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Organizing the Project— Before and During Construction

Organization and planning are two of the most important tasks facing the project superintendent. In today's fast-paced projects, rapid communication is a fact of life, and without organization, the nearly instantaneous response that all parties to the construction contract seem to require, will only add to an already hectic day on the job.

Before construction actually begins, the superintendent will need to review all the contract documents to begin to understand what is required by the owner, the architect and engineers, the general contractor, and the subcontractors.

The plans and specifications need to be scrutinized for completeness, and the contract reviewed with the owner to determine if project-specific requirements have been added. Are there a number of allowance items that will require further information from the owner in order to start the work? Are there several alternates which require a response from the owner as to whether they will be accepted, and whether these decisions are to be made in a timely fashion?

Does the contract contain *unit prices* to be applied to certain items of *contract* or *extra* work, and do the appropriate subcontract agreements contain these same unit price requirements (hopefully, less the general contractor's overhead and profit)? Proper administration of the contract with the owner depends upon answers to these and other such questions, and these issues should be brought to light and resolved prior to the start of construction.

The Preproject Handoff Meeting

Between the time that the estimate has been assembled and revised and the contract award, any number of changes to the bid documents may have taken place. Quite often in a competitive bid situation, the owner will select a contractor and

begin to negotiate both scope of work and contract sum. These sessions often end up with changes in scope and price, both minor and major, taking place, and hopefully these modifications will be documented when the contract for construction is executed.

There are other occasions when concessions are made by the estimating department in the heat of assembling a bid and these “concessions” are not documented. Promises may have been made to select a certain subcontractor or vendor in return for a favorable quote. Assurance may be given that a substitute product or piece of equipment will be strongly considered in return for a vendor or subcontractor offering a value engineering option at reduced cost in the quote. The estimating department may have inadvertently omitted a cost item or included a suspiciously low bid in the estimate in order to be competitive. The boss may have relented on some terms and conditions in order to obtain a contract with the owner. Unless all these conditions are brought to light early in the project, disagreements will occur as subcontract awards are made or purchase orders for materials are issued.

Some contractors hold a *preconstruction handoff meeting* attended by all parties having a hand in the preparation of the project’s bid or contract. The vice president who negotiated the job will attend along with the estimator who prepared the initial bid as well as the future key players in the construction process—the project manager and the project superintendent. This handoff meeting will fill in some of the blanks not evident in the construction contract or the plans and specifications. Each attendee will contribute his or her knowledge of modifications to the contract documents, inadequacies in the estimate, any tips picked up during the bidding process, and any deals made with the owner, subcontractor, or vendors that would not be apparent by reviewing the project documentation. This handoff meeting is usually documented either by notes prepared by one of the attendees, usually the project manager, or by the use of a preprinted form to ensure that all pertinent topics are covered. Figures 4-1 through 4-3 are examples of a preproject handoff meeting form. Figure 4-1 reflects information gleaned by discussing the project with the estimating department and the boss (in this case the division manager or partner). Figure 4-2, the PM/superintendent review, will cover issues to be addressed at the architect’s or owner’s meeting. Figure 4-3 contains a checklist of responsibilities to be shared between the project manager and superintendent.

These forms, when completed, will become part of the project’s basic files, to be referred to at some later date if appropriate questions arise.

Organizing the Job in the Office

The project manager has a responsibility to organize the project files in the office and to note any particularly important documents that should be sent to the field. Any, and all, significant or unusual modifications to the standard contract form must also be passed on to the project superintendent.

PREPROJECT HANDOFF MEETING

Date of meeting _____

PM has reviewed with Estimating, other PM, Division Manager or Partner as applicable their knowledge of the terms of the deal.

People at the handoff meeting

1) Were there any problems, or critical issues, reviewed as part of this meeting?

2) What was the anticipated fee that was supplied during this meeting? _____

3) What is the anticipated start, finish, and/or duration time? _____

4) MBE/WBE requirements: _____

5) Wage scale: _____

6) Special requirements, Division 1 critical issues: _____

7) Were there any subcontractors that you were requested to consider for this project?

Date of follow-up meeting if required to resolve all outstanding issues: _____

cc: Attendees, Division Manager

Figure 4-1 Preproject handoff meeting form.

If you recall, Article 3 of the 1997 edition of AIA Document A201, General Conditions, requires the contractor to “carefully study and compare the various drawings and other contract documents relative to the work . . . [and] any errors, inconsistencies or omissions discovered by the contractor shall be reported promptly to the Architect as a request for information.”

A great many potential disputes can be avoided if this procedure is followed by both project manager and project superintendent as soon as the contract with the owner is signed.

PM/SUPERINTENDENT REVIEW	
Job name _____	Date of meeting _____
PART I – To be used for Architect, Owner's Representative meeting	
People in attendance _____	
<input type="checkbox"/> Complete current contract set of drawings reviewed.	
<input type="checkbox"/> Specifications book reviewed with major sections highlighted.	
<input type="checkbox"/> What pre-installation conferences have been agreed to as required for this project?	
1) _____	
2) _____	
3) _____	
4) _____	
5) _____	
<input type="checkbox"/> Completed list of required project submittals reviewed (see attached).	
<input type="checkbox"/> Review of project Change Order procedures.	
<input type="checkbox"/> Schedule review.	
1) Was a full schedule completed and reviewed? _____	
2) Major issues related to schedule that need to be addressed or considered. _____	

<input type="checkbox"/> General open/deviation items review.	
1) What major issues need to be addressed or resolved at this point?	

<input type="checkbox"/> Review contact list, Architect, Owner's Rep., etc.	

rev 10/00	

Figure 4-2 Project manager and project superintendent review.

Coping with Addenda

If during the bidding process the architect or engineer issued a number of addenda to the plans and/or specifications, it is now time to assemble, categorize, and identify them for future use in the administration of the project.

There may be confusion, at times, between the difference between an *addendum* and a *bulletin*, since both signify changes to the plans and/or specifications. The term *addendum* applies to any changes made to the plans and specifications *before* the award and issuance of a contract to the general contractor.

PART II – To be used between PM and Superintendent

People in attendance

Who is responsible for RFI log? _____

Meeting minutes: Who will run subcontractor's meetings and keep minutes? _____

Who will be responsible for upkeep of full schedule? _____

Subcontract review.

1) Reviewed who the potential subcontractors were to be for the project. Was there a directory of subcontractors supplied? (attached) _____

2) What specific contract scopes have not been reviewed with the Superintendent at this time? _____

General open items review.

1) What major issues need to be addressed or resolved at this point?

Review of direct Superintendent purchase procedures. _____

Budget overview. _____

Permit status. _____

Date of follow-up meeting if required to resolve all outstanding issues: _____

cc: Attendees, Division Manager

rev 10/00

Figure 4-3 Project manager and project superintendent checklist.

Changes made to the plans and/or specifications after contract signing are referred to as *bulletins*. Usually, changes effected by addenda are included in the contract sum while changes made and issued as bulletins require investigation by the general contractor to determine if these changes result in increases or decreases to the contracted scope of work.

It is important that all parties to the contract recognize this difference and assign the proper designation to such changes. And it is interesting that not all architects and engineers abide by these standards.

The author was involved with a \$42 million project several years ago, and the contract with the owner included Addenda 1 through 4. However, the architect, after reviewing the “contract” drawings, made several *changes* to the drawings and issued the “For Construction” drawings as Addenda 1 through 5 in the title block. The author immediately contacted the architect and requested that the drawings be reissued, reflecting Addenda 1 through 4 *and* Bulletin 1.

Although the architect recognized the difference between the two terms and agreed that Addendum 5 should have been designated Bulletin 1, the firm had already printed 25 sets of drawings for distribution (and each set cost \$195!), and was reluctant to throw away nearly \$5000 and reprint all new sets. But the architect assured the author that any additional costs associated with Addendum 5 would be recognized as extra and reimbursable costs.

In the spirit of cooperation, no reprinting was demanded, but this incorrect designation plagued the project for months to come. The purchasing agent issued subcontract agreements that referenced the addenda and bulletins. This resulted in lots of phone calls from subcontractors requesting to see Bulletin 1 and taking issue with the fact that this document had been included in the scope of their work. Eventually this disparity was straightened out, but not before lengthy discussions took place between the purchasing agent, subcontractors, and vendors receiving copies of the “contract documents.”

In situations like this, verbal notification is not enough. A follow-up written acknowledgment should be prepared by the project manager and sent to the architect to memorialize this event. It would be helpful to send “information” copies to all concerned subcontractors.

When addenda have been issued as changes to the specifications, they can be incorporated into the contract specifications books in one of several ways. One method involves cutting out the line item(s) changes and pasting them directly over the lines they supercede. To identify the addenda from which they were extracted, the addendum number can be written in the margin. If these cutout portions are taped on one end only, they can be lifted for comparison between the original document and the revised one.

Changes can also be handwritten above or below the affected lines in the specifications, if they are not too wordy and don’t affect too many lines.

When addenda add full pages or even full sections to the specifications book, it may be difficult to add these pages or section to an already bound volume. If that is the case, remove the binding and put the specifications in a large-capacity three-ring binder. The binder will also allow the project superintendent to place separators or tabs on the various sections, making it easier to find a particular section when required.

Addenda may also take the form of sketches, details, or drawing clarifications printed on $8\frac{1}{2} \times 11$ inch paper, and these types of addenda can be taped directly to the construction drawing where the changes occurred. If this is not done, it is possible that the area changed by the addenda may go unnoticed and work may proceed with a detail that had been subsequently revised. There again, tape only one edge so that this sheet can be lifted to reveal the original detail.

It is helpful to maintain another booklet in the field that contains all the addenda in sequential order—both printed page and $8\frac{1}{2} \times 11$ inch sketches. In spite of the efforts to update contract specification manuals and drawings to reflect the addendum changes, this additional binder will prove invaluable as a cross-check of what changes took place and which addendum directed that change.

Job Files

Most of the written materials coming into and going out of the construction field office will end up in files, and it is important that they are easily retrievable. Although this sounds so simplistic as not to warrant discussion, how many times have you filed an important document and could not remember in which file it had been placed?

Of course letters to and from the architect, engineer, and owner will be filed in folders entitled “Correspondence with Architect,” “Correspondence with Engineer,” and “Correspondence with Owner,” but not all document filing is so easily compartmentalized. By requesting the office to forward two copies of every letter to the job site, a chronological file can be set up.

The chronological file

At times, this “chrono” file can be a lifesaver. In addition to the central, compartmentalized files, filed by subject matter for a particular project, another dual-tracking filing system can be established to supplement correspondence in the central files. All it takes is to make another copy of each outgoing document.

These duplicate documents will be filed *chronologically* instead of by subject matter. There may come a time when the project superintendent can remember *when* an important letter was sent or received, but because of its subject matter, it may have been filed in any number of subject files.

If a chronological file is created, a quick flip through the time period when it was supposedly sent or received will retrieve the document in a hurry.

And now that the contract has been reviewed, all addenda have been accounted for and properly posted, and project files have been set up, the project superintendent can proceed with the project administration.

Rereading the Specifications

The specifications section related to project start-up and project closeout proceedings is generally Section 0, Bidding and Contract Requirements, and/or Section 1, General Requirements. These sections should be reread thoroughly at the beginning of every project and especially before commencing any subcontractor or vendor negotiations, since some of the provisions in these two specification sections may affect those subcontractor or vendor negotiations. These specifications may contain certain conditions that are required before actual construction can begin and will also include guidelines to be followed during construction to satisfy closeout procedures. If project closeout requirements, for

Company Letterhead

Oriole Construction Company
566 Southway
Baltimore, Maryland 21200

A/E Collaborative
888 Airport Road
Towson, MD 21240

Re: The Academy
Project No. 5732

Attention: Mr. Arch Teck

Dear Mr. Teck:

Over the past several (days, weeks, months) we have received (either include the number of small sketches or simply state *numerous*) 8¹/₂ x 11 (or whatever size the small sketches are/were) sketches containing changes (or clarifications, or both) to the contract documents.

The number and type of changes documented in this manner creates a problem for our field personnel and our subcontractors, who are concerned that they may not have received or posted all of the changes issued by your office.

We request that revised drawings for (name the drawings to which these multiple sketches apply) be reissued, incorporating all of the changes represented in your previously issued series of sketches. Without the issuance of revised, full-size drawing incorporating these changes, we feel that we cannot be held responsible for their implementation.

With best regards,

Will Spencer
Project Superintendent

Letter 1 When the architect/engineer issues lots of small sketches containing changes, confusion can reign—send this letter.

example, include a provision for as-built drawings to be maintained by the mechanical and electrical trades during construction, allowing the owner the right to inspect these drawings and withhold payment if they are not current, then all parties must be made aware of this requirement.

If a special lien waiver form is required from each subcontractor to be submitted with the monthly applications for payment, these forms should have been incorporated into the packet accompanying the subcontract agreements or given to the subcontractor at the first project meeting.

Quick Review of Closeout Requirements

A quick review of the specifications prior to start-up of the new project might reveal some of the following conditions that require immediate attention:

1. Specific insurance requirements and insurance certificates for both the general contractor and the subcontractors are to be submitted to the architect before commencement of any work on the site. And those insurance requirements may be in excess of those normally required. Copies of all insurance certificates should be sent to the field office as soon as they are received. A copy retained in the field will alert the project superintendent to any policy expiration dates.
2. Requirements must be spelled out for field offices and temporary utilities, possibly including new telephone service and computer terminals for the architect and clerk of the works. This may require some time to arrange for temporary cell phones.
3. Some architects require the contractor to submit a site logistics plan for approval prior to the start of any mobilization. So the project superintendent must begin to formulate such a plan as soon as she or he has been assigned the project.
4. Project identification signs may be required not only for deliveries but also to comply with specific contract requirements. Some government projects require elaborate signage to be placed on-site prior to the start of construction, and there might be zoning restrictions that conflict with these size and location requirements.
5. If the project is in a congested urban area, are there restrictions on storage, access for deliveries, or noise abatement ordinances?

The saying “The project begins before the project begins” means that there may be many preconstruction activities that are to be met before actual construction can commence.

A quick read of the special conditions, requirements, and restrictions outlined in the specifications will ensure that the project gets off on the right foot, an image that is important to convey to an owner, architect, and engineer who will begin to feel that they are dealing with a professional who will exhibit the same degree of professionalism throughout the project.

Changes in CSI’s MasterFormat®

The new Construction Specifications Institute (CSI) MasterFormat®

In November 2004, the Construction Specifications Institute published their newly updated MasterFormat® Division Numbers and Titles, replacing the 1995 version. This much expanded edition keeps somewhat to the older format, at least from Division 1—General Requirements to Division 14—Conveying Systems. But Division 15—Mechanical has moved to Division 22 for Plumbing and Division 23

for HVAC work. The old electrical Division 16, which also had included communications and low voltage systems has been expanded. Division 26 is now devoted to Electrical and Communications Systems shifts to Division 27.

Figure 4-4 lists all of the new divisions, and Figure 4-5 provides a brief explanation of the changes that have occurred.

Submission of a Schedule of Values

After the contract for construction has been fully executed and the job is a go, the project manager will update the original estimate to include any last-minute changes that may have been reflected in the final, often negotiated, contract sum. This updated and revised estimate will also serve as the basis for a *schedule of values*, generally required by the architect as part of the monthly requisition process.

This current estimate will serve as the basis of a job cost code report so that purchase orders for materials, labor costs, and subcontracted work, when issued, can be cost-coded against the proper category for future budget analysis.

Reviewing Allowance and Alternate Items Included in the Owner's Contract

A review should be made of any specification section or contract exhibits to the contract for construction having to do with allowances and/or alternates. Allowances must be reconciled; alternates must be accepted or rejected.

Allowances

When the exact scope of a portion of work is either not known or not fully developed, the owner often includes a specific sum of money in the construction contract to be applied against this *allowance* item. When the scope of work covered by the allowance is finalized, the contractor will prepare an estimate for this work. If the estimate is higher than the allowance, a change order request will be submitted to the owner, requesting an increase in the contract sum for the amount of the overage plus the contractor's fee. Conversely, if the actual cost of the work is less than the allowance, a credit will be due to the owner.

At some point during the construction process, these allowances will have to be reconciled with the amount set aside in the contract, adjusted accordingly, and the work scheduled.

The superintendent should review all such allowance items to determine when this reconciliation needs to take place, in order to have the work fit into the construction schedule. In the early stages of a project, reconciliation of an allowance for vinyl wall fabric for the conference room may not be a priority; but depending on the delivery time for this product, selection and resolution of this product may be required sooner rather than later, if the schedule is to be met. Resolution and reconciliation of a finish hardware allowance will most certainly require expediting, particularly if hollow metal doors and frames or

Division Numbers and Titles

PROCUREMENT AND CONTRACTING REQUIREMENTS GROUP

Division 00 Procurement and Contracting Requirements

SPECIFICATIONS GROUP

GENERAL REQUIREMENTS SUBGROUP

Division 01 General Requirements

FACILITY CONSTRUCTION SUBGROUP

Division 02 Existing Conditions
 Division 03 Concrete
 Division 04 Masonry
 Division 05 Metals
 Division 06 Wood, Plastics, and Composites
 Division 07 Thermal and Moisture Protection
 Division 08 Openings
 Division 09 Finishes
 Division 10 Specialties
 Division 11 Equipment
 Division 12 Furnishings
 Division 13 Special Construction
 Division 14 Conveying Equipment
 Division 15 *Reserved*
 Division 16 *Reserved*
 Division 17 *Reserved*
 Division 18 *Reserved*
 Division 19 *Reserved*

FACILITY SERVICES SUBGROUP

Division 20 *Reserved*
 Division 21 Fire Suppression
 Division 22 Plumbing
 Division 23 Heating, Ventilating, and Air Conditioning
 Division 24 *Reserved*
 Division 25 Integrated Automation
 Division 26 Electrical
 Division 27 Communications
 Division 28 Electronic Safety and Security
 Division 29 *Reserved*

SITE AND INFRASTRUCTURE SUBGROUP

Division 30 *Reserved*
 Division 31 Earthwork
 Division 32 Exterior Improvements
 Division 33 Utilities
 Division 34 Transportation
 Division 35 Waterway and Marine Construction
 Division 36 *Reserved*
 Division 37 *Reserved*
 Division 38 *Reserved*
 Division 39 *Reserved*

PROCESS EQUIPMENT SUBGROUP

Division 40 Process Integration
 Division 41 Material Processing and Handling Equipment
 Division 42 Process Heating, Cooling, and Drying Equipment
 Division 43 Process Gas and Liquid Handling, Purification, and Storage Equipment
 Division 44 Pollution Control Equipment
 Division 45 Industry-Specific Manufacturing Equipment
 Division 46 *Reserved*
 Division 47 *Reserved*
 Division 48 Electrical Power Generation
 Division 49 *Reserved*

Div Numbers - 1

Figure 4-4 The new 2004 Construction Specifications Institute (CSI) divisions (By permission: The Construction Specifications Institute, and Construction Specifications Canada.)

Division 00 – Procurement and Contracting Requirements: Essentially the same scope as *MasterFormat 1995 Edition*.

Division 01 – General Requirements: Area for performance requirements added to allow for writing performance requirements for elements that overlap work sections (building envelope, structure, etc.). This allows for a mixture of broad performance specifications and prescriptive specifications in a project manual.

Division 02 – Existing Conditions: This division is now limited to "existing conditions," construction practices that relate to items at the site at the commencement of work – selective demolition, subsurface and other investigation, surveying, site decontamination, and site remediation, among others. All site construction as well as heavy civil and infrastructure subject matter, including utility and pavement work, has been relocated to the Site and Infrastructure Subgroup.

Divisions 03 – Concrete, 04 – Masonry, and 05 – Metals: Essentially the same scope as *MasterFormat 1995 Edition*.

Division 06 – Wood, Plastics, and Composites: Essentially the same scope as *MasterFormat 1995 Edition* with expansion in the areas of plastics and composites.

Division 07 – Thermal and Moisture Protection: Essentially the same as *MasterFormat 1995 Edition*.

Division 08 – Openings: Renamed but with essentially the same scope of as *MasterFormat 1995 Edition* with the addition of some other openings such as louvers and grilles.

Divisions 09 – Finishes and 10 – Specialties: Essentially the same scope as *MasterFormat 1995 Edition*.

Division 11 – Equipment: Equipment related to process engineering has been relocated to the Process Equipment Subgroup and equipment related to infrastructure has been relocated to the Site and Infrastructure Subgroup.

Division 12 – Furnishings: Essentially the same scope as *MasterFormat 1995 Edition*.

Division 13 – Special Construction: Special construction related to process engineering has been relocated to the Process Equipment Subgroup. Security access, building automation, detection and alarm, and fire suppression subjects have been relocated to the Facility Services Subgroup.

Division 14 – Conveying Equipment: Renamed with process related material handling subjects relocated to the Process Equipment Subgroup.

Division 15 – Mechanical: Division 15 has been reserved for future expansion and material has been relocated to Division 22 – Plumbing and Division 23 – Heating, Ventilating, and Air Conditioning in the Facility Services Subgroup.

Division 16 - Electrical: Division 16 has been reserved for future expansion and material has been relocated to Divisions 26 – Electrical and 27 – Communications in the Facility Services Subgroup.

Facility Services Subgroup: This subgroup retains the same basic content as published in Draft 4, but with some new divisions, arranged in a revised order.

21 – Fire Suppression: Fire suppression subjects relocated from Division 13 in *MasterFormat 1995 Edition*.

22 – Plumbing: Plumbing subjects relocated from Division 15 in *MasterFormat 1995 Edition*.

23 – Heating Ventilating and Air Conditioning: HVAC subjects relocated from Division 15 in *MasterFormat 1995 Edition*.

25 – Integrated Automation: Expanded integrated automation subjects relocated from Division 13 in *MasterFormat 1995 Edition*.

26 – Electrical: Electrical and lighting subjects relocated from Division 16 in *MasterFormat 1995 Edition*.

27 – Communications: Expanded communications subjects relocated from Division 16 in *MasterFormat 1995 Edition*.

28 – Electronic Safety and Security: Expanded electronic safety and security subjects relocated from Division 13 in *MasterFormat 1995 Edition*.

Site and Infrastructure Subgroup: This subgroup contains heavy civil and utility subject matter, as well as site construction material moved from Division 2 in *MasterFormat 1995 Edition*.

Division 31 – Earthwork: Site construction subjects, chiefly below-grade, from Division 2 in *MasterFormat 1995 Edition*.

Division 32 – Exterior Improvements: Site construction subjects, chiefly above-grade, from Division 2 in *MasterFormat 1995 Edition*.

Division 33 – Utilities: Expanded utility subjects relocated from Division 2 in *MasterFormat 1995 Edition*.

Intro - 3

Figure 4-5 A brief explanation of the contents of the new CSI divisions (By permission: The Construction Specifications Institute, and Construction Specifications Canada.)

Division 34 – Transportation: Expanded transportation subjects relocated from various Divisions in *MasterFormat 1995 Edition*.

Division 35 – Waterway and Marine Construction: Expanded waterway and marine subjects relocated from mainly Division 2 in *MasterFormat 1995 Edition*.

Process Equipment Subgroup: Some material in this subgroup is new to *MasterFormat 2004 Edition*, while some has been relocated from Divisions 11, 13, and 14 in *MasterFormat 1995 Edition*.

Division 40 – Process Integration: Process facilities are composed of a variety of subsystems, tied together and integrated by distribution pathways, control, and instrumentation. All of these systems must work together as a whole. This division includes elements used to tie these systems together: piping, heat tracing, insulation, and instrumentation and control systems, and also provides a place to specify commissioning requirements for the subsystems and the facility as a whole.

Division 41 – Material Processing and Handling Equipment: Equipment for processing and conditioning of raw materials; material handling equipment for bulk materials as well as discrete units; manufacturing equipment and machinery, test equipment, and packaging / shipping systems.

Division 42 – Process Heating, Cooling, and Drying Equipment: Equipment for process heating, cooling and drying of materials, liquids, gases and manufactured items and materials.

Division 43 – Process Gas and Liquid Handling, Purification and Storage Equipment: Equipment for handling, purification and storage of process liquids, gases, slurries; includes atmospheric tanks as well as pressure vessels.

Division 44 – Pollution Control Equipment: Equipment for controlling emission of contaminants from manufacturing processes and treatment of air, water, soils and noise contaminants.

Division 45 – Industry-Specific Manufacturing Equipment: A division in which users can specify equipment that is used only within a single industry. All industries currently identified within the North American Industry Classification System (NAICS) are allocated space within the division.

Division 48 – Electrical Power Generation: Plants and equipment for the generation and control of electrical power from fossil fuel, nuclear energy, hydroelectric, wind, solar energy, geothermal energy, electrochemical energy, and fuel cells.

Divisions not named above are explicitly reserved to provide space for future development and expansion. To minimize costs resulting from potential future expansions, it's not recommended that users populate these divisions with their own material.

MASTERFORMAT 2004 EDITION AND OTHER INDUSTRY CLASSIFICATION EFFORTS

The *MasterFormat* Expansion Task Team's work also envisions the expanded content of *MasterFormat* serving to inform Table 22 (Work Results) of the *OmniClass* Construction Classification System (OCCS), a multi-table system for organizing information used by the AEC industry. CSI has worked with the cross-industry group responsible for the creation and maintenance of this standard, the OCCS Development Committee, to ensure that *MasterFormat* is compatible with *OmniClass*. As a result, the full version of *MasterFormat* will be one of the first applications of the OCCS. Once fully developed, the OCCS will be the basis for deriving relational applications, and will support and empower the transfer and use of information in the construction marketplace, ultimately serving all participants who work to sustain the built environment throughout the entire life cycle. *MasterFormat*'s 2004 edition will play an important role in this activity.

The 2004 edition of *MasterFormat* replaces the 1995 edition and is produced jointly by The Construction Specifications Institute (CSI); (800) 689-2900, and Construction Specifications Canada (CSC); (416)777-2198. For those interested in more information about *MasterFormat* and its use in the construction industry contact CSI Member Service at (800) 689-2900 or consult the web at www.CSINet.org/MasterFormat.

factory-machined wood doors are called for, since these frames and doors cannot be released for production until an architect-approved finished hardware schedule with shop drawings is submitted to the hollow metal frame/door supplier.

Alternates

Alternates present a somewhat different problem. One problem with alternates has to do with the date by which they must be selected. Too often neither the bid documents nor the contract establishes a time limit on the selection of an alternate. Each alternate may require a different time frame selection. For example, if one alternate relates to lobby quarry tile set in a mortar bed instead of carpet, obviously the owner must make a decision well in advance of the placing of a concrete slab in that area, since the slab must be depressed to receive the tile.

If an alternate deals with the application of stain versus paint on certain wood surfaces, the selection process is less urgent.

When alternates require the purchase and installation of equipment, the time limit for selection must consider the requirement to place an order for the equipment, receive shop drawings, obtain the architect's approval, and allow for enough time to receive the equipment so it can be incorporated into the project in its proper sequence.

The project superintendent, after reviewing both allowance and alternates, should discuss any concerns with the project manager.

Shop Drawings and the Shop Drawing Log

A review of the specifications will establish the procedures for shop drawing submissions, such as

- Is there a special stamp required by subcontractor and general contractor that must be used on each shop drawing submission?
- How many copies of shop drawings are required for submission, and how many sepias or other reproductions are also needed?
- How are samples to be handled, identified, and submitted?
- Are all types of shop drawings to be sent to the architect, or can structural drawings be mailed directly to the structural engineer with only a copy of the transmittal going to the architect?

Shop drawing submittals and the creation and updating of the shop drawing log are the responsibility of the project manager; however, the project superintendent has a prime interest in this entire process.

A shop drawing log should be prepared which will serve many purposes:

1. Establish a submission date for each required shop drawing.
2. Track receipt of shop drawings from vendors and subcontractors.

3. Track transmission of the shop drawing to the architect and engineer.
4. Track receipt of approved or rejected shop drawings.
5. Record the date when these drawings were returned to the vendor(s) or subcontractor(s).
6. Alert the superintendent to any delays in submissions review and return of critical materials.

Some contracts require the general contractor to submit a shop drawing log listing each required shop drawing and its planned submission date, while other contracts require the general contractor to incorporate a shop drawing submission schedule into the critical path method (CPM) schedule for the project.

It is critically important that subcontractors submit their drawings promptly. Often subcontractors will delay critical submissions because they continue to negotiate with the suppliers to obtain the best possible price. Little do they realize that significant delays in key product submissions may create delays that will ultimately prove costly to them.

At the first job meeting, major subcontractors and/or material suppliers should be presented with a time frame for submission of a preliminary shop drawing schedule. This schedule should include the major pieces of equipment for which shop drawings are required and the date when each drawing will be submitted. This schedule should also indicate projected product delivery dates, taking into account the review period allowed by the architect/engineer. (Refer to the specification section dealing with shop drawings.) A sample shop drawing submission schedule is shown in Fig. 4-6. Note that along with the proposed date of the drawings to be submitted, given 2 weeks for review by the architect/engineer, a proposed delivery date for each piece of equipment is inserted.

PRELIMINARY DWG. SUBMISSION & EQUIPMENT DELIVERY SCHEDULE				
		Submitted by ABC electric co., inc.		
		10/09/62	Project: Woodbridge office buliding	

Equipment (Description)	DWGS submitted		Delivery after approval	Delivery date
1. Wiring devices 16140	11/19/92		04 Weeks	01/06/93
2. Panelboards 16160	10/26/92		04 Weeks	12/14/92
3. Safety switches 16170	10/26/92		04 Weeks	12/14/92
4. Switchboard 16440	10/26/92		10 Weeks	01/25/93
5. Motor control center 16480	10/26/92		10 Weeks	01/25/93
6. Lighting fixtures 16500	11/19/92		10 Weeks	02/18/93
7. Lighting protection system 16601	11/19/92		06 Weeks	01/21/93
8. Emergency lighting system 16610	11/19/92		10 Weeks	02/18/93
9. Fire alarm system 16721	11/19/92		10 Weeks	02/18/93
10. Time switch 16930	11/19/92		05 Weeks	01/21/93

Figure 4-6 Sample shop drawing submission schedule.

SHOP DRAWING LOG																
Subcontractor _____								Project _____								
Contact & phone no. _____								Trade _____								
Date received	Shop drawing Number & title	No. of copies	Sent to	Date sent to Arch./Eng.			Date returned	No. of copies returned	Action				Distribution			Remarks
				Initial submission	Resubmission	Final submission			No exception taken	Note corrections	Resubmit	Rejected	Distribution date	No. of copies		

Figure 4-7 Tracking shop drawings to/from architect.

Figure 4-7 contains a typical shop drawing submission log which will be used to track the flow of shop drawings to and from the architect/engineer along with action taken and parties to whom shop drawings are to be distributed after being reviewed.

More and more architects and engineers are demanding that general contractors actually *review* each drawing to ensure compliance with the plans and specifications instead of merely passing them through with little or no scrutiny. Some contract provisions allow the architect/engineer to charge contractors for additional reviews beyond the first or second submission.

If compliance with the plans and specification is questionable, contact the subcontractor or vendor submitting the shop drawing and discuss the problem. If there are deviations from plans and specifications, it might be best to highlight them to alert the reviewer as they are being transmitted to the architect/engineer. A note on the submittal indicating the deviation and the reason for it will go a long way in maintaining or improving relations with the architect and engineer.

When the shop drawings are submitted to the architect/engineer and an expedited review is requested, so state on the transmittal. As long as this privilege is not abused, an architect will usually process them more rapidly than required by contract.

Company Letterhead

Oriole Construction Company
566 Southway
Baltimore, Maryland 21200

A/E Collaborative
888 Airport Road
Towson, MD 21240

Re: The Academy
Project No. 5732

Attention: Mr. Arch Teck

Dear Mr. Teck:

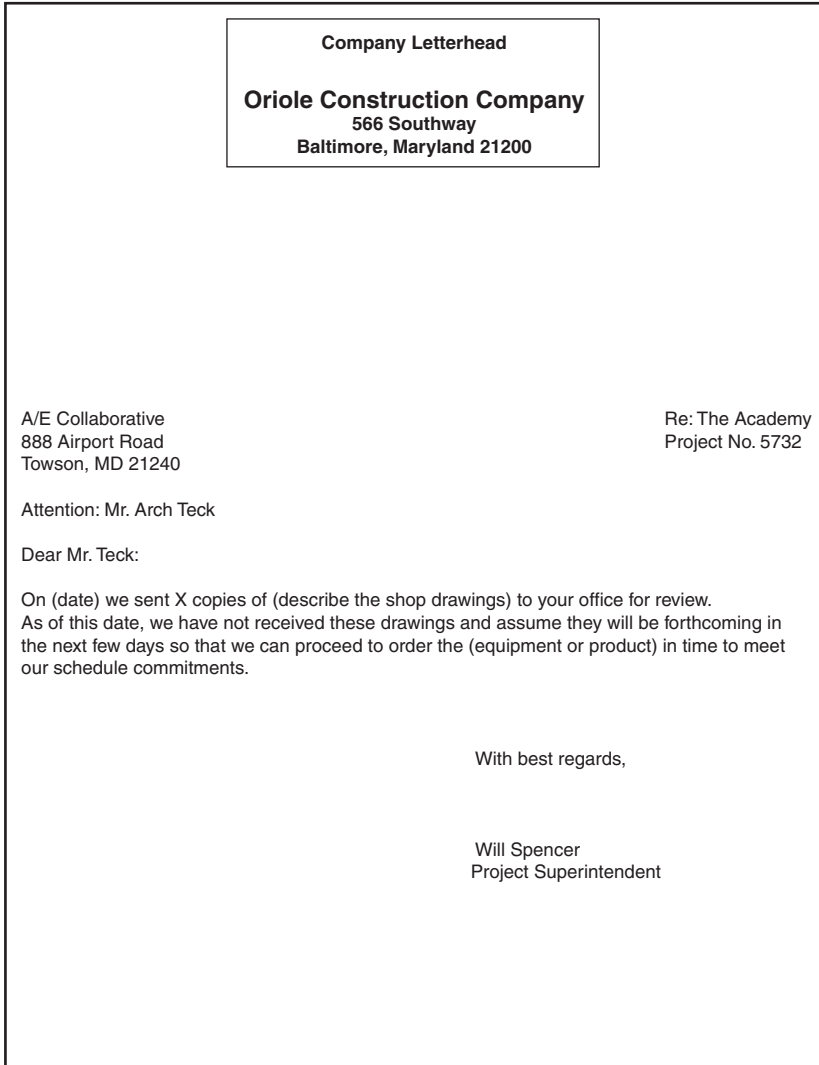
We are attaching X copies of (describe the shop drawings) for your review. Although specification section (insert the spec section pertaining to shop drawing review) allows for a 2-week review period, we would appreciate an expedited review of these drawings (or you can be more specific – a 1-week turnaround, 5-day, etc.) to ensure that (product or equipment) delivery can occur on-site when required.

With best regards,

Will Spencer
Project Superintendent

Letter 2 Requesting an expedited review of shop drawings. (Do not abuse the privilege.)

Many project managers provide the project superintendent with an “information” copy of a shop drawing for review and comment either prior to or concurrent with the submission to the architect/engineer. If there are any comments, the superintendent should quickly mark up the drawing and return it to the project manager for review and discussion with the architect/engineer. If there are no comments, the shop drawing should be immediately discarded so that it cannot be confused with the approved shop drawing when issued.



Letter 3 When the architect/engineer is overdue in returning shop drawings.

During the subcontractor's meeting, the shop drawing log is to be reviewed with each attendee; and if a submission is late, the subcontractor should be placed on notice, in the meeting minutes, that this late submission must be expedited to avoid any potential backcharges.

The project manager at the owner/architect/engineer meeting will review the status of drawings at the A/E's office to ensure that drawings have not languished there too long. If these procedures are practiced religiously, one major weapon in the battle to assign responsibility in case of late product or equipment deliveries and related delays will have been developed.

Company Letterhead
Oriole Construction Company
566 Southway
Baltimore, Maryland 21200

A/E Collaborative
888 Airport Road
Towson, MD 21240

Re: The Academy
Project No. 5732

Attention: Mr. Arch Teck

Dear Mr. Teck:

On (date) we submitted X copies of (describe the shop drawings). As of this date, we have not received those drawings from your office. Due to the delivery time required to receive this (equipment or product), we need to have these shop drawings in hand not later than (date). Your expedited review and return will be appreciated.

With best regards,

Will Spencer
Project Superintendent

Letter 4 When previous letters to the architect/engineer still do not produce the requested shop drawings.

Care must be taken to discern which subcontractors or vendors need to receive informational copies of approved shop drawings. For instance, when an approved copy of a boiler shop drawing is being returned to the mechanical subcontractor, the electrical subcontractor should receive an informational copy. Too often a piece of equipment is ordered with electrical characteristics at variance with the voltage requirements indicated on the contract drawings. If an error such as this is caught in the shop drawing stage, there may be little or

<p>Company Letterhead</p> <p>Oriole Construction Company 66 Southway Baltimore, Maryland 21200</p>	
<p>A/E Collaborative 888 Airport Road Towson, MD 21240</p>	<p>Re: The Academy Project No. 5732</p>
<p>Attention: Mr. Arch Teck</p>	
<p>Dear Mr. Teck:</p>	
<p>On (date) we requested the return of (describe shop drawings) and indicated that the construction schedule would be affected if these drawings were not returned by (date). To date we have not received the (describe the drawings) and we are assessing the impact on our schedule.</p>	
<p><i>Or substitute this sentence for the last one above:</i></p>	
<p>As of this date, we have not received (describe shop drawings) and therefore anticipate a delay in completing the (describe the work or task that will be impacted by these late deliveries; e.g., drywall, finish carpentry, painting, millwork), which will delay this operation by (number of days or weeks) and will also affect work subsequent to this trade's work.</p>	
<p>With best regards,</p>	
<p>Will Spencer Project Superintendent</p>	

Letter 5 Final letter to the architect/engineer when previous letters fail to produce shop drawings.

no additional cost required to make the equipment compatible with the building's electrical system. If it is not caught at this early stage and the equipment is delivered with the wrong voltage, it is easy to envision the problems that will occur.

Remember that even if the architect/engineer mistakenly approves an equipment shop drawing containing the wrong electrical characteristics, it does not relieve the general contractor of the responsibility to provide the correct (*contract*) equipment.

Company Letterhead

Oriole Construction Company
566 Southway
Baltimore, Maryland 21200

A/E Collaborative
888 Airport Road
Towson, MD 21240

Re: The Academy
Project No. 5732

Attention: Mr. Arch Teck

Dear Mr. Teck:

On (date) we submitted (describe the shop drawings or sketches) to your office with a request to review and comment. On (date when second or third request was made) we again requested review of these shop drawings.

As of this date we have had no response from your office and we have been advised by (subcontractor or vendor) that delivery of (equipment or product) will be seriously delayed to the point where it may impact our construction schedule.

Upon receipt of the reviewed shop drawings, we can obtain the current delivery date of the (equipment or material) and determine what impact, if any, this delivery has on the overall project completion date. We will advise your office accordingly.

With best regards,

Will Spencer
Project Superintendent

Letter 6 Notifying the architect/engineer of a delay because of the need for a shop drawing review.

Abbreviations and acronyms referred to in the specifications

As the specifications are reviewed, there will be repeated references to certain alphanumeric abbreviations relating to design and performance criteria and corresponding sources. These are some examples:

Item	Abbreviation/acronym in specification
Precast manholes	Conform to ANSI/ASTM C-478
Concrete quality	To meet American Concrete Institute (ACI) specification 213R
Wood doors	Per Architectural Woodwork Institute (AWI) Section 1300 to ANSI/NWMA I.S., 2d revision

These references to trade and professional publications assume that every general contractor has a complete library including ANSI (American National Standards Institute), the ASTM (American Society for Testing and Materials) handbook, and the five-volume set of *ACI Manuals of Concrete Practice*.

Inspections and Testing

Another section of the specification book that should be reviewed carefully prior to the start of the job concerns inspections, testing, and quality control procedures. The responsibility for these services is usually fixed in the specifications and will include, as far as testing is concerned, the type and number of tests required during excavation and site work, tests required prior to and during placement of concrete, and if the structure is a steel frame, the testing and inspections required as the frame is being erected. Some engineers may require an inspection of a structural steel fabricator's shop if the shop is not certified by the American Institute of Steel Construction (AISC). The contractor may be required to reimburse the engineer for the inspection of a non-AISC-certified shop.

If some particular testing is the responsibility of the owner, the project superintendent must give the owner, or the owner's designated representative (architect or engineer), sufficient notification when said testing will be required.

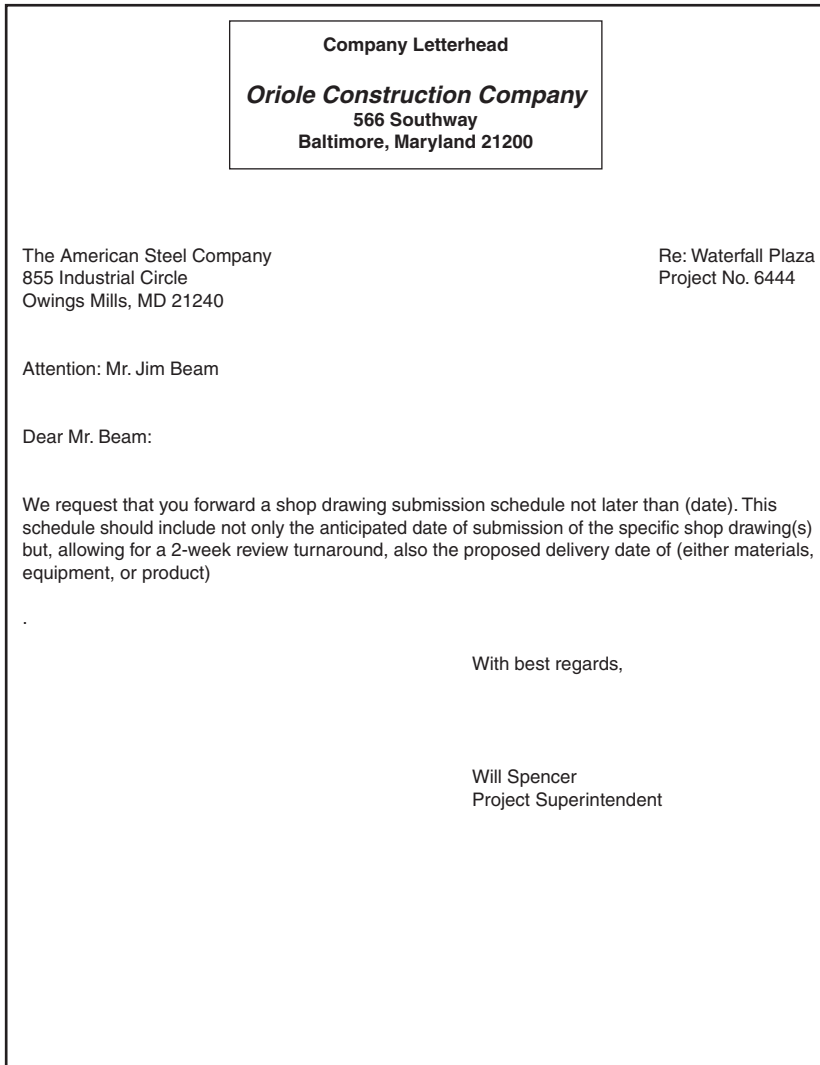
When testing is to be performed by the general contractor, the specifications may require architect or engineer approval of the testing laboratory before it can be engaged. As for the reports generated by the tests, the specifications will designate how they are to be distributed. Generally a copy of each such test is sent directly to the architect, with copies to the general contractor.

Many local building departments or building officials may also require copies of compaction tests, concrete test breaks, and steel inspection reports.

It will be the project manager's responsibility to establish the distribution list for all test reports at the beginning of the project, so that all interested parties are assured of receiving the reports they require.

The project superintendent should attempt to witness all field tests so that he or she can become aware, first hand, of whether a particular test or series of tests has failed or passed. If the architect or engineer requests immediate action in the case of a failed test, the superintendent should obtain a handwritten notification from the A/E; if that is not forthcoming in the field, the superintendent should prepare a written memo of any instructions and send it to the project manager.

The A/E should be requested to expedite any inspection reports requiring corrective action.

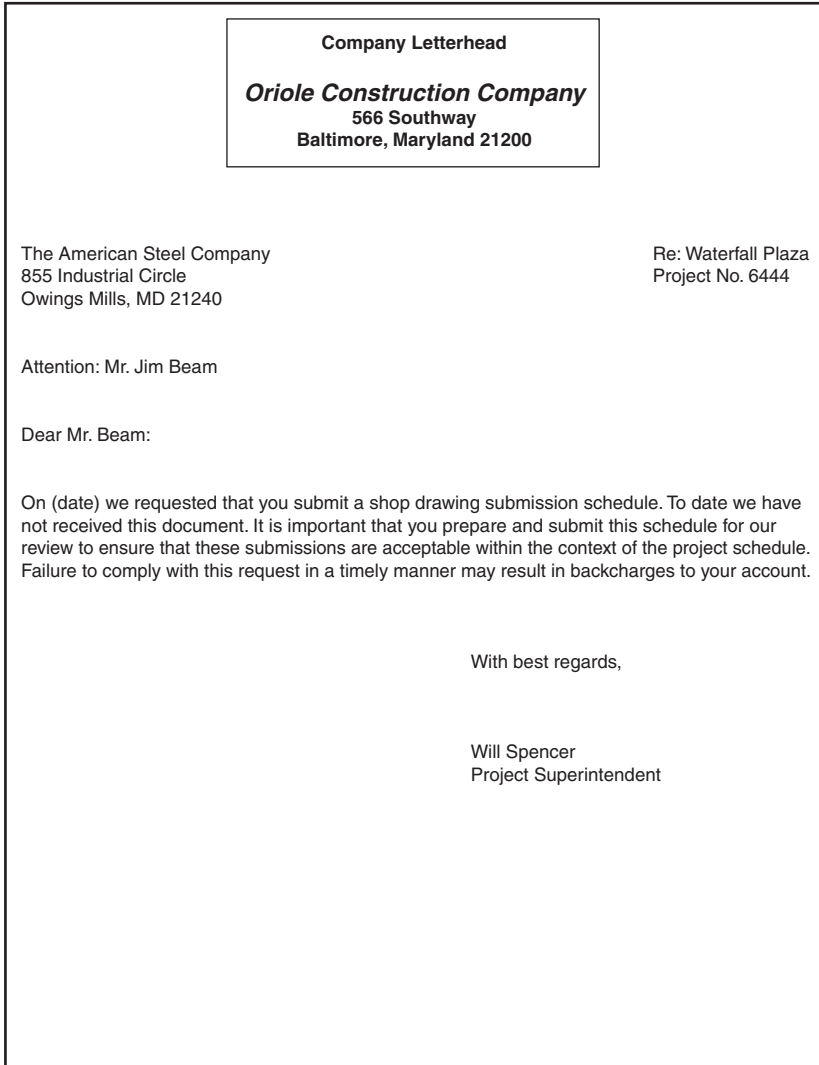


Letter 7 Letter requesting a shop drawing submission schedule.

Job Scheduling

A job progress schedule is initially prepared as the job is being estimated. Its purpose at that time was primarily to determine the duration of construction so that an estimate of the general conditions or general requirements containing time-related costs could be prepared and included in the project's estimate.

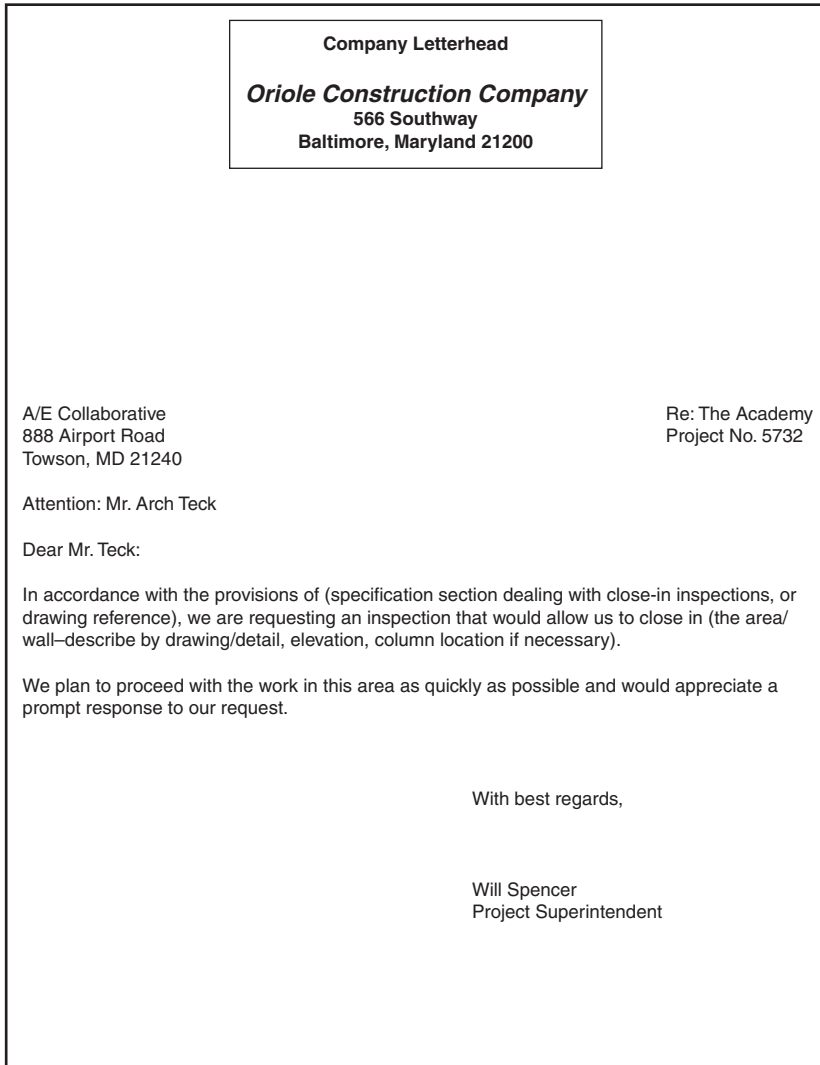
Some bid documents require the general contractor to furnish a bar chart with the bid proposal, but in both cases these schedules are normally broad-brush



Letter 8 Shop drawing submission schedule request follow-up letter.

or milestone type. Now that the project has become a reality, the job progress schedule needs to be reviewed and refined for other purposes.

The specifications may require that an initial, detailed job progress schedule be submitted to the architect within a specified period of time after contract signing. This schedule will become the *baseline schedule*, and all future schedule updates will refer to this initially, accepted version. The contract may also include provisions for periodic updates to the baseline schedule, usually coinciding with the monthly progress payment schedule. Although the primary



Letter 9 Requesting a close-in inspection.

purpose of creating a schedule is to provide all participants in the project with an orderly, time-related sequence of events to follow in order to effect a timely completion of the project, it can become the general contractor's friend or foe when delays are encountered and the project completion date is extended.

If the schedule is prepared properly, with subcontractor and supplier input, and is updated judiciously, and delays are identified and accounted for, it can be a critical document in resolving a claim. If not treated with the proper attention, a poorly administered schedule can be used against the general contractor, if and when any delay claims arise during the project.

Company Letterhead
Oriole Construction Company
566 Southway
Baltimore, Maryland 21200

A/E Collaborative
888 Airport Road
Towson, MD 21240

Re: The Academy
Project No. 5732

Attention: Mr. Arch Teck

Dear Mr. Teck:

In accordance with the provisions of (specification section or drawing reference), we have completed the excavation (be specific in describing the location and the type of excavations: storm/sanitary trench, footing excavation, etc. Use dimensions from column lines or property lines to locate) and are requesting an inspection prior to backfilling.

Since we are continuing to work in this area, your prompt response to our request will be appreciated.

With best regards,

Will Spencer
Project Superintendent

Letter 10 Request for an inspection prior to backfilling.

The bar or Gantt chart

The bar chart is often referred to as the *Gantt chart* in deference to its originator, Henry Gantt. This schedule lists the various construction activities, or tasks, in a vertical column on the left side of the schedule, and a calendar, represented by either weeks or months, is placed horizontally along the top of the chart. A bar placed alongside each activity or task listed in the left-hand margin will extend to the duration represented by the time line spread horizontally across the top of the chart.

<p>Company Letterhead</p> <p><i>Oriole Construction Company</i> 566 Southway Baltimore, Maryland 21200</p>	
<p>The American Steel Company 855 Industrial Circle Owings Mills, MD 21240</p> <p>Attention: Mr. Jim Beam</p> <p>Dear Mr. Beam:</p> <p>Please submit a schedule of your work tasks indicating the start and finish of each essential operation.</p> <p><i>You can also add, if you wish:</i> We will incorporate these tasks and time frames into our overall construction schedule which, when completed, will be submitted to you for your final review and comments.</p>	<p>Re: Waterfall Plaza Project No. 6444</p> <p>With best regards,</p> <p>Will Spencer Project Superintendent</p>

Letter 11 Requesting a schedule of work.

Some projects are such that a simple bar chart can be implemented effectively to display and track job progress. The bar chart is simple to create and is easily understood by professional and nonprofessional alike. Most field supervisors feel comfortable with a bar chart; and the simplicity of the bar chart makes for an excellent presentation in large groups. But this chart does have limitations:

- It cannot graphically display a great deal of detail in complex projects.
- It cannot adequately display the interdependence of one work task with another.



Letter 12 Request for a subcontractor to review baseline schedule.

- Updating the schedule does not permit displaying of the delay impact and the cause and effect of delays on the entire project's completion.
- The bar chart cannot reflect the impact that a delay in one activity will have on a prior or subsequent work activity.

While the bar chart is often used in the bidding process to depict various milestone dates and start-finish dates for broad categories of work tasks, in today's fast-paced construction project where complex, detailed, and interrelated activities must be shown, the critical path method schedule is what is required.

Critical path method

We won't deal with the mechanics of creating a CPM schedule but will discuss the important elements and concepts of this scheduling method. The critical path method of construction scheduling involves the preparation of a graphic display of most major and minor operations taking place during the life of the project.

A simplistic explanation of CPM can be described by the use of an arrow diagram. One end of the arrow indicates the start, and the other end indicates the completion, of an activity. The length of the arrow indicates the length of time apportioned to each activity. Some construction operations precede others on a straight-line basis and cannot start until a prior operation has been completed. Other operations can start prior to the completion of the preceding activity, and some operations are performed simultaneously or concurrently with others.

Although this may sound elementary to those project superintendents versed in complex, computer-generated CPM schedule preparation, it is the kind of thinking that is applied whenever such schedules are being prepared.

The CPM schedule provides

- Concise information regarding planned sequences of construction
- A means to predict with reasonable accuracy the time required for overall project completion and time required to reach milestone events
- Proposed calendar dates when activities will start and finish
- Identification of critical activities
- A matrix that can be manipulated to change the project's completion time, if required
- A basis for scheduling subcontractors and material and equipment deliveries
- A basis for balancing scheduling, workforce, equipment, and costs (if the schedule is resource-loaded)
- Rapid evaluation of time requirements of alternative construction methods
- A vehicle for recording and reporting progress
- A basis for evaluating the impact of delays and changes

There are six basic phases in the CPM schedule development process.

1. Understand the project, not only from a technical standpoint but also from the perspective of the contract requirements.
2. Interact with others. How did the estimator put the job together? Discussions with the project superintendent, vendors, and subcontractors are essential to develop sequences and time frames. Bringing the owner, architect, and engineer into schedule development, if practical, makes them a part of the process.
3. Physically create the schedule based upon access to a computer and scheduling software, at which point the project is divided into subnetworks—site work, foundations, structure, building envelope, interior finishes.

4. Develop activity codes.
5. Specify subcontractor networks.
6. Draft the logic diagram.

The project superintendent must participate in the draft review of the project schedule and comment on the sequence of events, the time allotted to various segments or components of construction, and whether there is ample time allowed for *float*.

Are the number of days designated for some activities reasonable or too few or too many? What about weather delays? What about time allocated for various inspections, such as framing and mechanical and electrical rough-ins?

Do any events require some *lag*, or will another activity be created to accommodate this time needed between the start of one activity and the ending of a previous activity? For example, if cast-in-place concrete foundation walls are included as an activity, and the contract requires 3 days' cure time before the forms can be stripped, do you include 3 additional days in the form-pour activity or create a separate activity designated as *curing time*?

There are three abbreviations that should be kept in mind when you prepare a CPM schedule:

PLDF: Predecessor lag duration float

SLDF: Successor lag duration float

FS: Finish–start

The project superintendent's experience is necessary to create a workable, effective end product.

The first schedule released will be designated the baseline schedule, and all other updates will be compared with the activities displayed on that issue.

This is where the project superintendent can play a key role. At subcontractor meetings or upon review of the schedule with the project manager, any changes to the baseline are to be reported to the project manager along with the reasons justifying these changes. When a delay claim or notification is being prepared by the project superintendent or project manager as the project progresses, it is essential that all changes to the baseline schedule be precisely defined by showing not only the affected activity, but also the date on which the CPM schedule was revised to reflect the change.

Although some CPM schedules may be complex, by becoming familiar with basic schedule terminology, some of the mystery will be lifted.

Activity flow—the sequence of work from one task to the other.

Order of activity or order of precedence—an indication of which work event or task precedes or follows the other.

Duration—the time required to complete a work task.

Nodes—the graphic representation of specific tasks displayed as a rectangle, hexagon, or rounded box and usually containing a number identifying the task it represents. A node may also include start and finish dates. *Note:* The current computer scheduling software programs do not make use of a node, but this may be found on earlier CPM schedules.

Early start—a date earlier than that initially anticipated for the start of an activity, but which can be accomplished if its predecessor has been completed.

Late start—a date indicating a start later than initially proposed but which will still allow for on-time completion of the task.

Early completion—completion of a task prior to its initially scheduled date.

Late completion—completion of a task later than originally scheduled but which has no effect on the overall scheduled completion date.

Float—contingency time allotted to a specific work task or to a series of tasks to compensate for unforeseen delays.

The Importance of Float and Who Owns It

It will be a rare case, indeed, when every planned event in the construction schedule takes place as indicated. Weather delays, workforce shortages, equipment and materials delivery problems, and just plain mistakes all take their toll on job progress. To compensate for the unknown or unanticipated, a contingency needs to be added to each schedule in anticipation of occasional delays.

In the language of CPM, this contingency time is called *float*, and who owns this float can become an important issue, especially when the construction contract includes a liquidated damages provision and the general contractor will be assessed added costs for late delivery of a construction project. It is important for the contract language to indicate whether the contractor “owns” the float that can be used to compensate for delays incurred during the life of the project. Or does the owner “own” the float to be used to respond to construction decisions raised by either design consultants or the general contractor during the course of construction which, if not resolved in a timely manner, can create delays?

Determination or definition of the party owning the float time is important when liquidated damages, penalty, or bonus clauses are included in the construction contract. A builder who completes the project on time, not using any float time, may be adjudged as having actually completed the project *ahead of* schedule and therefore may qualify for an early completion bonus, if such a provision was included in the contract.

Conversely, if by using the float time the completion of the project is extended by the number of float days, the *contract completion* date may arguably be defended, thereby avoiding liquidated damages. However, if the owner owns the float, both situations described above would not be defensible.

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End of Lesson Wrap-Up

Congratulations on completing this lesson! You've taken another important step in your journey to becoming a certified professional in the construction industry.

Up Next: Quiz Time

Before we move forward, there's a short quiz waiting for you. Remember, this quiz isn't designed to trip you up but to reinforce your understanding of the concepts we've covered. It's a way to ensure that you have grasped the essential elements of the lesson and are ready to build on this knowledge in subsequent modules.

You're Doing Great!

You're doing an excellent job so far, and we encourage you to keep up the momentum. Every quiz and lesson is a building block towards your ultimate goal of certification and professional advancement.

See You in the Next Lesson!

We are excited to continue this journey with you and look forward to seeing you in the next lesson. Keep up the great work and stay motivated—your future in construction management looks promising!

Keep learning, keep growing, and remember, we are here to support you every step of the way. See you soon for more learning and development

Contact Information:

Construction Management Certification

Website: www.ConstructionManagementCertification.com

Email: support@ConstructionManagementCertification.com