- Samples of various products, such as those listed below:
 - Flooring
 - Wall treatments
 - Ceiling treatments
- Daily logs
- Food service equipment shop drawings
- Elevator equipment cut sheets
- Elevator shop drawings
- Specialty item cut sheets
- Special equipment cut sheets
- Warranties
- Operation and maintenance manuals
- Performance and payment bonds

Many of the submittals require review and sometimes approval of the owner or architect/engineer before an order can be placed for certain products. Thus, if the submission, review, and approval process is not timely, the project schedule may be compromised. This issue is of concern on almost all projects. As such, the contractor must keep and maintain excellent records with regards to submittals.

Recordkeeping for submittals is a tedious, complex, and cumbersome process. However, it should not be taken lightly. One method of maintaining accurate records for submittals is to assign revision number zero to the original submittal.

As each submittal is revised, the revision number would also change. This simple procedure allows project personnel to know the status of a submittal in its history.

One method of submittal recordkeeping is to establish and maintain a submittal log. A sample submittal log is included at the end of this section.

The initial work in preparing a submittal log entails the project manager performing a detailed page-by-page search of the project documents (contract, terms and conditions, specification, drawings, etc.) to find each item which must be submitted. These submittals should be categorized as "For Information Only," "For Review Only," "For Review and Approval," and "For Close-out Only."

The next step involves preparing the submittal log from the information obtained in the discovery phase, as shown in Fig. 8.2.

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As items are submitted, returned, and resubmitted, if required, the project manager must update the log. If the submittal process adversely affects the project schedule, the project manager must keep his options open by performing the following tasks.

- Provide the owner with a written notice within the requirements of the 0 contract.
- Update the schedule to show the impact of the submittal process. 0
- Transmit a copy of the revised schedule to the owner. .

In summary, the submittal process is one of the functions for which the project manager is responsible and, at some point, accountable. The submittal log is a double-edged sword. It indicates both the contractor's and the owner's timeliness in submitting, reviewing, and processing key elements of project data.

Project: Public School No. 1 Date: 12/16/93 Revision No.: 4

Figure 8.2 Submittal Log

	Contract		Revision		Latest Dates			
Submittal Title	Reference	Responsible Party	No.	Date Received	Sent	Returned	Date Forward	Status
CPM Schedule	G.C.	General Contractor	2	N/A	11/13/93			Information
Submittal Schedule	G.C.	General Contractor	3	N/A	11/13/09			Information
Safety Manual	G.C.	General Contractor	0	N/A	9/1/93			Information
Rebar Shop Drawings	3200	Rebar Subcontractor	0	9/10/93	9/12/93	9/17/93	9/17/93	Approved
Concrete Mix Designs	3300	Concrete Supplier	0	9/2/93	9/4/93	9/17/93	9/17/93	Approved
Brux Sample	4200	Masonry Subcontractor	2	10/4/93	10/5/93	10/17/93	10/17/93	Rejected
Structural Steel Shop Drawings	5100	Structural Steel Supplier	1	10/3/93	10/5/93	10/21/93	10/22/93	Resubmit
Cabinet Shop Drawings	6400	Cabinet Supplier	0	11/16/93	11/18/93			Review
Plumbing Fixture Cut Sheets	15100	Plumbing Subcontractor	0	11/17/93	11/18/93			Review
Boiler Cut Sheet	15200	Plumbing Subcontractor	0	11/17/93	11/18/93	12/3/93	12/3/93	Approved

REQUESTS FOR INFORMATION/CLARIFICATION

As a project flows from initiation towards culmination, the design intent becomes more visible. Additionally, during the design phase of the project, it is practically impossible for the architect and engineers to foresee every situation that might arise during construction. Also, theoretical field and design conditions do not always coincide with actual conditions discovered as the project proceeds. There are also questions raised during construction which deal with differences of interpretation.

As a result of the many questions raised and clarifications required the contractor must have a process in place to systematically transmit the questions to the architect and track the response time and change orders or claims resulting from the response. The industry standard for this is to use a Request for Information (RFI) form for submitting the request and an RFI Log for tracking the response time, etc.

The project manager has the responsibility for the RFI process. Outstanding RFIs should be an agenda item during the weekly project meeting with the architect/engineer. RFIs may be in either letter or special document format. The project manager should use a numbering system for whichever format is chosen.

Samples of an RFI Log are shown in Fig. 8.3.

Many claims consultants and attorneys use the RFI log as a tool of great significance in proving delay type claims.

Some owners have already (and others will surely follow suit) incorporated clauses in the contract to reduce the number of RFIs submitted by placing a "fine" on frivolous RFIs. A frivolous RFI is defined as an RFI for which the answer is simply a reference to the plans or specifications with no additional input required to clarify the question. A public agency in California charges contractors \$250 for each frivolous RFI.

Figure 8.3 Request For Information Log

Project: ______
Date: _____

Revision No.

RFI NO.	RFI SUBJECT	DATE SUBMITTED	DATE RETURNED	CHANGE ORDER REQUIRED?

JOB SITE SAFETY

Construction businesses generally devote a great deal of effort into marketing, bidding, scheduling, quality control, cost control, and project management. Safety is normally considered a regulatory requirement that involves spending rather than making money.

The National Safety Council published statistics in 1986 that indicated from 1960 to 1983 the construction industry accounted for more than twice as many disabling injuries and over three and one-half times the accidental deaths of all industries combined.

Accidents cost the construction industry billions of dollars annually. A study conducted by Stanford University and released by the Business Round Table in 1982 estimated that the direct and indirect costs of construction were almost \$9 billion (1979 dollars) annually.

Not only does an employer have a legal and moral responsibility to provide a safe working environment, but construction companies should be aware that treating safety as a profit center may reap unbelievable rewards. In the 1990 <u>Engineering News-Record</u> article, "Job site Dangers Defy Worker Protection Drive," Korman reported that a subcontractor was able to reduce its workers' compensation claims from \$800,000 to \$56,000 per year. Another contractor, who had no formal safety program, paid workers' compensation claims of \$500,000 in 1986 after working 600,000 man-hours. In 1987 that contractor hired a safety director and implemented a formal safety program. In 1987 claims were reduced to \$300,000 for 700,000 man-hours worked. In 1988 claims were further reduced to \$115,000 for 600,000 man-hours. In 1989, more reductions were forthcoming with claims less than \$50,000 after 600,000 man-hours.

The keys to improving construction site safety appear to be the following:

- Treat safety as a profit center.
- Establish a formal safety program with input from employees.
- Provide safety training to all employees.
- Stress top management's commitment to safety.

The general contractor must have a written safety program in order to demonstrate management's full commitment to safety. The safety program should address the following:

- Roles and responsibilities with respect to safety for certain individuals listed below:
 - Company safety officer

- Project manager
- Project superintendent
- Operating manager
- General manager
- General superintendent
- Emergency telephone numbers and pager numbers for the following:
 - Police
 - Fire department
 - Hospitals
 - Project manager
 - Owner
 - Project superintendent
 - OSHA
 - Subcontractor management personnel
 - Emergency medical services
 - Utility Companies
- Listing of displays required by state or federal law including the following:
 - Labor standards
 - Safety and health protection on the job
 - Permits
 - Emergency telephone numbers
 - Emergency medical services
- Location of first aid kits on the job site.
- Location of fire protection devices on the job site.
- Description and posting requirements s for signs (i.e., "Hard Hat Area," "Danger," "Caution," "Overhead Electrical Lines," etc.).
- Subcontractor or vendor safety program policies.

- Procedure for excavating near underground utilities.
- Procedure for accident investigations.
- Procedure for handling a job site fire.
- Policy for material safety data sheets (MSDS).
- Procedure for accident reporting and recordkeeping.
- Policy for inspecting the job site for unsafe physical conditions or work practices.
- Housekeeping program.
- Policy for weekly "tailgate" safety meetings

It is the responsibility of the project superintendent to see that the workplace is hazard free and that crew members and subcontractors follow correct safe working habits including wearing of proper protective equipment.

Examples of safety needs to be considered are listed below:

- Covering of vertical rebar ends on which one can fall.
- Installation of a construction passenger elevator for building 60 ft or more in height or 48 ft in depth below ground level.
- Temporary stairs or ladders for building access and exit. If a building or structure is more than three stories or 36 ft, two or more stairways are required.
- Construction areas need be lighted to at least minimum illumination intensities as required by statutes.
- Temporary railings on all open sides of ramps, surfaces, wall openings, floors, or other elevations 7-1/2 ft or more above the ground, floor, or level underneath.
- Elevator shafts that are not enclosed with solid partitions and doors shall be guarded on all open sides by standard railings and toeboards.
- Floor and roof openings through which a worker could fall need to be covered or barricaded.
- Wall openings, from which there is a drop of more than four feet and the bottom of the opening is less than three feet above the working surface need to be guarded.
- Excavations where the bank is 20 ft high or more and the slope is greater than 3/4 horizontal to 1 vertical and when there is

work performed within 10 ft of the edge need be fenced or otherwise guarded.

- A fire protection program for all phases of construction needs to be developed; specific provisions need to be included for portable fire fighting equipment, fixed equipment (including standpipes), and storage of flammable liquids.
- Combustible debris shall be removed promptly during the course of construction. All waste shall be disposed of at intervals determined by the rate of the accumulation and the capacity of the job site container.
- Inspecting all electric and pneumatic tools.
- Maintaining a housekeeping program for the project that is honored by all job site personnel.
- Inspecting stacked materials to ensure that there is no danger of a stack falling over.

JOB SITE HOUSEKEEPING

The benefits of good housekeeping are listed below:

- Saves time and increases construction efficiency.
- Prevents or minimizes construction fires.
- Prevents worker injuries.
- Prevents waste and damage to materials and equipment.
- Provides more room in which to work.
- Improves the quality and quantity of work.
- Eliminates unnecessary delays to other trades.

COST CONTROL

A primary responsibility of the project manager is to assume the role of cost engineer. In this role the project manager performs the following functions:

- Review and approve all invoices applicable to the project.
- Set up the project budget.
- Track the actual costs and compare against budgets.
- Prepare a monthly status report indicating the estimated final cost of the project as compared to original or revised (due to change orders) budgets.

The initial step in preparing a project budget is to convert the estimate worksheet prepared by the estimator into a bid analysis and recap worksheet (see Fig 8.4). Theoretically the total project budget should equal the contract amount with change orders factored into the equation.

After a contract is awarded, the project manager should review the project documents to make an initial list of the individual components (both direct and indirect) that compose the project scope. This list should be converted to a single line spreadsheet (preferably computerized) called the budget worksheet. The costs shown on the bid analysis and recap worksheet should be transferred to the budget worksheet (see Fig. 8.5). For each breakdown item the budgeted costs should be further defined into the following categories:

- Labor: Budget for in house labor to perform the task.
- Material: Budget for items which are buy out and a purchase order is written.
- Subcontract: Budget for work activity which is to be subcontracted.
- Equipment: Budget for equipment associated with an activity, including purchased outright, rented or internally company charged.
- Other Expense: Budget for materials, supplies, expenses and miscellaneous costs associated with an activity which are typically not handled with a purchase order.

Additionally, codes should be established for each cost which the project manager wishes to track. The industry standard is to use a customized form of the Construction Specification Institute numbering system.

For the budget worksheet, each component of the work which is either to be supplied or installed by a separate entity should be shown as a different line item. For example, wood doors might have three separate line items as indicated below.

- Wood doors/material: Line item budget for the wood door supplier.
- Wood doors/labor: Line item budget for either a wood door hanging contractor or for the contractor's own work force.
- Wood doors/other expense: Line item budget to cover buy out items needed to install the wood doors such as hinge templates, carpenter's chisels, shims, etc.

Next, the project manager should review, evaluate and categorize all the bids that were received on bid day. The project manager must select the subcontractors and material suppliers to be used for the project during this evaluation phase.