conditions. Groups of people, normally from several parent organizations, are assigned to a project or hired to contribute their services and assist in the construction of a facility. Due to the relatively short life of a construction project, loyalties are usually with the parent companies, and the construction project is not viewed as a career, but as a career step.

Even a modest-sized construction project involves a tremendous number of people. Organizing their efforts would be complex, even if they all worked for the same parent corporation. The division of effort and methods of coordination change as the project moves through distinct phases. Sources of information, location, timing, and problem complexity change as people enter the project, perform their assigned duties, and depart. Reorganizing is a continuous process that attempts to balance conflicting values and requirements.

The heart of the matter is the basic problem of managing people such that they work together efficiently to accomplish the goal. This requires enlistment of skilled people who are willing to sacrifice short-term gratification for the long-term satisfaction of achieving a larger goal.

This CII publication addresses methods, guidelines, and considerations necessary for successful project organization, key member roles and selection, and the elusive art of effective teamwork. No two construction projects are the same; there is no substitute for common sense and flexibility in the administration and application of these methods and guidelines.

Reading this document, a common thread of thought will be noticeable: the key to successful organization architecture is selection of properly skilled people. These individuals possess the ability to recognize the degree of uncertainty, at any point in the execution of the project, and manage the efforts of others to achieve clearly defined objectives that result in successful completion of the final product.

Concept of Organization

When an owner undertakes a construction project, what is being bought is really the efforts of a team in addition to a completed facility or “product.” All but the simplest projects involve the efforts of a diverse group of people who work together to serve the needs of a project, yet who also work apart in the service of different corporations.

Improving the ability of groups of people to work together requires a shift in thinking at all levels. Developing a project should be viewed as managing a complex decision-making process, rather than merely preparing a series of products. This requires focusing on the commercial contract between parties and the roles of people within work groups. These working groups are teams that work together to accomplish more than they would if they worked separately. The use of teams is central to the construction project approach because a team is where the decision-making process begins.

While planning construction, organizations use a combination of planning and immediate problem-solving techniques. The team created to tackle a problem should be composed of individuals whose history and skills are matched with the tasks at hand. This team should be constructed so that the skills of its individual team members are combined to best serve the overall purpose of the team.

The lines and boxes of an organization chart depict the concept of division of work and the relationship of the worker to formal authority. Organization can be defined as the sum of the ways labor is divided into distinct tasks (the boxes) and coordination required among the tasks (the lines). The people assigned to the organization, with all their history and skills, and the task before them determine the structure of the organization.

The nature, or structure, of the organization

depends on the task the organization is to perform. It has been said, “Uncertainty appears to be the fundamental problem for complex organizations. Coping with uncertainty is the essence of the administrative process.” Uncertainty arises both within the personal relationships inherent to the organization as well as the task environment. Organizations cope with uncertainty by a combination of planning and immediate problem solving.

Organizational Exchanges

Exchanges are an essential activity in the internal dynamics of an organization. An example of an exchange is the contract, which is designed to protect organizations, constantly at risk, as they function in a highly competitive business environment. The concept of exchanges is integral to the way organizations do business.

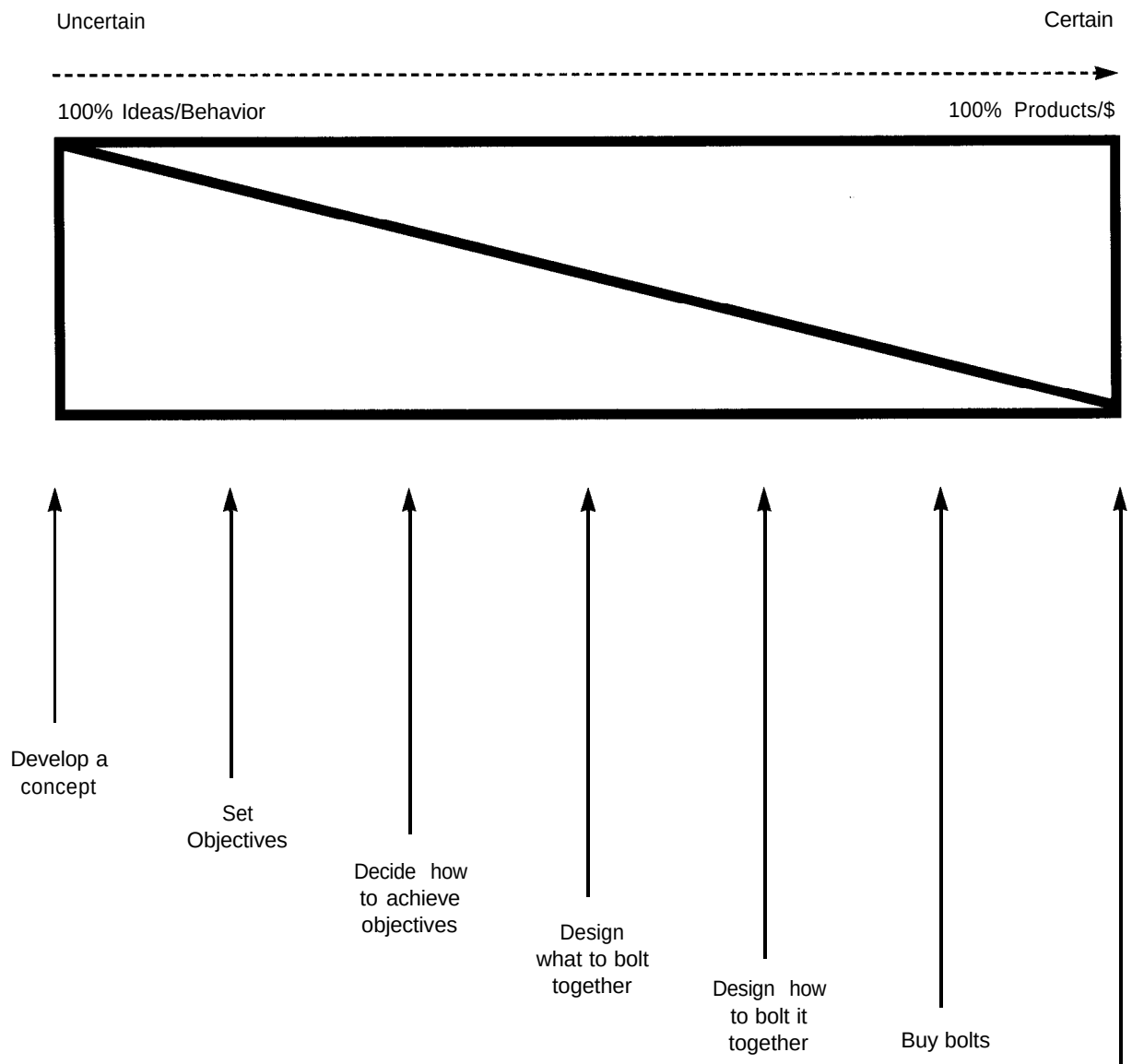
Just as commercial contracts involve exchanges between large corporations, and similarly small private contracts establish formal rules for exchange of products or services between contracting parties, exchanges occur among team members performing the work.

The concept of exchange includes the behavior and relationships of team members. For example, someone must stop to answer the questions of a co-worker—such an exchange costs time, but the team gains because work can proceed. In the same way, if a team member has an original, creative idea, he or she may lose individual recognition once the idea is implemented by the team.

As a project moves from an uncertain concept to a determined reality, as illustrated in Figure 1, the mix of behavior and product exchanges varies, evolving from behavioral exchanges during conception and development to product-related exchanges during actual construction. The nature and composition of

the team and the rules governing its behavior usually change as a project advances through developmental stages, during which initial uncertainties are resolved and the project becomes increasingly more well defined.

Figure 1 Phases of Certainty



Concept of Teams

A team may be defined as a group of people who, by working together, accomplish more than if they worked separately. A team is more than a group but less than a community. A group is a number of people who come together in the same place at the same time. A group, however, is not trying to work together to accomplish anything. A community is a group of people with close personal relationships who care about each other's well-being. The community, however, is not necessarily trying to accomplish anything more than maintaining itself.

A team is more than a group because individuals are cooperating in order to accomplish a goal. A team, however, is less than a community because its members do not necessarily have close, personal relationships. Team members should trust and respect other team members, but friendship is not necessary for effective teamwork. Teams function effectively on the basis of professional relationships. A team can be a democracy or a dictatorship; its members may have volunteered or may have been assigned. Once a person becomes a member of a team, however, the definition above applies.

Robert Keidel, in his book ***Game Plans: Sports Strategies for Business***, discusses organization types by using an analogy of spectator sports—baseball, football, and basketball.

Baseball is a simple game with few rules; the players are independent, with little interaction compared to other sports. The skill and performance of the individual players are the most important considerations for success. Individual performance is monitored by many statistics. A sales organization is the best analogy to a baseball team. The rules are simple: Sell! The sales people work independently, and the success of the organization is determined by the cumulative success of all the individual

salespersons, who are often paid according to the ratio of sales to quota.

Football, however, is a complex game with many rules. Teamwork and individual team members focusing their skills to perform as a unit on each play are the basic ingredients of success. The game plan, which gives hierarchical direction and specifies systematic teamwork, is important. Most industrial organizations are analogous to a football team; they are functional organizations, driven by a business plan, and require continuous interaction and communication between individuals and departments.

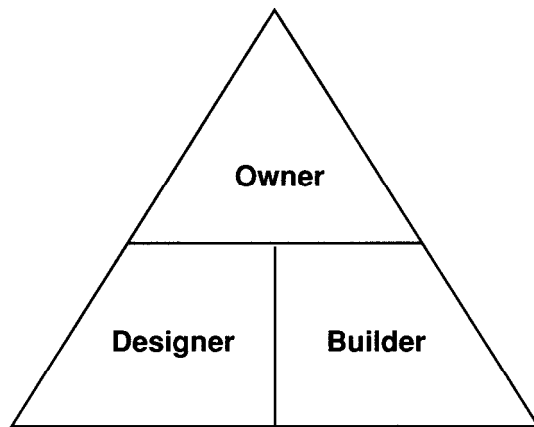
Basketball, in our organization analogy, lies somewhere between baseball and football. It is played in a continuously changing situation, and player-coordinated, spontaneous teamwork is the most important feature for success. The family restaurant, in which every family member cooks, serves, washes dishes, and acts as cashier, is an example. Other examples are university staffs and multi-disciplined consulting firms. High technology companies fit this category and are dependent on teams, working independently, to develop products and processes for marketing by the larger entity. These development teams come and go as opportunities arise and needs are satisfied.

Types of Project Teams

Acknowledging that construction contracting is a team process, not the transfer of finished goods, poses the question, "What kind of team?" Figure 2 illustrates the simplest explanation, where the project team is viewed as elements from each contracting party assigned to the project to produce the desired facility. This is a "baseball" concept and implies that project success is achieved by each party fulfilling its assigned contractual responsibilities. There is some interplay between the parties, as specified

in the respective contracts. The most important consideration is the ability of each player to perform well.

Figure 2 Project Team Elements



This concept views teamwork as contract administration, or the management of the relationship between the contracting parties. It recognizes that these parties are usually hypothetical legal entities, and it attempts to solve the associated problems. The concept acknowledges that real people are involved; personal relationships are defined in terms of accepted social behavior, such as ethics, honest communication, and professional competence.

Research indicates that the “baseball” concept is the traditional approach in the construction industry. Company manuals address relationships between individuals and specify how each company’s team will deliver contractually required intermediate products to the other company’s team. Intercompany, or joint, teams are not part of this concept and usually are not addressed in either the contract structure or procedure manuals.

The “baseball” concept is not wrong, but it is insufficient for large, complex construction projects. It may be adequate for special,

uncomplicated projects, with little schedule pressure, where detail design is complete before construction begins and no changes are required. Most construction projects, however, do not fall into this category.

The “football” concept is a better fit for the construction process. It is driven by planning and includes many diverse relationships. The hierarchy of teams (although they may not be formally designated this way) on a construction project shown in Figure 3 is described briefly in the text which follows, and in greater detail later in this chapter.

Investment Management Team. After a positive investment decision, an Investment Management Team is formed in the owner’s organization to provide overall control of the new venture. The major functions, such as marketing, engineering, finance, and manufacturing, are usually represented. A Project Executive usually leads the team and reports to the head of the business unit which made the new investment.

Project Management Team. The Project Management Team is composed of responsible managers from each of the contracting parties. Their mission is to accomplish the work, including coordinating the engineering, procurement, construction, and startup phases. The Owner’s Project Manager leads this team and also is a member of the Investment Management Team.

Contractor Management Teams. Reporting to each of the Contractor Project Managers are the Work Managers, who together comprise the Contractor Management Teams assigned to the project by each of the contracting parties to fulfill the requirements of their contracts. Each Contractor Project Manager reports to both the Owner’s Project Manager for contractual matters, and to the Project Sponsor in the parent organization for business matters.

Work Managers. The Work Managers are

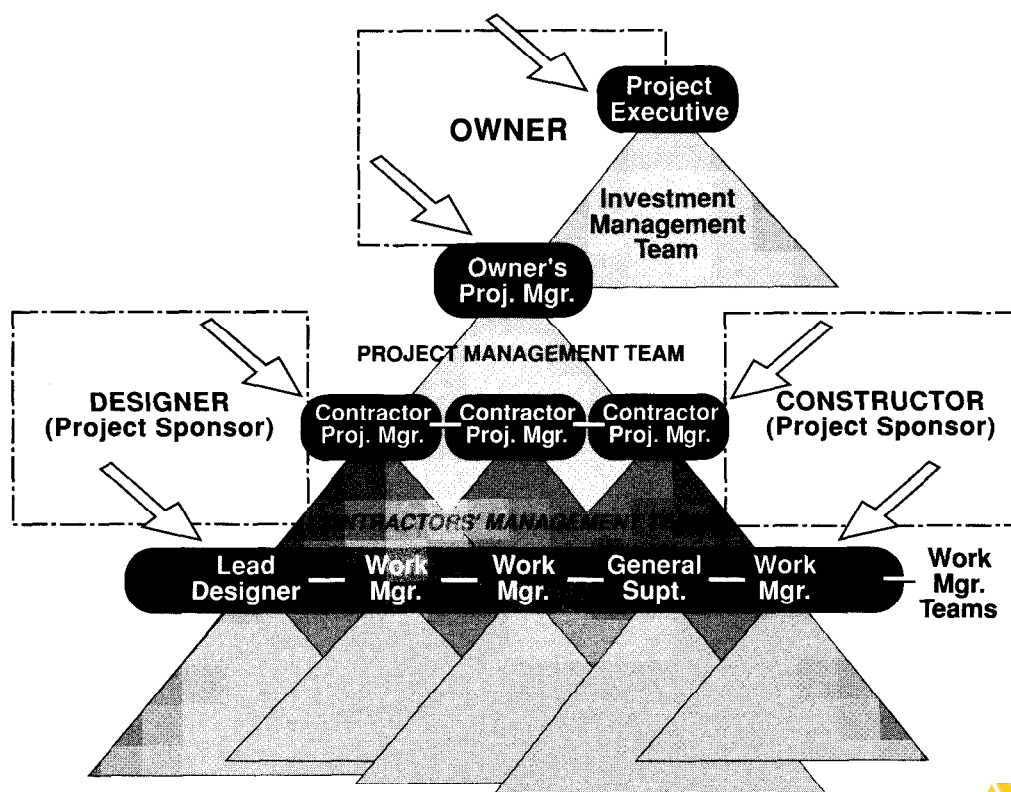
the design leaders and supervisors who lead the teams actually accomplishing the work. They are directly responsible for the part of the contract assigned to them by their Contractor Project Manager, in accordance with the business practices of the parent organization. They must also communicate and coordinate their efforts with Work Managers from the other business units. Usually, this communication does not flow vertically through the chain of command, but instead flows horizontally between people actually involved in the work.

Work Manager Teams. Communication at the working level is not just a network. Instead, teams of individuals from the various business units are united to accomplish specific tasks. For example, the lead designer for a structure,

the steel fabricator, and the general superintendent have to understand each other and also work together if the steel is to be erected correctly and on time. Ideally, the basic elements of the Work Manager Teams should be in place during definition and planning, thus giving a voice to those who implement final project responsibility in determining their future. An example is the constructability analysis addressed by other CII publications.

This hierarchy of teams is similar to a professional football organization. The Construction Owner is similar to the owner of a football team who contracts for the required resources. The Project Management Team is the coaching staff which forms the game plan. The Owner's Project Manager is the head

Figure 3 Project Teams



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coach. The Work Managers and their teams are the running backs, wide receivers, interior linemen, linebackers, and other players who actually participate in the game.

Professional football organizations also incorporate flexibility into their teams. "Run to daylight" and improvisation on broken plays are intentional parts of their strategy. According to the analogy used here, some basketball is played in the middle of the football field. Similarly on successful projects, the Work Managers, who are the players, form Work Management Teams to adjust their efforts across business unit boundaries.

Teams, Leaders and Decisions

Construction is driven by a planning process. Increasingly detailed decisions are required when moving through the hierarchy of teams. Decisions at one level become action items for the next team. To facilitate the delegation process, the leader of each team, except for the Project Executive, is a member of the next higher team. Table 1 is an illustration of this leader/team ladder with a listing of the major decisions made by each team. Two kinds of decisions are to be made. The first is planning decisions-what will be built and how is it to be constructed? Secondly, process decisions are required to determine how each team will conduct business. These process decisions form part of the code of conduct, which is described in Chapter 6.

During the definition and planning phase, the needs of the owner must be determined. Someone must organize the owner's team and establish a clear direction for the project. The key to success is a strong Project Executive, who has the power and authority to make decisions of impact. This function is necessary because the Owner's Project Manager may have insufficient influence to resolve disagree-

ments, which occur due to conflicting objectives of the marketing, manufacturing, finance, and engineering functions.

A formal Investment Management Team should be formed from elements of the owner's organization to define project objectives, establish priorities, and approve the work of contractor teams. This team is led by the Project Executive and includes representatives from marketing, engineering, finance, procurement, the Owner's Project Manager, and the user, such as the manufacturer. This group oversees the project, reviews and approves vast amounts of information, establishes policy, solves problems, makes decisions, coordinates, and communicates. This team function is vital to project performance.

Generally, the Project Executive resolves conflicts within the owner's organization. It is essential that this position has sufficient authority, either formal or informal, to make necessary decisions which will allow the Owner's Project Manager to implement an action plan. The Project Executive should be the ultimate contractual authority. If not, there must be an established, rapid board or committee authorization process that the Project Executive can use to resolve conflicts and force decisions.

Approvals are a special consideration for the Investment Management Team, since these are their tools to control the project organization. This applies to planning documents, contractual commitments, progress payments, and final acceptance. A rapid process must be established to gain approvals within the owner's organization. Approvals should be natural control points during the life of the project; they must not become lengthy processes which delay project progress. The Project Executive should set the tone for open, candid communications and timely action.

Table 1 Project Teams, Leaders and Decisions

Teams & Leaders		Decision Responsibilities	
		Planning	Process
Investment Mgt.	Project Executive	Project Objectives	Approvals
Project Mgt.	Owner's Proj. Mgr.	Project Strategy Roles & Responsibilities	Changes Problem Solving
Contractors Mgt.	Contractor Proj. Mgrs.	Information Systems	
Work Mgr.	Lead Designer General Supt.	(Company Requirements)	(Company Requirements)
		Constructability Analysis	Technical Resolutions
	Work Mgrs.	Construction Schedule	Submittals
Work		Work Plans	
		Operations Schedules	

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An Owner's Project Manager (OPM) is the member of the Investment Management Team responsible for the management of the design, procurement, and construction activities; this is probably the most important management function of the project. The OPM may have limited resources under direct control because the work has been contracted to various business units. Still, the OPM is responsible for the accomplishment of this work.

Most owners recognize the need for an OPM, but may not realize the importance of the position. As a pure management position, the OPM is responsible for getting the work accomplished through other people. The OPM should be the agent of the owner, authorized to act on behalf of the owner. The OPM does not have to be the ultimate contract authority, but must be authorized to represent the owner's interest, within the bounds of the established contracts.

The Owner's Project Manager should be an experienced construction professional. Manufacturing supervisors and facilities managers may not be familiar with the construction process. If the owner does not have such a staff person, one should be acquired for the project.

The Project Management Team, a joint team of the Contractor's Project Managers, is led by the Owner's Project Manager. The primary task of this team is to plan the project, subject to the approval of the Project Executive. This team also develops the project strategy, with the resulting project schedule, and specifies the information system required. Their relationship is defined by the roles and responsibilities defined in the contracts between the parties.

Actual management of the design, procurement, and construction activities is pursued by a network of individual managers. As each business unit is hired to deliver an end product, its responsible manager becomes part of this network. This management team of individu-

als, from different business units, must communicate and work together to coordinate the efforts of the various entities. Each manager must accomplish the work in the contract, plus coordinate with other managers to control the flow of work through each phase of the project.

The Project Management Team must define its rules and personal commitments. The two most important areas are problem solving and changes. These require a joint effort and mutual cooperation, despite inherent conflicts between specific company and overall project concerns. Each party must provide objective input. The individuals involved in changes should mutually decide how they will manage problems and changes, from inception to settlement. It is important that discussion and mutual understanding be a part of this process.

The Contractor Teams are company teams from the contracting entities, who are led by the respective Project Managers. Functional units within the teams are led by Work Managers, who are supervisors or design leaders. These teams not only accomplish the main-line activities of design, procurement, installation, and startup, but also staff functions, such as accounting, scheduling, cost control, and office services.

Delegation is the heart of a Contractor Team; it requires the responsible manager to take four steps:

- Establish requirements
- Make assignments
- Monitor results
- Give feedback

The last of these is the most important. Feedback is necessary, not only to adjust individual performance, but to revise the original requirements, which may have been improperly stated.