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Lessons in Engineering during Construction

by

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Examination

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Examples of Engineering during Construction

Engineers perform a variety of roles and functions during construction, including:

- Construction administration
- Construction management
- Project management
- Construction engineering
- Inspection
- Special inspection
- Special testing
- Threshold building inspection
- Building inspection
- Programming
- Functional and performance testing
- Commissioning
- Certification
- Training



Figure 1: Engineers performing inspections during construction.

Sources: Left: author; Right: commons.wikimedia.org/wiki/File:Eng.Christian_Odhambo_Akuku_inspecting_the_finished_piers.jpg, Christian odhambo akuku, CC-BY-SA-4.0



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Lesson 1: Know the Construction Documents

Regardless of your role, it is important to know the construction documents. They contain the instructions for exactly what is to be built. Construction documents vary greatly for each project, with common documents identified below.

Design-Bid-Build

For a traditional design-bid-build project, construction documents are called contract documents since they form the agreement between the Owner and the General Contractor. The contract documents often consist of the following:

- Front-end documents (executed contract with terms and conditions)
- Technical specifications and bid addenda
- Plans/Drawings
- Reference/appendix documents such as:
 - Geotechnical report
 - Topographical survey
 - Lead and asbestos survey report
 - Subsurface investigation report
 - Regulatory approvals and permits
 - Standards and typical details (City, County, DOT, other organizations)

Design-Build


For a design-build project, the construction documents may consist of the following:

- From the Owner:
 - Bridging documents
 - Contract/agreement
- From the Design-Build team:
 - Plans/Drawings
 - Specifications
 - Equipment lists
 - Subcontract agreements
 - Supplier agreements
 - Reference documents (similar to design-bid-build above)

At minimum, all engineers involved in construction phase activities should know how the construction documents are organized, who created them, and the order of precedence (in case of a contradiction). The engineer in responsible charge (engineer of record) often must give an official opinion on how to interpret and apply the construction documents to specific construction situations.



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CITY OF BERKELEY
 DEPARTMENT OF PUBLIC WORKS
 ENGINEERING DIVISION
SPECIFICATIONS

FOR
SANITARY SEWER REHABILITATION
 URGENT SEWER REPAIR PROJECT FY 2024
 SPECIFICATION NO. 24-11645-C

OCTOBER 2023

BID OPENING DATE: **December 21, 2023**

1947 CENTER STREET, 4TH FLOOR, BERKELEY, CALIFORNIA 94704
 (510) 981-6400

SANTARY SEWER PROJECT SPECIFICATION NO. 24-11645-C

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LEESBURG INTERNATIONAL AIRPORT

LEESBURG, FLORIDA

AIRPORT LAYOUT PLAN SET

DECEMBER 2019



VICINITY MAPS
S.D.



NO.	TITLE	SHEET NUMBER	REVISIONS	DATE
1	GENERAL PROVISIONS	1		
2	CONTRACT CONDITIONS	2		
3	CONTRACT SPECIFICATIONS	3		
4	CONTRACT SPECIFICATIONS	4		
5	CONTRACT SPECIFICATIONS	5		
6	CONTRACT SPECIFICATIONS	6		
7	CONTRACT SPECIFICATIONS	7		
8	CONTRACT SPECIFICATIONS	8		
9	CONTRACT SPECIFICATIONS	9		
10	CONTRACT SPECIFICATIONS	10		
11	CONTRACT SPECIFICATIONS	11		
12	CONTRACT SPECIFICATIONS	12		
13	CONTRACT SPECIFICATIONS	13		
14	CONTRACT SPECIFICATIONS	14		
15	CONTRACT SPECIFICATIONS	15		
16	CONTRACT SPECIFICATIONS	16		
17	CONTRACT SPECIFICATIONS	17		
18	CONTRACT SPECIFICATIONS	18		
19	CONTRACT SPECIFICATIONS	19		
20	CONTRACT SPECIFICATIONS	20		
21	CONTRACT SPECIFICATIONS	21		
22	CONTRACT SPECIFICATIONS	22		

FLORIDA DEPARTMENT OF
TRANSPORTATION APPROVAL

FOR DRAWING: _____

DATE: _____

STATE ENGINEER

SPONSOR APPROVAL

THIS AIRPORT DRAWING IS APPROVED BY:

NO. _____ DATE _____

BY: _____ TITLE _____

AVCON PROJECT NO. 301633010

PALM BEACH COUNTY PROJECT NO. 131040100004

FOOTPRINT NO. 440151-0441

NO.	DATE	DESCRIPTION	SHEETS

Figure 2: Example construction/contract documents.
 Top: Specifications book with front-end documents (Part A & B, Sections 1, 2 & 3) and technical specifications (Section 4)
 Bottom: Cover sheet of a plan set (for a different project).

Sources: berkeleyca.gov/sites/default/files/documents/24-11645-C%20Specifications%20-%20FY24%20Urgent.pdf,
leesburgflorida.gov/my_city/airport/layout_plan.php

Sometimes addenda are incorporated into the drawings and specifications by replacing the changed pages, with the resulting documents called the “conformed set”. Engineers need to be very careful not to make errors when making a conformed set, as it could result in misleading the contractor and a change claim due to any impact.



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Lesson 2: Address Design Issues Promptly

During the course of construction work, it is common to encounter potential errors or omissions in the construction documents. The construction contractor often submits a request for information (RFI) each time such an issue is encountered.

In my experience, it is important to give priority to addressing potential errors and omissions. The required design changes may impact construction in many ways including:

- Delays in construction with associated costs
- Ordering new equipment and materials
- Drawing modifications
- Permit updates

At the time an issue is discovered, the impact is often underestimated. The engineering team is often very busy and puts the item onto a long “to do” list, which means the design change may not be confirmed and finalized for days or weeks. Often engineers are given 2 to 3 weeks to review submittals and RFIs. In the meantime, the impacts to other aspects of construction are realized and the contractor or owner may start working together and brainstorming alternatives. By the time the engineer in responsible charge reviews the details of the situation, the contractor may have already submitted a change order request and is ready to enact a solution that is in their best interest, but may not be the best design solution for the owner.

Often what the contractor claims to be an omission is not since the requirement is specified elsewhere in the voluminous specifications, which the contractor may then dispute. The longer it takes for the engineering team to review and respond to the issue, the more control is lost over the situation.

Request for Information			
RFI Details			
RFI #	Name	Request Date	Respond by
#74	Gym Light Fixtures	January 12, 2019	January 19, 2019
Requesting Party Information			
Name	Title	Company	Phone / Email
Michael LaFirenza	General Contractor	Comfy Contractors	(555) 555 - 5555
Request Description			
The plan specs (files / screenshots attached) for the gymnasium in the North Building do not specify part numbers for the lighting fixtures. Should we use the same lighting fixtures and configuration used in the South Building? (Note: additional lighting fixtures must be ordered, charged)			
Responding Party			
Name	Title	Company	Phone / Email
Brandon Medina	Engineer	Medina Engineering	(555) 555 - 5556
Response			
Yes, use the same light fixtures from the South Building's gymnasium (see attached unit specs). I have consulted the owner, and they've approved additional expenses for the additional light fixtures			

Figure 3: Example RFI

Source: i1.wp.com/constructioncoverage.com/wp-content/uploads/2019/01/construction-rfi-



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However, a hasty and incorrect response should be avoided also. The better an engineer knows the construction documents, the faster an accurate response can be made.

The contractor or owner may also propose design modifications to be reviewed by the engineering team. Engineers are trusted to help determine the potential consequences of the design change and give a recommendation. Often the design changes need to be incorporated into the drawings and specifications through a design clarification or revision.

Construction issues needing engineering support may arise at any time during construction, making it difficult to forecast how much engineering labor is needed each week. Flexibility is very helpful. For example, on a slow week, time can be spent getting ahead on other projects so that during a busy week additional hours can be utilized. Also, if an engineer is taking personal time off, other resources should be identified in advance.

Working overtime is often required during some weeks during construction, and charging more than 40 hours a week may require approval from a manager or the client, or may not be allowed. It is helpful to identify the approval process in advance so when the workload is very intense, any approvals for overtime can be obtained efficiently. Often engineers end up working extra hours during intense parts of construction and do not get paid extra for their efforts, which can lead to long term dissatisfaction.



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Lesson 3: Prioritize Tasks

Engineers often experience extreme workload variations during the construction phase of a project. There may be days or weeks with very little to do, followed by days or weeks with dozens of issues including:

- Submittals
- RFIs
- Inspections
- Construction corrections
- Design changes
- Permit issues
- Pay application disagreements
- Weather issues
- Change orders
- Safety issues and training

Often it is just not possible to do everything within a reasonable time period, even when working overtime. And bringing in a coworker with little to no knowledge of the project is either not possible or not helpful. This is where prioritization of tasks becomes essential. I recommend always keeping a list of tasks and prioritizing them at least once a week. Reviewing the list at the beginning of each day can really help make the day efficient and effective. An template for a “to do” list is provided with this course.

TO DO LIST					
CATEGORY	DESCRIPTION	DUE	PRIORITY	STATUS	NOTES
Submittal	Vertical Pump Submittal Review	3/8	Medium	Completed	
RFI	RFI #11 Response	3/10	High	In progress	
Design Issue	Elevation Correction at Bldg 302	3/8	High	In progress	Meet w/ Sarah
Misc.	Review Geotech Requirements	3/11	Medium	Pending	
Pay App	Review Pay App #9	3/10	Medium	Pending	Draft comments to George
Change Order	Review PCO #4	3/13	High	Pending	
Inspection	Concrete Pour Inspection	3/15	Medium	In progress	
Submittal	Backfill Material Submittal Review	3/15	Low	In progress	
Inspection	Special Inspection Report	3/9	Medium	In progress	Send to Bldg. Official
Submittal	Base Course Submittal Review	3/15	High	Pending	

Figure 4: Example “to do” list. The yellow item should be done next.

Source: Author

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Lesson 4: Prepare for Meetings

Often engineers spend most of their work days in meetings, some in-person and some virtual. Although meetings can be tedious, they are critical for a successful construction project.



Figure 5: Weekly construction meeting with Owner, Contractor, and Engineers.

Source: <https://www.flickr.com/photos/arizonadot/6881676937/in/photostream/>

Example construction related meetings involving engineers include:

- Pre-construction meeting
- Construction progress meetings
- Client meetings
- Internal meetings
- Pay application review meetings
- RFI, submittal, and change review meetings
- Construction issue meetings
- Commissioning meetings
- Inspection meetings
- Building official/inspector/reviewer meetings



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Engineers are often asked to participate in the following ways:

- Submittals review status
- RFIs review status
- Proposed change orders review status
- Design changes status
- Upcoming inspection coordination
- Inspection findings and deficiencies
- Commissioning requirements
- Answer technical questions on drawings and specifications
- Comment on technical requirements for upcoming work

It is very important to prepare for each meeting. Even a short preparation of 5 to 10 minutes can make a difference. When leading the meeting, additional preparation is needed, including sending out an agenda in advance.

Although each project and meeting is unique, here are some general meeting preparation guidelines:

- Understand the overall purpose and goals of the meeting. State these goals in an invite and at the beginning of the meeting. If unsure, inquire from the organizer.
- Ensure you understand the role of each person invited to the meeting. If there is a new person invited, inquire about their role or introduce yourself before the meeting if possible.
- Decide on two or three specific/personal goals of the meeting. For example, you may want to highlight a recent success and point out how it will help the owner, push for the Contractor to correct a deficiency, clarify a specification interpretation, introduce a new team member, or avoid a discussion on a design topic that needs more review or coworker input to reach a conclusion.
- Review pre-meeting documents such as the agenda, RFI log, submittal log, schedule, 6-week lookahead schedule, commissioning plan, building inspection comments, punch list, pay application, etc.
- Understand the construction status by reviewing recent photographs, daily reports, recent emails, and other documents. Make a list of unknowns and questions to ask during the meeting.
- Anticipate technical issues and review relevant construction documents related to those issues. Decide if you will be prepared to give an interpretation and



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direction. If not, decide how much more time will be needed, including getting commitments from coworkers as needed.

- Make sure your calendar is cleared for the meeting. If you have back-to-back meetings and believe the previous meeting may go long, inform others that you may be late for the meeting and chose someone to cover for you if possible.



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Lesson 5: Document Decisions and Action Items

Documentation is very important during construction. When disagreements occur or litigation is threatened, the written accounts from engineers is often trusted as evidence and used to create a timeline of relevant events. The following are examples of documentation often created by engineers:

- Meeting notes, minutes, transcripts, and recordings
- Daily reports
- Construction photographs & videos
- Inspection reports
- Emails
- Design clarifications
- Proposed change order review comments
- Submittal review comments and RFI responses
- Regulatory agency correspondence
- Phone call and conversation notes

Reported By: <u>Mark Ludwigson, P.E.</u>		Inspection Date: <u>May 10, 2025</u>	
Site Conditions			
Site Condition: <u>Partly Cloudy</u>		Temp: <u>83°</u> F <u>AM</u> <u>X</u> PM <u> </u> Humidity: <u>40%</u>	
Additional Comments: -Progress meeting held at 9 am. -The conflict at the north west footer for an existing electrical conduit was reviewed in the field with operations staff.		Visitors: John Doe (ABCD Inc.)	
Summary of Construction Activities			
Scheduled Activities Started/Completed: ACME Inc.: 6 workers onsite. Supervisor was onsite to monitor the electrical contractor and to supervise the 2 workers working on Ductbank No. 4. Excavation was done to the bottom of the ductbank. Felix took density tests for the compacted soil. A conduit was encountered <u>in the area of the footing</u> , and it was agreed to reroute the conduit to avoid the conflict with the footing.			

Figure 6: Example daily report.

Source: Author



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Meeting Notes

For meeting notes, avoid transcribing everything that is said, which can be done by recording the audio of the meeting and/or using transcription software. Instead, focus on these two items:

- 1) Decisions made
- 2) Action items

These two items are the most useful for those who missed the meeting and attendees interested in recalling what occurred in the meeting.

MEETING MINUTES

4. Shut-downs and Tie-ins
 - a. 6" to 12" force main connection:
 - i. Attendees discussed the shut-down planned for Thursday, August 20. The attached commissioning plan was submitted for review.
 - ii. Operations staff agreed to drain the existing 10" force main in order to allow Acme to cut the existing 12" force main and connect the new 6" force main.
 - b. Chemical tank feed connection:
 - i. Attendees discussed the shut-down tentatively planned for August 21.
 - ii. A shutdown would be needed for 7 to 8 hours.
 - iii. ACME is to submitted a proposed plan with further details.
5. Submittals:
 - a. Shop drawings
 - i. Priority is 6" plug valve submittal.
 - ii. See attached submittal log.
6. RFIs
 - a. Priority is RFI 13 regarding the existing water line separation.
7. Change orders
 - a. PCO 4: Removal of buried foundation
 - b. PCO 7: Replacement of existing breaker

Figure 7: Example construction meeting minutes.

Source: Author



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Other Notes

Making notes after an important phone call or in-person discussion is also helpful. This can be done as an internal note (digitally saved) or with an email. Even an email to yourself can create a written record of information exchanged and decisions made. This also helps to later create a timeline of events.

Example:

Engineer Mahsa is performing construction oversight work. Mike from the soil testing firm calls and says he can't find the geotechnical report for the project and that he needs the soil requirements in the report in order to perform site testing tomorrow. Mahsa tells him that it is saved in Procore (the construction management software) in the Geotech folder under documents. After the call, Mahsa also emails Mike with this message:

"As discussed, you can find the geotechnical report in in Procore in the Geotech folder under documents. Let me know any further questions or if you have trouble finding what you need."



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Lesson 6: Embrace Safety

The last thing anyone wants is a construction accident and someone getting hurt. Everyone involved with the project can help prevent that from happening. Engineers can take a leadership role in prioritizing safety. This can be through small things, like starting meetings with a safety moment and making sure to wear PPE (personal protective equipment).

PPE

Whenever entering a construction site, typically you need to wear a hard hat and steel-toe boots. These are examples of PPE. PPE minimizes the risk of injury from falling debris, hazardous materials, moving parts, and other hazards. Other examples are as follows:

Head Protection:

- Hard hats: Protect against falling objects and impacts.

Foot Protection:

- Safety boots: Protect feet from crushing injuries, punctures, and other hazards. Usually include toe protection such as steel-toe or composite-toe.
- Safety shoes: Offer similar protection to boots, but with a lower profile.

Eye and Face Protection:

- Safety glasses: Protect against debris, dust, and chemicals.
- Goggles: Offer more complete eye protection, especially against splashes and fumes.
- Face shields: Protect the entire face from hazards like welding sparks or chemical splashes.

Hearing Protection:

- Earplugs: Insert into the ear canal to reduce noise levels.
- Earmuffs: Cover the entire ear to block out noise.

Hand Protection:

- Gloves: Protect hands from cuts, abrasions, chemicals, and other hazards.
- Chemical-resistant gloves: Protect against liquid chemicals.

Respiratory Protection:

- Respirators: Protect against inhaling hazardous dust, fumes, and vapors.
- Dust masks: Provide basic protection against dust and debris.
- Face mask: Prevent the spread of respiratory viruses.



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Body Protection:

- High-visibility clothing: Ensure workers are easily seen, especially in low-light conditions and around moving vehicles.
- Safety vests: Reflective vests that enhance visibility.
- Protective suits: Used for tasks involving hazardous materials or extreme temperatures.

Fall Protection:

- Safety harnesses: Used in conjunction with lanyards and anchors to prevent falls from heights.
- Lanyards: Connect safety harnesses to anchors, allowing workers to move freely while remaining secured.
- Personal fall arrest system (PFAS): Personal fall protection system usually including a safety harness, lanyard, and anchor system.

Site-Specific Safety Protocols

Typically, the General Contractor will have a site-specific safety plan with protocols to be followed within work areas, including PPE requirements. Other contractors, consultants, and the Owner may have their own safety plans or procedures with additional requirements. It is common for safety plans to reference or incorporate other plans as needed. It is important to know which safety plans apply and then read the relevant parts of those plans.

Identify Hazards

When walking a jobsite or observing construction work, if something looks unsafe or is not being done in accordance with the safety plan, the potential issue should be pointed out to the appropriate individual, usually the site superintendent. Although engineers are usually not liable or responsible for construction safety, an accident may be prevented by saying something quickly. Engineers are not usually in a position to tell construction staff how to do their work, so it is often best to point out the potential issue to a supervisor without giving direction or orders to construction workers.



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Lesson 7: Provide Technical Leadership

Through the bustle of a construction project, it is easy to lose sight of an engineer's role to provide technical guidance. Engineers are looked up to as experts on specific technical topics. Engineers are often expected to know the drawings and technical specifications and be able to interpret and apply them to construction situations.

Responsible Engineers

Normally there is an engineer in responsible charge (a.k.a. engineer of record or responsible engineer) for each design discipline (a.k.a branch or field), whom signs and seals documents. And these responsible engineers typically utilize support staff (under their responsible charge) to perform field inspections, review shop drawing submittals, attend construction meetings, create punch lists, etc. It is helpful to have a list of the responsible engineers (and architects if applicable) and designees involved in the project. See Table 1 for an example. Engineers should not be expected to be experts in areas outside their assigned discipline.

Table 1: Example List of Responsible Engineers				
Discipline	Spec. Divisions	Drawing Sheets	Resp. Eng.	Support Staff
Civil	1, 2	G, C	Eileen Doe, P.E.	Vicki Doe, P.E. & Valarie Doe
Structural	3 to 10	S	Cretia Doe, S.E.	Bob Doe
Process Mech.	11	PM	Gloria Doe, P.E.	Laverne Doe
Fire Prot.	21	F	Matt Doe, P.E.	N/A
Plumbing	22	P	Veolia Doe, P.E.	N/A
HVAC	25	M	Mary Doe, P.E.	Howard Doe
Electrical	26 to 28	E	Randy Doe, P.E.	Becky Doe, P.E.
Geotechnical	Geotech Report	N/A	Ivy Doe, P.E.	Kai Doe



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Know the Contract/Construction Documents

One of the best ways to provide technical guidance is to know the relevant contract/construction documents, as pointed out in Lesson 1. It helps to review the documents that apply for the upcoming work. For example, if the look ahead schedule says pavement subgrade work will begin, the pavement details, specifications, and geotechnical report should be reviewed ahead of time.

Explain the Purpose

It is helpful for engineers to explain the purpose behind the design that is to be constructed. Construction staff often make better decisions and produce higher quality work in the areas that really matter with a better understanding of the following:

- Functions of each component
- Material selection explanations
- Operations procedures
- Maintenance methods and items requiring frequent maintenance
- Equipment with and without redundancy
- Permit restrictions and reporting requirements

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Lesson 8: Understand Everyone’s Role

As discussed in the last lesson, it is helpful to have a table of the of the individual engineers and support staff for each discipline. But at a higher level, it is important to know the roles of all the parties involved in construction. Creating a hierarchy chart, like Figure 8, can help keep everyone’s role straight and help define communication paths.

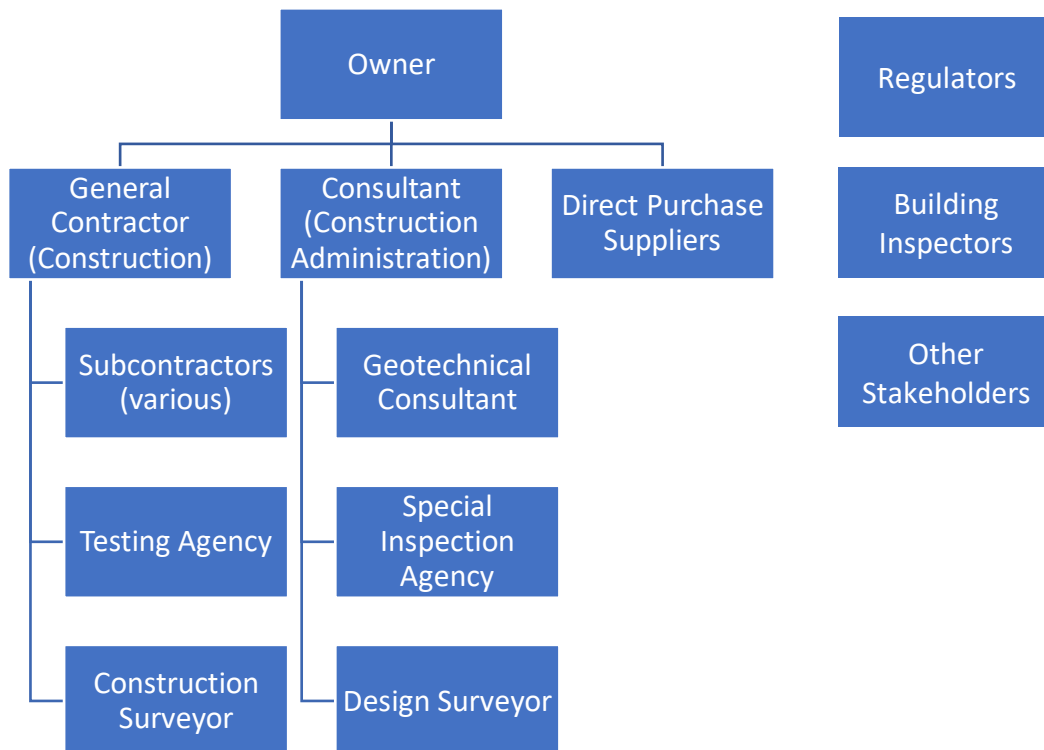


Figure 8: Example construction hierarchy chart.

Source: Author

Example:

Given the hierarchy in Figure 8 and concrete cylinder testing being the responsibility of the General Contractor. Engineer Adrian is working as part of the Consultant team, and he observes that the testing agency is not taking the required number of cylinders for testing. Whom should Adrian inform of the discrepancy?

The answer depends on the Owner’s preference (or contractual requirements) for communication between the General Contractor (GD) and Consultant. Typically, the Consultant should inform the General Contractor of construction issues, with the Owner copied on correspondence. In that case, Adrian should send a message to the GC that



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details the discrepancy, with the Owner copied. It should be avoided to correspond directly with the GC's subcontractors (the testing agency in this case).

A simple responsibility matrix, like Table 2, can help identify the roles of each organization.

Table 2: Organization Responsibility Matrix				
Task	Responsible Organization			
	Owner	General Contractor	Consultant	Other / Notes
Construction		X		
Permitting	Authorization of Various Applications	Building Permit, Stormwater during Construction, Fire Marshall Approval	Air, Water, Wastewater NPDES, Site Plan Approval	
Tax Exempt Certificate	X			
Topographical Survey			X	
Construction Staking & Surveying		X		
Geotechnical Engineering			X	
Chemical Deliveries	X			Owner's Chemical Supplier
SCADA Integration	X			Owner's Consultant
Material Testing		X		
Special Inspection & Special Testing			X	
Daily Inspections & Observations			X	
Weekly Meetings & Minutes			X	
Construction Admin. Software	X			
Long Lead Equipment Purchase	X			Installed by Contractor
Drone Photography		X		Required in Specifications
CCTV Upgrade	X			Owner's Security Consultant



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Lesson 9: Construction Management Software

Using construction management (CM) software can streamline workflows, indicate pending tasks, and overall save time. Example CM software includes:

- Procore
- Autodesk Construction Cloud
- Fieldwire
- Contractor Foreman
- Oracle Aconex
- Corecon
- Premier Construction Software
- e-Builder Enterprise
- RedTeam Go
- LetsBuild
- ProContractor by Viewpoint

The screenshot shows the Autodesk Construction Cloud interface for the 'Seaport Civic Center' project. The 'Submittals' section is active, displaying a table of items. The table has columns for Status, Number, Spec, Rev, Title, Type, Priority, Package, and Ball in. The items are listed as follows:

Status	Number	Spec	Rev	Title	Type	Priority	Package	Ball in
Open Submitted	3923A	03 3000 CAST-IN-PLAC...	0	7 Day Concrete Breaks	Test Data	Normal	-	John S (Reba)
Closed	3922	05 1200 STRUCTURAL ...	0	Steel Substitution	Mockup	Normal	06 1000-001 Shop Drawin...	Forme
Required Waiting for submission	3921	03 3000 CAST-IN-PLAC...	1	21 Day Concrete Breaks	Certificates	Normal	-	Rita Bi (Alpha)
Open Submitted	3920	09 9000 PAINTING AN...	0	Attic Stock - Lobby Paint	Attic Stock	Normal	-	Christi (Tan C)
Closed	3919	01 1000 SUMMARY	0	Certificate of Occupancy	Certificates	Normal	-	
Open Submitted	3918	096800 CARPETING	0	Attic Stock - Office Carpet	Attic Stock	Normal	-	Leah F (Unite)
Open In review step 01/01	3917	01 2600 CONTRACT M...	0	Elevator O&M	O&M Manuals	Normal	-	Alexar +1 mo
Required Waiting for submission	3916	142100 ELECTRIC TRA...	0	Elevator Certificates	Certificates	Normal	-	Adam (Checl)
Open Submitted	3915	129300 SITE FURNIS...	0	Office Furniture Samples	Samples	Normal	-	Rita Bi (Alpha)
Open Submitted	3914	03 3000 CAST-IN-PLAC...	0	SDS - Concrete Additivie	Product Data	Normal	-	Kyle S (Unite)

Figure 9: Example submittal log from a popular CM Software.

Source: <https://construction.autodesk.com/tools/construction-submittal-software/>



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