



The Digital Construction Toolkit

Welcome to a better project.

Thank you for your purchase!

Thank you for registering and purchasing the digital construction toolkit. This document is intended to be an offline resource for you to reference in your project if you don't have access to the online document.

We created this toolkit to assist people in developing their processes and procedures on their projects and promote better project execution. We encourage you to read through each of the articles and start using the documents and templates on your project.

If you have any feedback or questions, please don't hesitate to contact us via email – mail@essential.construction

A handwritten signature in black ink, appearing to be 'Kyle', written in a cursive style.

Kyle – Founder at Files.Construction

This toolkit is broken down into several sections, including:

- **Section One** – Estimating and Startup
- **Section Two** – Planning and Execution
- **Section Three** – Project Administration
- **Section Four** – Site Logistics
- **Section Five** – Reporting and Closeout

Along with this document you'll find templates that you can use on your project within the folders.

Section One – Estimating and Startup

The estimating and start up phases of a project are the most critical timing of the project. Getting started on the right foot can mean the difference between success and failure.

Documents and Templates Included in this section:

- Construction Contract
- Construction Estimate
- Construction Estimate Summary
- Value Engineering
- Letter of Intent

Estimating and Startup – Featured Article

Seven steps to a successful construction project startup

Starting a construction project can be a daunting ordeal. There's a lot to consider and sometimes very little time to do it. The key thing to remember when spending starting up your project is to prioritize based on importance. Today we'll be walking through some of the key things to consider when starting up your construction project.

Step One – Understand Your Project and Get Your Contract In Line

Before starting any project you should understand what you are building. Spend time with the drawings (even if it means a few extra hours after 5pm) and read the specification through and through.

Highlighting drawings sometimes helps to define scope (more on that later).

Once you have a firm handle on the scope, make sure you have your contract execution under way with your owner or partner. Unless you are the owner, under no circumstance should you start a project without some form of agreement or contract in place.

Step Two – Verify Your Contract Amount and Budget and Trade Scopes

Understanding the project budget is equally as important as the scope. If you already have the budget set (by your estimating department) you'll need to play some catchup, otherwise you may need to tender out the various scopes of work to different trades.

Finalizing the trade scopes of work and contracts will involve finalizing pricing (through quotations or formal subtrade tendering). Verifying what is in each scope of work and making allowances to cover off any risks or scope gaps is important. Try not to rush this stage as a proper project buy in can save you a lot of time and money in the long run.

Step Three – Safety

Getting your safety plan in line early will help you to start the project off right. The project safety plan should cover all of the different legal and regional HSE requirements that will be outlined by different safety associations. You can normally find this on one of their websites.

- [OSHA](#)
- [IHSA](#)

Make sure you take out your notice of project (or whatever the equivalent is in your area), complete your safety plan, assess and measure the safety risks and implement appropriate safety plans, take out insurance and any other certifications you need, [understand your emergency response plan](#), and put all workers through proper safety training.

Step Four – Project Execution and Project Construction Plans

The project execution and construction plans are really just documents which outline the different processes you'll be following on the project. Below is a list of subjects that should be included within the two documents

- Team Summary and Organizational Chart
- Submittal and [RFI management](#) and procedures
- Change management and procedures
- Schedule management and procedures for updating and notification requirements
- Billing management and procedures
- Materials handling plan (how will major and minor deliveries be handled and what are the details behind each)
- Vertical access plan (how is material getting to and from the various elevations)
- Major work plans (ie crane lifts and high risk activities)

- [Quality Control Plan](#)
- Risk management plan
- Human Resources and Training Requirements

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Step Five – Verify Your Schedule

By this time you've [already put together your schedule](#) and understand the work break down structure. Now you need to verify it with your awarded trades. Consider implementing pull planning or regular scheduling exercises with your foremen. Have regular meetings to check status and verify that the durations you have in your schedule are correct.

Step Six – Get Copies of Your Construction Permit

Unless you want to end up in a situation where your construction project comes to a halt when the building inspector shows up make sure you have taken out all of the appropriate permits. For your building permit, make sure you're aware who is responsible for it, on some projects the architect is, on some the owner, and on some projects the general contractor is responsible. No matter who is ultimately responsible no work should start until the appropriate permit is in hand.

In addition to the main permit there are many other small permits that you may need to get, permits such as an HVAC permit, Electrical Permit, Lane Closures, Elevator Permit, and the list goes on and on. Before starting activities research it to understand what permits apply to your work.

Step Seven – Start The Work

The fear of starting or not knowing sometimes causes people to hesitate in pulling the trigger on a project. Nothing can delay a project more than a slow start so make sure you show urgency and push the schedule and project from the beginning. No matter how well you plan a project, problems will arise. By starting a project you're forcing those problems to come out sooner rather than later.

Nothing can delay a project more than a slow start so make sure you show urgency and push the schedule and project from the beginning.

Starting a project can be a daunting task but by following our steps above you should be prepared and working on your project in no time. Have you started up a project recently? What were some of the lessons learned that you had? Share them with us in our forum or comments.

Estimating and Startup – Featured Article

Construction Tendering – Everything You Need To Know

Construction tendering is something every project manager will need to go through in their career. Tendering on construction projects typically signals that a project is close to starting, therefore it can be an exciting time period.

While the time may be exciting, having a proper tender can dictate the success of the project. Selecting the wrong vendor could mean quality suffers or worse they go bankrupt and impact the the progress on the whole project.

What Is Subcontractor Tendering?

Subcontractor tendering is the process of selecting a vendor to perform a certain scope of work by having a group of vendors compete for the work. A selection of vendors are solicited and submit their bids which are then analysed. The successful trade typically has the most complete scope of work and the lowest number.

Start By Defining Your Construction Timelines

Before you start tendering you need to understand your construction project. If you need help developing your work break down structure and schedule, [check out our article on construction scheduling](#). The reason for developing your schedule is to assist you in understanding the sequence of your tenders.

Not all projects are the same, and on one project you may need your mechanical vendor on site first, another you may need your drywall. Understanding this sequence is critical to tendering.

Once you have your priorities established start by scheduling your tenders. List all of the subcontractor scopes you'll need a tender package for and list timelines beside them. Here's some timeframes to give yourself:

- Tender Package (With Trades) – 2 Weeks
- Time for Addendum (Questions and Answers) – 1 Week (just incase)
- Post Tender Interviews – 2 Weeks
- Contracts – 1 Week

Overall you should be able to tender and award a package in six weeks. If it's a larger more complicated package you may need to give yourself and your trades more time.

Who Will You Be Tendering To?

Now that you've established your timelines you need to determine who you will be going out to. If you're part of a larger company you may already have a prequalified list of vendors that can perform your work. If not, consider reaching out to your local construction association. They keep a list of subcontractors and can help you in selecting vendors for your project.

Each package should have a minimum of 3-4 bidders and each bidder should be unique (ie not two divisions of the same company). There may be certain restrictions limiting who can be on your list, some of them include:

- Capacity of the trade for work
- Unionized or non-unionized (are you or your owner obligated to use union trades)
- Timeline and schedule
- Quality requirements (not all companies can build luxury product)

Create a spreadsheet, and along with each of your packages and timelines associated with each, add in all of your vendors per package.

Before you go out to tender, make sure to call each of the bidders and confirm that they would be interested in providing a price. Simply sending the package out without talking to them could waste your time and theirs.

Preparing Your Tender Package

A tender package should consist of a front end document, tender forms, drawings, specification, schedule and any other important information you think the subtrades should have. The front end document is the most important, and while we won't go into great depth as to what it should include, here are some key items:

- Details on the tender duration itself (time and date for submission)
- Where and how to submit bids (ie by email, in person, by fax etc)
- Duration pricing will be good for
- Contract type and summary
- Accounting requirements
- Safety Requirements

- Logistics Restrictions
- Detailed trade scope of work (ie drywall, painting etc)

Your tender forms should follow the main tender package, typically tender forms are broken down into a few different pages

- Main Price Breakdown
- Itemized Pricing (Pricing included in the main number but broken out (ie a washroom within a house))
- Seperate Pricing (Pricing that is NOT included in the base price but you may want to add the scope (ie a the price to add a second washroom to a house)
- Alternate Pricing (pricing to use alternate methods or products)
- Unit Rates (Unit Pricing for their materials – ie Supply and Install of a SF of Tile – typically used to evaluate changes)
- Staff Rates

Once you have your tender forms prepared it's time to send out your tender package.

The Construction Tendering Period

Typically nowadays tender packages are distributed by email or by way of an online bid submission software. Drawings specifications and any other information is also distributed digitally (dropbox or box help greatly with this). In the old days (not that long ago) the general contractor would make documents available in their office for the trade to come and review.

[bctt tweet="#cnstrctrtp – Once the #construction documents have been sent out to the sub-trades for tender it's important to follow up with them regularly. You don't want to waste two weeks only to find out noone is pricing the job. " username="cnstrctrdotcom"]

Once the construction tender has been issued you should arrange for a site walk. This will allow the trades to view the site, and give you the chance to walk them through the logistics and site restrictions.

It's important to remember that the tender is supposed to be confidential therefore, do your best to limit emails or correspondence where the trades see eachother's email addresses. BCC when sending information out via email.

When questions get asked by trades you need to ensure all vendors get the same information at the same time (in order to ensure fairness). Answers should be compiled into a document called an addendum and issued to all of the trades of the same package. Any changes to the tender scope and information should also be issued via an addendum as well.

Closing the Construction Tender, Interviews and Award

The closing details should have previously been outlined in your tender package, therefore when it comes time to close it should be pretty clear. Wait until you've received all of the bids, and then open them.

The bids should all be initialed by yourself, and your owner if necessary to ensure there is no page swapping once they are open.

After you've opened them it's time to prepare a bid evaluation. For a great article on evaluating construction bids [check out this link – it goes into great detail on what to look for and how to grade them.](#)

Interviewing the vendors is an important part of the evaluation process. Bring the most complete and lowest vendors in for a meeting, in it discuss the details of their bid, your tender package to ensure they have a firm understanding of the scope of work and the construction project.

Once your meetings are done, the evaluation has been completed and you know which vendor it's time to prepare your contract and issue an award letter to the selected vendor to let them know they are successful.

As a matter of best practice it's important to let the other vendors know they weren't successful. Issue a letter of regret to the bidders who won't be getting the project. This will help to maintain relationships with the others for future projects.

Common Types of Construction Contracts and Their Use

Construction projects are a conglomeration of various parties that all need to work together. Working together requires that each of the team members know their roles and responsibilities and what they are required to deliver. A construction contract is a tool that you can use to help outline these requirements.

What exactly is a construction contract, how can it be used and what are the different types?

A construction contract is a document that outlines the roles and responsibilities between two or more parties on a project. It is a legally binding document that the groups agree to at the start of a project and are held accountable to throughout.

The contract can take many forms and formats. It can be complicated or simple and tailored to your project. No project is the same and no construction contract should be the same because of that. Whether it's an industry template or your own there's plenty of options for you.

A construction contract should include information such as:

- **Names of Companies or Individuals Involved**
- **Project Description and Details**
- **Cost of Work**
- **Inclusions and Exclusions within the work**
- **Requirements and responsibilities of each party**
- **Timeframe that the work is required to be completed (construction schedule)**
- **Staffing requirements**
- **Insurance Requirements**
- **Billing And Payment Requirements**
- **Procedures for Changes to the Contract**
- **Warranty and Closeout**
- **Dispute Resolution Processes**

Construction Contract Types

As not every project is the same, there are various types of contracts between the owner and contractor which depending upon which is chosen can change your responsibilities drastically.

The different types of construction projects include:

- **Lump Sum**
- **Construction Management (Cost Plus / Guaranteed Maximum Price)**
- **Design Build**
- **Design Build Finance Maintain**

Below I'm going to walk you through the details of each as well as provide some real world examples. When utilizing each of these contracts it's important to have someone knowledgeable in contract law prepare them – a lawyer or accountant should help review the nuances.

Lump Sum Contracts

A lump sum contract is one of the oldest and simplest types of construction contracts. This type is often used by governments and in simple residential construction.

A construction lump sum contract is based on creating a defined scope of work to be performed by a contractor and assigning a dollar value to that scope of work. If the work that is required to be performed is outside of the "scope of work" it is considered to be an extra to the contract.

Under a lump sum contract the consultants are typically engaged by the owner and the contractor falls under a separate contract with the owner. The contract is typically governed by the prime consultant.

I would recommend a lump sum contract type if you're looking to get moving quickly on a project and have a complete design. These are great for usage on simple residential and commercial construction projects.

Lump Sum Construction Contract Example

As we move through the various contract types I'm going to keep the example consistent. For the examples I'll be using a 10 storey office tower as the example building.

Utilizing a lump sum contract the owner would likely have engaged all of the consultants in advance and have a relatively complete design. Each component of the building would be outlined either in the contract documents or the scope of work.

The contract would be solely based on those documents and the scope of work. Meaning each door, wall, foundation type, mechanical unit, exterior wall system would be outlined in detail. Any change to, deviation or omission on those documents would be the responsibility of the owner to cover the costs.

Pros and Cons of Lump Sum Contracts

While this contract type seems risky, it's been in use for hundreds of years and only recently have alternative contract types started to be put in use in our industry. There are advantages and disadvantages to it which can include:

PROS

- **Defined Project** – the product that the owner is expecting to receive is defined in advance and known.
- **Competitive Value** – if the drawings are complete, having competitively tendered the project can create value as people try to beat each other for the project.
- **Widely Adopted** – there's a familiarity within the industry. Contractors and owners are used to working under this type of agreement.

CONS

- **Design Risk** – if the contract documents aren't perfect there's an opportunity for the contractor to claim extras. This means missed details, changes in site conditions etc can all result in major cost changes.
- **Transparency** – the nature of a lump sum contract is that it is based on a whole and guaranteed number. The contractor is typically not required to provide as much information and cost breakdown.
- **Changes** – changes requested by the owner can have a bigger cost impact as the competitive nature of the tendering process can force contractors to try to make up money on these.

Construction Management Contracts

Construction Management contracts were introduced in the 1980s as a new way to manage construction contracts. Unlike their lump sum counterparts they encourage a more collaborative approach to construction.

A construction management contract is an agreement between an owner and a contractor that allows the contractor to take a leadership role on the project. The contractor typically provides a budget or estimate for the project that is based on a set of documents and fills in any blanks or risks with their experience. The contract typically includes things like coordination between documents (if one document doesn't match another the contractor is responsible).

Once the budget is provided the contractor engages subcontractors to perform the scopes and manages the owners money. Because the contractor has had to opportunity to build their own budget and the team is relying on their experience to fill in the gaps there can be less pressure on the contractor.

“Construction Management Contracts Encourage a More Collaborative Approach to Building”

Two Types of Construction Management

There are a few different types of [construction management contracts](#) but the two major ones are **cost plus** and **guaranteed maximum price**.

A cost plus contract type allows the contractor to provide a budget or estimate on the project. In the event that the overall project overruns the budget the owner is responsible. A guaranteed maximum price on the other hand provides cost certainty from the owner. In the event the project overruns the budget the contractor is responsible.

As a former contractor a cost plus contract is really the holy grail of contract types with little risk!

Examples of Construction Management Contracts

Using the office building example we noted above, the construction management contract is more fluid. Unlike the lump sum contract a construction management contract can start on day one before documents are prepared.

An owner might provide a schematic design to a contractor and the construction management contract can be written up on it based on the contractor's experience. In the case of the office tower the contractor may initially sign a contract for a 11 storey office tower for a budget of \$10 million. The contractor charges the owner based on the actual costs of the project including rates for overhead agreed to as part of the contract.

As the design progresses the owner may opt to take the guaranteed maximum price option – locking in a number and providing themselves with cost certainty.

Pros and Cons of Construction Management

The nice thing about a construction management contract is that you're relying on the contractor to be competent at what they do. This can have its pluses and minuses:

PROS

- **Flexibility** – a construction management contract allows you to bring on a contractor early on and start projects at different phases. It allows you to start construction before the drawings are complete.
- **Cost Certainty** – The GMP (Guaranteed Maximum Price) option provides the owner with cost certainty by relying on the [contractor to point out things wrong or missing in the design](#).
- **Transparency** – all invoices and costs from subcontractors and suppliers are submitted through to the owner and consultants allowing for a full review.

CONS

- **Team Competency** – the project requires that the teams performing on the project are competent and good. The contractor is only as good as their experience meaning your estimate may be completely wrong.

- **Niche** – not every contractor and construction team is familiar with this construction contract type. Therefore it can be a challenge for people unfamiliar with the concept.

Design Build Contracts

We all know that one contractor that complains about how bad designers are. The great thing about design build construction contracts is that it puts the contractors in charge of the designers and consultants.

A design build contract is similar in nature to a construction management contract where the contractor is required to take a leadership role in the project. The major difference however, is that the contractor engages the consultants and provides a complete proposal to an owner.

Unlike construction management contracts and lump sum contracts the owner typically issues a request for proposal at the start of a project. Contractors and consultants partner up to create proposals feature in different designs and prices for the owner. The owner then selects a team to design and construct the building.

The request for proposal will contain some high level variables that the project teams must stay within in, these can include price, design requirements, timeframes, etc.

Examples of Design Build Contract

Utilizing the office tower example, an owner may have a vision for an office tower. They would start the process by issuing an RFP to a prequalified list of contractors.

The RFP may outline things like – we want an office tower for \$10 million dollars with 11 floors and 100,000SF. The project needs to be completed within 4 years. It may then go on to provide further detail on the usage of the spaces, requirements for consultants and services that are to be provided.

Contractors then assemble design teams and submit proposals to the owner. The owner performs a detailed analysis on the bids verifying that the proposals meet the requirements of the project and awards based on that.

The contractor and consultants then partner up to complete the design, documents, permitting processes and ultimately deliver the project.

Pros and Cons of Design Build Construction Contract

Creating a team is one of the defining characteristics of design build contracts. If the project goes badly both the consultants and contractors will lose money. Therefore it is in everyone's best interest for the project to go as planned.

That being said there are some pros and cons to the design build contract:

PROS

- **Teamwork** – the project team is [encouraged to work together](#) to ensure the project is successful and profitable.
- **Management** – not every owner is experienced enough to run a project and make decisions early in the process. Having another team responsible for the details and pushing important decisions back to the owner can help an inexperienced owner.

CONS

- **Control** – this could be a pro or a con depending upon your role. As an owner you don't control as much and especially with the design. As the contractor you can have more control which provides a benefit.

Public Private Partnerships – Design, Build Finance and Maintain

One of the new and more complex type of construction contracts is the Design Build Finance and Maintain model. Due to their complex nature these contracts are typically only reserved for some of the largest projects run by governments.

A Design Building Finance and Maintain type contract is very similar in nature to a design building contract with a few added complications. During the proposal process the contractor partners up with not just designers but a financial institution and a facility manager as well.

At the completion of construction the facility manager takes over the building and runs it for a set number of years defined in the RFP. The bank or financial institution offers lending to the owner. Essentially the owner has the length of the design and construction period as well as the maintenance period (which can be upwards of 25 years) to pay off the facility.

Examples of Design Building Finance Maintain Construction Contract

Utilizing the 11 storey office tower example, the process would work very similar to the design build construction contract example. The designers would be engaged by the contractor and they would collaborate to provide a design that works for the owner.

Because the construction team has a stake in the operation of the building often times the design process is much more involved. Owners create user groups which provide input throughout the design on how things like offices are laid out and spaces are used.

Once the construction team finishes building the office tower a facility manager takes over. They look after maintaining the building including janitorial staff and also maintain the building equipment (including mechanical and electrical equipment).

Finally during this whole process a bank is financing all of the work. They take care of paying all construction and design costs for the length of the project and then charges the owner a set amount per month.

Pros and Cons of Public Private Partnerships

This is a bit of a sensitive issue. There are plenty of articles online that criticize them. The challenge is that due to their size, when there are issues that the public sees they are usually large. As an example an over run on a two billion dollar project may be one hundred million dollars, however, in comparison to the size that's only an over run of 5%.

Regardless, here's a rundown:

PROS

- **Comprehensive** – due to the design process the detail that goes into developing the project is typically more than most other projects.
- **Collaboration** – most times trades are brought on as partners early on in the process. This creates collaboration between designers and the people building it creating a more well coordinated building.
- **Usability** – As I noted above – usergroups are often brought in during the design phase to comment on design. This creates a better space for the end user.

CONS

- **Complex** – due to their nature and size these projects are very complex. Only the biggest companies with the most resources can pursue them.
- **Costly Pursuit** – if you're unsuccessful in your bidding you can lose a lot of money. Due to their size these often take millions of dollars and resources to pursue.

Construction Contracts Matter

During the start up phase it can often be daunting to have the conversation with your owner about a contract. It can seem intimidating and inexperienced owners may think you're trying to take advantage.

For most industry veterans though a contract is a way to protect all of the people involved to ensure that if an issue arises there are rules and guidelines on how each party interacts. Having a contract on a construction project is one of the most fundamental requirements of any work.

What construction contract types have you worked under and what were their challenges?

Section Two – Planning and Execution

Once you've confirmed that you've received the job it's time to make sure it goes well. Planning for your project to succeed and then executing your plan.

Documents and Templates Included in this section:

- Construction Plan Template
- Construction Purchase Order
- Project Execution Plan
- Six Week Look Ahead Template
- Employee Handbook

Planning and Execution – Featured Article

How To Prepare A Construction Plan

Learning how to prepare a construction plan can take years and multiple projects before you are exposed to enough information. With that said building a construction plan is simple if you use these easy to follow steps.

What Is A Construction Plan?

A construction plan is a detailed document, both written and visual which outlines how you will complete a project or portion of one. The document is typically composed of the following:

- A narrative or written document outlining how the various components will be approached
- Drawings and illustrations indicating [temporary construction](#) and phasing
- Photographs and images
- A [detailed or milestone construction schedule](#)

When Should I Develop The Plan and Who Should Be Involved?

A construction plan should at the bare minimum be developed at the start of a construction project, however, it should not be a static document and should be updated and developed further as things change on a construction project.

The intent of a construction plan at the start of a construction project or during the estimating phase is to assist the team in understanding the company's approach to building the project. An estimator may need a project plan in order to determine the number of feet of fence or plywood required.

For that reason a construction plan should be developed by the entire project team including the superintendent, project manager, estimator and any other staff involved. Different people bring unique outlooks to problems and potential solutions.

Step One – Familiarize Yourself With The Project

You can't build a plan without first understanding the scope of the project. Start by familiarizing yourself with the construction plans and specifications. Depending upon the phase of the project you may not have a full set of drawings available. Here's a few things you should include in your review:

- Project Renderings
- Existing Site Photos
- Overall Project Timelines
- Weather Patterns
- Other projects ongoing in the areas
- Drawings
- Specifications
- Existing Services
- Google Maps
- Contracts

Understanding each of the above pieces of information will help you as you move forward. While reviewing these pieces of information make sure to keep notes.

Step Two – Prepare The Construction Plan Document

The actual preparation of the document can take time and a lot of effort to prepare so breaking it up into manageable pieces is advised. There are a number of topics that need to be covered.

You'll need a few different things to prepare the entire document including a word processing software such as Word or Google Docs, PDF editing software such as Bluebeam and or CAD.

Once you've got the software you'll want to start by opening up a document and listing out all of the topics you're going to cover. Don't worry, if you don't want to do this we've prepared a construction plan template for you here.

Some subjects for you to cover in your construction plan include:

- Project or Work Summary
- Milestone / High Level Schedule
- Sequence of Work / High Level Description of Site Logistics
- Site Summary
 - [Construction Site Safety](#)
 - Temporary Protection
 - Interaction with Public Realm
- Deliveries and Material Handling
 - Delivery Management
 - Vertical Access Plan
 - Lifting and Hoisting
 - Garbage Disposal
- Temporary Services
 - Electrical
 - Heating
 - Water
 - Washrooms
 - Gas (if applicable)
- Quality

Below is a high level description of content that should be included in each one of the sections noted above in your construction plan.

Project or Work Summary

This section should include a high level description of the construction project. Include a project rendering or picture.

Milestone or High Level Schedule

This section should include a high level walkthrough of the [construction project schedule](#).

Sequence Of Work

Outline the sequence of work for the project. For example Foundations > Superstructure > Roof > Building Envelope > Finishes.

Be specific about the activities in each area and work required.

Address any phasing requirements for the project in this section.

Site Summary

This section is intended for you to dig deeper into describing and outlining the site. Address it in the three sections.

Site Safety: Walk through how the project will be set up, location of safety board and other facilities. Include a drawing of your site safety plan.

Temporary Protection: your construction site will require temporary fencing, include notes about what's being provided and where.

Public Realm: describe how your project will interact with the public realm and steps taken to separate work from them. Include drawings of temporary separations, public and non public areas.

Deliveries and Material Handling

This section is intended to help you understand how your project will handle materials both incoming and outgoing:

Delivery Management – how will you manage deliveries on the project. Where are your receiving and loading areas, gates, etc. Provide a construction drawing.

Vertical Access Plan – if your building is tall you need to plan on getting material up and down the building. Provide schedules and drawings indicating what is operational and when.

Lifting and Hoisting – if you have a crane outline where and what it is as well as capacity. Map out cranes on a drawing. We suggest putting together a [full crane lifting plan](#).

Garbage Disposal: [construction waste is always a problem on construction sites](#) and planning for how you're going to remove it is important. Show bin locations and who will be responsible for it.

Temporary Services and Facilities

Not having your temporary services in place on a construction site can grind a job to a halt. In this section you'll write about how you're going to support the job with the following systems:

- [Temporary Electrical Systems](#)
- [Temporary Heating Systems](#)

- Temporary Water and Washrooms
- Temporary Gas

Step Three – Review With Your Construction Project Team

Once you've compiled all of the above information into a document it's time to revisit it with your team. Review each chapter and note comments from each individual.

At this point in time you should also consider bringing in any third party resources you have to review your construction plan. People such as structural engineers, mechanical and electrical engineers, elevator professionals and subtrades can all provide valuable input.

Congratulations You've Just Completed Your Construction Plan

Take a moment to celebrate and know that your project is in better hands than when you started. You'll want to make sure that the document is readily available for people to reference through the project.

What was your construction plan creation experience like?

Fundamentals of Construction Scheduling

Scheduling, one of the cornerstones of a successful project and one that a lot of people shy away from. We've all been on that project where the schedule is behind, the schedule when presented is confusing or non-existent and it's your job to make the most sense of it.

When you google the term "schedule" a wide range of subjects comes up, from a detailed theory behind developing the proper break down structure to different concepts on lean planning and principles. Today we are going to explain to you some of the fundamentals of construction scheduling. As a sidenote – this article does expect that you know how to operate the scheduling software, for tutorials on scheduling software, unfortunately you'll need to google it.

To start let's explain some of the basic terminology:

Basic Scheduling Concepts You Need To Know

Gantt Chart – you know those weird bar charts you always see someone bring out in a meeting? A gantt chart is just a fancy name for it. Ultimately a gantt chart is the default display for most schedules and scheduling software such as Microsoft Project or Primavera. A few basic notes: the gantt chart lists the project activities along the Y-Axis. Along the X-Axis is the project timeline (by day, month, quarter, year etc). The bars that are displayed represent the duration of a given activity.

Work Break Down Structure (WBS) – think of the work break down structure as your categories within your schedule. They are buckets where you can enter categories and allow you to display your information in a more organized fashion. A good example of a work break down structure category might be "Substructure" or "Superstructure"

Activities – Activities are the bread and butter of your schedule, each activity is listed along the Y Axis of the schedule and represents an item of work on your project. Activities have durations (which we will get into) and fit within a category or work break down. A good example of a category might be "Place Concrete – Level 03".

Durations – durations are the length of time that a particular activity will take and thus the length of the bar in the gantt chart. Activities are typically set up to be "days" in duration but more complex scheduling softwares can get down into the hours and minutes.

Relationships – relationships are really one of the most important part of a schedule. Activities and work breakdown structure without relationships are really just an organized list. Relationships define what activities are before and after an activity and are typically represented on a schedule with black arrows. There are different types of activities but the most common and widely used is finish to start. A good

example of how an activity should affect your schedule, a finish to start activity would be applied to the drywall as it relates to the painting activity, meaning the painting work would only start after the drywall work was done.

There are plenty of other things to know but understanding the above terms and what they look like on a schedule will give you good footing for the next steps that we'll explain.

Basic Steps to Properly Setting Up Your Schedule

In this section we'll walk you through the right way to set up your first schedule. When people start scheduling I see a lot of people get over eager and start listing activities right away. Before you do that, stop and read the below:

Step 1 – Think it Through

As we mentioned above – a lot of people jump into things quickly and start listing your activities without really planning the project. Before you start spend time with your drawings, spend time with the specification and your client to understand their needs. Some questions you should be asking yourself are:

- Does my project need to be completed in phases (ie does it start all at once or can I only do part of the project)
- What are my site restrictions?
- Do things need to remain until other activities are completed?
- Are there any critical milestones or turnovers that need to be met? Are there any restrictions preventing you from starting (ie is there a tenant in the building now?)
- What are the major scopes of work?

Step 2 – Set Up Your Work Break Down Structure

Earlier in the article we explained what a work breakdown structure is but didn't go into much detail. We mentioned you should think of your WBS as the categories or buckets activities will fall into. Essentially they are the major scopes of work your activities will fall into. These should be set up at the start of the project and planned out in advance. Work break down should be set up so it's broken up into major groups followed by a more refined breakdown. A good example of this is as follows:

- Milestones
- Preconstruction
 - Design
 - Permits

- Procurement
 - Tendering
 - Contracts
 - Submittals
- Construction
 - Demolition
 - Substructure
 - Superstructure
 - Building Envelope
 - Finishes
 - Mechanical
 - Electrical
- Deficiencies and Closeout

The above is a basic work break down structure but should help you to understand the concept behind it. There are lots of different ways to break down a project but ultimately it will be tailored to your project. Remember, start big and work down to small. Activities should be utilized for the actual work itself.

Step 3 – List Your Activities

Another huge mistake I see a lot of new people make is to list activities out, build relationships and set durations right away. To simplify your life begin by listing out all of your activities within each work break down division for the entire project. DO NOT set the durations or the relationships yet. Once complete sleep on it, and re-review. Make sure everything has been listed, the reason for taking this approach is that once you start adding relationships adding activities in between becomes much more difficult and takes much longer.

When naming your activities make sure to keep the naming convention consistent, for example, don't add the level at the end and at the start, keep formatting and wording the same. Another good suggestion if your building has multiple areas is to list the area or phase within the name itself. This way if you have two drywall items you can distinguish between them. A good example of some activity names includes:

- PHSA_LVL01_Concrete
- PHSB_LVL03_Concrete

- Area2_UL_Drywall Ceilings
- Area2_LL_Drywall Ceilings

As you can see the labelling is consistent throughout. This helps in reading the shedule later on and makes it look more professional.

Step 4 – Build Your Relationships

Okay the moment you've been waiting for, where your schedule actually starts to spit out real information. Building the relationships requires a basic level of construction knowledge, understanding what relies on which activities to complete. This is a skill that is developed over years and each person may have different ideas. To build your relationships between activities consider bringing in others to assist you in developing the logic.

To build a relationship the actual method varies from software from software but in essence you need to determine what goes first and link the two activities. There are many different relationship types, below is a summary for you:

- Finish to Start [FS] – the most common type of relationship means that one activity must finish before the next is started
- Finish to Finish [FF] – means that the finish of one activity must occur at the same time as another activity.
- Start to Start [SF] – this relationship means that both activities start at the same time as one another. An example of this might be two of the same type of activity in different areas or if for example mechanical and electrical rough in can commence at the same time.

Once you have all of your relationships in hit schedule and watch your document come to life!

Step 5 – Enter Your Activity Durations

The next step in the process is to enter your durations, this is another task that you may not be best suited to do if you're just starting in the industry. Often it takes many years of experience to understand productivities. There are plenty of great resources for construction productivities but below I've included links to just a few:

Activity durations should be based in reality. For example if you have a duration that says five days make sure there is a reason you have five days in the schedule. A schedule is only as good as the information that goes into it, so having inaccurate information feeding the schedule can lead to an inaccurate schedule and ultimately project problems.

Step 6 – Peer Review

The last step I'm going to make a recommendation on today is doing a peer review of your schedule. For the most part if you've followed the steps above you've created this mostly in isolation. That isn't good.

Bring in your peers, trades, consultants and even the owner to review your schedule and provide honest feedback. If something is out of sequence make sure they tell you, same with durations. It's important to not just get other people's opinions but their knowledge and take on things. They may have a way to build something faster by re-sequencing activities.

Further Reading

I've only touched on the basics of scheduling in the above but there are lots of other important things you need to understand before you can consider yourself an expert. I've included a few links below for your further reading. Special thanks to all of the people that provided the content in the below links.

- [Work Break Down Structure Explained in Detail](#)
- [Critical Path Method Scheduling](#)
- [Terminology Glossary – cnstrctr](#)
- [Pull Planning and the Last Planner System](#)

Communication Tips For Construction

Although communication may not be one of the first things that come to mind when starting out on a construction project, communication is just as important as the actual building materials that go into a project. The process, schedule, budget and design of any building depends on proper communication.

In any instance where I've come across a significant issue on a project it's been because communication has failed. From installing the wrong product (company not communicating upward what product they were using) to an improper detail (not reviewing and communicating the detail far enough in advance) communication has always been the issue.

So how can you avoid issues with communication on your project. We've established five different steps that you can implement both individually and as a team to ensure the project communicates properly.

STEP 1 – Develop Workflows and Organisation Charts

Understand peoples and companies roles within a process is important. Does the architect need to sign off on every submittal? who is responsible for writing RFI's? What is the process for approving a design concept?

Take each process on a job and develop a workflow which outlines responsibilities. This way, if something falls apart, the contributing party can be held accountable, and, more importantly the problem can be resolved and avoided.

STEP 2 – Appoint Individuals Responsible for Managing the Team

As an owner it's important to appoint people or firms which specialise in normalising communication on a project. Whether you assign a project manager to represent you the owner, or hire a construction management firm there are people who specialise in organising and communicating with trades and consultants. These people can make your life easier and make the process go much smoother.

STEP 3 – Implement Technology that Makes Communicating Easier

There are a lot of platforms that are on offer that help to open up communication on a project and to ensure everyone has access to it. For more information on various technologies to assist with your need refer to our [technology in construction](#) article.

Step 4 – Email Isn't Always the Best Form of Communication

You know that superintendent on your jobsite that always says that the days of fax and landline was a better time. Well he may not be entirely wrong. Despite all of the different technologies we have at our finger tips today nothing beats a phone call or coffee. Technology takes away the personal connection you can develop with someone.

Remember, relationships are important, hearing a person out is important. Speaking with someone can go along way to try to make time for it whenever you can.

STEP 5 – Create a Culture of Collaboration

No one person will make a project be a success. instead a project is a group of people collaborating to achieve a common goal. Holding people accountable is important, but ensuring people are working together is more important. No one benefits from people not talking to each other so create a culture promoting it.

Communication in construction is just as important as a schedule, budget or design. Not communicating can lead to a failure at all levels in the project so make sure it is open and consistent throughout the lifecycle of the project to ensure success.

Section Three – Project Administration

A construction project is like a machine, and one of the most important cogs in that machine is the project administration phase. Project admin are the processes that keep the engine working smoothly.

Documents and Templates Included in this section:

- RFI Template
- RFI Log
- RFI Workflow
- Submittal Cover Page
- Progress Billing
- Progress Billing Workflow
- Contract Document Log
- Change Order Log Template

Project Administration – Featured Article

How To Issue An RFI

One of the most basic concepts of construction project management is the concept of an RFI (Request for Information). Information flow is a critical part of any construction project. The primary means of asking a question and getting information from other parties on a construction project is by issuing an RFI (request for information).

Whether you are a subcontractor, contractor, supplier or other member of a project, writing a clear question can mean the difference of getting information in a timely manner or not. **Let's start by defining what RFI means?**

R.F.I. = Request For Information

Now that we understand what the term RFI means, let's continue with defining what an RFI actually is. **So what is an RFI?**

What is a Construction RFI?

An RFI (request for information) is a formal way of documenting a request for additional information required in order to complete a project or specific task on a construction project. A request for information is a question or statement that typically asks the another party for information that cannot be found elsewhere on the project contract documents.

It can be issued via a document control system, email, fax, letter or on site by anyone involved with the project.

To state it simply – an RFI is the formal and industry standard way to ask a question on any construction project.

With the definition of an RFI behind us you may be asking yourself what exactly you can use an RFI for?

An RFI Has Multiple Uses On a Project

The way an RFI is used on your project will depend entirely on the situation you find yourself in. An RFI can be used for the following:

- To ask a question
- To verify a statement or verify a missing part of the contract documents
- To identify an issue
- To initiate a change
- To document information previously provided

Let's walk through each of the above with a few examples:

To Ask A Question

What colour should the washroom walls be?

Does the carpet continue into the reception room?

Where does the mechanical unit go?

What height should the ceiling be installed at?

To Verify Information In The Contract Documents

Confirm the ceiling is supposed to be installed at 10'6".

Please provide spec section 7400 – missing in spec but called for in table of contents

Verify that the attached demolition procedure is acceptable.

Confirm there are only two washroom partitions on the ground floor.

Identify An Issue

Ductwork and lighting will prevent the ceiling from being installed at 10'6".

Spec section 7400 and room finish schedule call for different finishes on the concrete finishing

The dimensions of the existing stair do not match those noted in the drawings.

The dimensions in the drawing X+Y do not add up to the total noted on the drawings.

To Initiate A Change

Please provide section 07400 – A CCN will be required in order to accept it as part of the contract documents.

No floor finish is called for in the bedroom, is it required and if so please provide a change notice.

Installing the ceiling at 9'0 will not achieve the design intent. Please confirm if the ceiling was supposed to be installed at 10' and if so please provide a change.

Owner requested walls to be painted white – they have already been painted black per the drawings. Please provide a change.

To Document Information Already Provided

Per our site walk on X date – ceiling is to be installed at 10'6" – bulkheads are to be created at light fixtures.

Per our phone conversation on X date all carpeting is to be green.

As discussed during our on site meeting dimension of stairwell to be minimum 1100mm.

As noted on X date during site review section 7400 is not applicable to the project.

As you can see from the above examples there are many ways that an RFI can be useful to you as a contractor or subtrade on a project. So what is the correct way to issue an RFI on your project?

How Do I Issue An RFI?

There are a number of steps when it comes to issuing an RFI. **The steps to issuing an RFI include:**

- **Understand your problem**
- **Create a clear and legible title**
- **Assign a person responsible and distribution list**
- **Write A Clear and Concise Question**
- **Include attachments**
- **Include a due date**

The first step in issuing an RFI needs to be understanding your problem. RFI's are often used by sh**y contractors as a way of avoiding effort. Asking a question that is already answered in the documents is one of the fastest ways to make a consultant hate you.

RFI's should never be issued because you are too lazy to look up information in the drawings or specifications. Do your homework first!

Start by reviewing the contract documents thoroughly, including the plans, details, schedules and specifications. Once you're confident that the answer doesn't exist elsewhere begin the process of preparing an RFI and move on to step TWO.

STEP TWO – Create a Clear and Legible Title

Too often do I see generic titles which provide no context of what the actual RFI is about. Below are some examples on how I would change specific details in order to make them more descriptive. Not only does this provide more information assigned to respond to the question but also provides you with more description if you need to go back to it in the future.

Original – Plumbing Riser

Revised – Plumbing Riser Size Confirmation at Grids A/5

Original – Beam Repair

Revised – Confirmation on extent of beam repair on floor 3

Original – Paint Colour

Revised – Paint type PT-7 – Confirmation of paint colour

As you can see in each of the above cases the RFI title was changed slightly in order to make it more clear and help the reader to understand the intent of the question. Practicing this will help to improve on the turnaround time of your RFIs.

STEP THREE – Assign a Person Responsible But Don't Just Forward the RFI to One Person

Assigning the RFI correctly can be just as important as asking the correct question. It doesn't make any sense to be issuing a mechanical RFI to the structural engineer.

Make certain that it is clear who the RFI is assigned to but, don't just forward to a single individual. Coordination is part of construction project management. To help coordinate, send your RFI to groups of people that all need to be informed by it's impact. If the RFI is structural in nature but could impact the routing of conduit or light fixture placement make sure the electrical engineer is on it as are the applicable trades.

There is no shame in making sure people are informed on a construction project.

STEP FOUR – Write a Clear and Concise Question

The foundation of a request for information in construction is the question itself. Your question should be to the point and specific but here's just a few more tips:

- Does the question provide the person answering the question with the information they need.
- Include drawing references
- Include previous RFI references if applicable
- Reference submittal or material types
- Reference grid line location or floors
- Keep the question simple – don't get wordy and avoid fancy construction lingo if possible
- Keep the question professional – don't let your frustration get in the way of asking the correct question

Following each of the above will help you to ask the right question and will help to make RFI turnaround time faster and easier for consultants.

STEP FIVE – Include Attachments

Include anything that will help to make answering the question easier, there are a variety of different things you could attach but here are just a few examples:

- Drawing highlighted or clouded
- Photos of site conditions
- Existing Building drawings
- Email communications
- Cutsheets or shop drawing references
- Survey results or details

Attachments help to illustrate or make someone's understanding of the problem more clear. The more information you can provide someone with the easier time they will have in understanding what the problem actually is.

STEP SIX – Include a Due Date

As with anything on a large project each issue has its own individual timing requirements. If the item isn't urgent and you have time to wait on an answer give the consultants time. If it's urgent make sure the due date is reflective of that.

Ultimately the timing of your RFI's on the project is going to be dictated by your master schedule. Don't have one yet? [Maybe consider reading up on our Construction Scheduling article.](#)

Everyone deserves and appreciates extra time – plan ahead and don't treat everything as urgent in nature.

Distributing Your RFI

After you've compiled your RFI it's time to issue it to the consultants or owner. In days before computers this used to be done using hardcopies (yes really). Faxes and letters were physically issued to the consulting team. This – obviously, was a slow and time consuming process. Fortunately new technology has made the process of issuing an RFI easier.

RFIs can be issued using the following methods:

- **Hardcopy**
- **Email**
- **On site (in person)**
- **Project Management Software**

Hardcopy – you can issue hardcopies of RFI's to consultants. In areas where internet isn't widely available this may be your only option. Printing RFI's having them reviewed while consultants on site, sending faxes or mailing them. This is the slowest option.

Email – one of the most common ways of processing RFI's. You can issue them in the body of the email or issue them as an attached word document or pdf. When issuing RFI's via email try to standardize the format and the subject line. For example:

- **JOB NAME – RFI # – RFI SUBJECT**

By standardizing the subject you can make tracking them easier. To make your life easier we have an RFI template available for your use.

On Site (In Person) – One of my favourite ways to ask questions is through site visits with the consultants. By walking with an architect or engineer you can more easily explain the issue you're facing. This allows you to build rapport with the individuals and avoids back and forth emails.

After you get your answer using this method make sure to document the answer via email.

Project Management Platform – there are many different project management platforms available such as Procore, Geniebelt, Plangrid, BIM360 etc. These platforms are intended to make your life easier and manage communications. These platforms allow you to pin RFI's on drawings and use pre-built forms to standardize information being provided to the project team.

Whichever method you choose to issue your RFI it's important to standardize the way you do so and stick to one or two methods the entire project.

How Can I Manage Multiple RFI's?

Now that you've issued an RFI – of equal importance is managing them. RFI's can quickly add up on a project and create a back log for consultants. To avoid track RFI's and regularly reinforcing their importance of getting answers.

Before you begin to manage your RFI's it's important to understand what your consultants are responsible for. **What is the standard turnaround time on an RFI?**

The time for consultants to answer an RFI is typically 10 working days, though this may be different. Check your contract for project specific turn around times.

Keep in mind 10 working days is the turn around time for all consultants to get the answer to you.

To help manage the process of an RFI consider developing an RFI workflow at the start of the job. **An RFI workflow documents the standard steps in issuing an RFI and the next steps to take after each decision is made.** We have an [RFI workflow template](#) for you to make this process easier.

Creating a log is also a useful exercise to help track RFIs. An [RFI tracking log](#) lists all of your RFIs, the date they are issued, and when they are due. The RFI tracking log also provides a way to track whos court each RFI is in, this allows you to more easily follow up with the appropriate individual.

A recommendation would be to set up a weekly meeting with all people responsible for RFI's. Use this meeting to get answers and follow up with each party on RFI's in their court.

Templates and Other Resources

I hope you have learned alot about issuing RFI's on a construction site.

Below you will find some additional resources on this subject for you to use. If there are any additional questions or comments please don't hesitate to contact us at webmail@cnstrcr.com

- [Construction Repository – RFI Template](#)
- [Construction Repository – RFI Log Template](#)
- [Construction RFI Workflow Template](#)
- <https://www.aconex.com/blogs/2014/01/ten-tips-on-managing-rfis-for-your-construction-projects.html>
- <http://www.contractorform.net/Request-for-Information-Form-Template.html>
- <http://www.formsbirds.com/free-construction-rfi-form>

Managing Construction Submittals

Submittals are like the starting blocks on a construction project. If you have a solid start the rest of the project will be easier to win. If you have a slow start or stumble on the submittals than you'll spend the rest of the project catching up.

Managing the submittal process is fairly straight forward but to do so you need an understanding of some basic concepts, work flows and to help you along the way, technology. **But what exactly is a submittal on a construction project?**

A submittal on a construction project is any document or material submitted to the consultants for review to ensure that it is in conformance with the project plans and specifications.

Construction Submittal Concepts

Cut Sheet – A set of data or information on a product or material that is pre-manufactured. For example you get cut sheets of washroom accessories, light fixtures, caulking and drywall components.

Shop Drawing – something that is custom built or altered to suit site conditions. Shop drawings will include plans, elevations, sections etc of each component to be installed. Shop drawings are typically provided for structural steel, rebar, misc metals, tile layouts etc. The intention of shop drawings is to provide site specific installation instructions.

Samples – samples are basically what they say they are. Samples are small pieces or full size pieces of products which represent the final product to be installed. Some products such as tile may require that a range of samples be submitted. This way you the architect will get a better understanding of the range of acceptable inflection in a product.

Mockups – where multiple materials come together the consultant or owner may request a mockup. Mockups are great way to control quality as a lot of the interfaces can be figured out in advance. Basically a mockup is a large section of a specific material or set of construction materials installed to look like the final product.

[bctt tweet="Knowing the concepts and terminology for #construction submittals is only half the battle, understanding the proper #workflow will make you a submittal #master!" username="cnstrctrdotcom"]

Construction Submittal Workflow

Your contract type will change what your submittal workflow will look like, however, in general they will always look the same.

Step 1 – Subcontractor Receives Submittal from Supplier or Engineers Submittals Themselves.

Step 2 – Subcontractor Submits Submittal to General Contractor.

Step 3 – General Contractor Reviews Submittal – if it conforms to the specification continue on to step 4 – if not the general contractor marks up the submittal with comments and sends it back to the subcontractor as revise and resubmit.

Step 4 – General Contractor sends Submittal to the Consultants (Prime Consultant if under a typical contract type).

Step 5 – Each of the applicable consultants reviews the submittals and marks it with one of the following status:

- Reviewed – no comments
- Reviewed as Noted – minor comments not requiring a resubmission
- Revise and Resubmit – major comments or revisions, resubmission is required

Step 6 – Consultants return submittal once it's all been reviewed to the general contractor.

Step 7 – General contractor sends back to the subcontractor.

Step 8 – if the submittal requires resubmission the subcontractor revises and resubmits back to the general contractor (start again at step 3) if not the subcontractor files and orders materials based on the submittal.

As we mentioned at the start of this section the workflow for construction submittals will change based on your contract type. As a recommendation meet with your consultants at the start of the project and establish the routing for each submittal so everyone is on the same page.

We won't go into great detail over what to look for in your submittal reviews but there is a lot of great information over at this article on [what consultants should look for in construction submittal reviews](#).

Streamlining the Construction Submittal Process With Technology

There are plenty of different online solutions to help you improve the construction submittal process. Rather than write out the pros and cons of each (check out our [technology in construction](#) article for more information) we're going to focus on ways this can help.

Digital Distribution – rather than emailing submittals back and forth to one another and revisions potentially getting lost a central depository can help to keep track of all the files. Some software platforms will even email out notifications and allow you to assign submittals to individuals so they know when they need to review a document.

Tracking – as mentioned above – submittals can get lost. Easily. Using technology helps to avoid that and put ownership on individuals. Online or digital platforms can let you print reports which indicate which are outstanding and at different review stages.

Collaboration – one of the slowest processes for reviewing submittals is the fact that only one party can review at a time. By the time a submittal has made it through all of the various parties it could be one to two weeks later. Some platforms allow each party to review and markup the documents online.

Getting the construction submittal process right on a project can mean the success or failure of a project. Hopefully with some of the above tips and advice you can get it right on your next project.

Online Construction Submittal Platforms

- [Procore](#)
- [Plangrid](#)
- [Autodesk BIM 360](#)
- [eSub](#)

Submitting A Change Order Quotation

If there is one thing an owner instinctively gets their back up about it's change requests in construction. The concept behind a change request is simple – the owner, consultants or project requirements involve doing something different than the contract documents. In today's article we're going to walk through some common best practices for change pricing on construction projects.

Ask For A Construction Change Document

One of the biggest mistakes you can make is to blindside someone. No one likes to be surprised and people like it even less when that surprise comes with a bill.

If you know there is going to be a change on the project ask for a Change Notice, Site Instruction or even an email asking the owner or consultant for you to price the change. This will take away the "surprise" and will ensure everyone is aware of the coming quote.

Preparing The Change Quotation

There are a number of steps related to preparing the change quotation – these can be broken down as follows:

- Distribute change documentation to subcontractors
- Obtain quotations from subcontractors and suppliers
- Compile above noted quotations in a spreadsheet
- Compile a cover letter
- Review
- Submit to owner
- Follow Up

Subcontractor Quotations for Changes

One of your first steps once receiving a change is to send it to your subcontractors and suppliers for pricing. If the change is well defined in a change notice you'll be able to distribute the document directly to them. If the change isn't as well documented you'll need to describe what you're looking for exactly.

When distributing your change – make sure to give a deadline for quoting. Your contract may stipulate a turn around time but the industry standard is five working days from date of issue.

Compiling Your Construction Change Quotations

As you start to receive quotations it's important to file them and track which ones you have. It can be very easy to get overwhelmed in all of the construction communication. Make life easier – you receive a quote file it and check off in a spreadsheet that it's been received.

Once you have all the quotes it's time to compile them all. In order to do so you need a construction change management software or a spreadsheet. If you're a small business just starting out considering grabbing our change spreadsheet from the files section.

Your spreadsheet should include trade name, value, description of the work, and any overhead and profit you think will be necessary to cover off your costs and fee.

Depending upon your type of contract you'll want to provide more or less information. On lump sum contracts you typically provide high your breakdown and subtrade quotes if necessary. On construction management contracts a more detailed breakdown will be required.

Writing the Construction Change Cover Letter

One of the best best practices we recommend is to write a cover letter along with your change. The reason for the cover letter is simple – it may not be your direct day to day contact signing off on the change. If an executive who is involved at 10,000 feet is signing off on your change this is your opportunity to explain the cost in a way that you want explained.

Try to keep the cover letter short – include all of the basic facts and information including title, cost, change document reference (CN, SI etc), and a brief description of the work included along with the reason why.

Submit Your Request for Change For Approval

Compile all of the documents in a single PDF (make reading it easy for people). Include your cover letter, summary of quotations, quotations and consultant change document.

Once everything has been compiled email the document to your approver and provide a deadline. Make sure the email is clear and concise and doesn't repeat what's in the letter. Include a reference number for the owner to track with (ie change request 1) this way your emails don't get lost

Follow Up On Your Change Request

Once the change has been submitted make sure to follow up regularly. This can take the form of a simple email, or a more formal change log distributed each week to make sure everyone knows which ball is in which court.

Be patient, however, know how changes affect the schedule on your project. If a change will start affecting the project let the owner and architect know in advance so there is no confusion when the time comes and they can work towards the timeline in getting you approval.

Lastly and the best advice we can give is to be fair and transparent in your changes. Contracting has a stigma that everyone is in it to rip you off. By being open and fair your owner will trust you more and allow you to get your changes approved more quickly with less hassle.

Section Four – Logistics

Here's where the rubber meets the road. Planning activities on the site can be rewarding, but if done wrong has the potential to go very wrong. Plan your activities correctly!

Documents and Templates Included in this section:

- Site specific safety procedure
- Safety orientation
- Toolbox Talk Template
- Traffic Management Plan
- Daily site diary
- Safety orientation template
- Site specific safety plan

[Logistics – Featured Article](#)

Planning for Winter Conditions

In the words of everyone's favourite HBO character John Snow "Winter is coming". For those of you in warm climates, consider yourself lucky, for those of you like us that live in colder climates, it's time to start planning if you haven't already. Each year we have a season that demands the most of our construction projects. From making logistics more difficult, freezing liquids, making certain surfaces incompatible winter is a challenging time to work.

Before winter comes you should already have a plan in place on how to deal with the change in conditions. This week we're running you through eight things that need to be part of your winter protection plan.

A Schedule

Winter is a fickle thing. It could be here tomorrow and gone the next day. As such you need to plan for the worst. Your winter heating plan should include a schedule showing when you will start to implement

the different components of your plan. Consider phasing your approach, at the start of the winter you won't need to heat as much as you will in the middle of it.

Temporary Protection for Services

How will you protect critical services for your construction site? Cold freezes things, as such you need to take care that piping containing liquids is kept warm. This includes standpipes, sprinkler systems, domestic water, sanitary lines, and lots of others. Make sure these are properly heated and/or protected from cold temperatures.

Temporary Winter Protection Structures

As well as protecting temporary services, building temporary structures to keep the cold out can be just as important as providing heating. A building will generate heat naturally so you should aim to keep in whatever you can. Temporary insulated walls at large openings in the envelope, tarps to keep wind out are good ways to control the elements in and out of your building.

A Guide To Tower Cranes

Construction tower cranes are the focal points of jobsites throughout the world. They are the backbone and workhorses of most large construction sites. If they aren't working; the jobsite isn't working to it's full capacity.

Most of the questions I've received from people in my life who aren't in construction tend to focus on the subject of tower cranes. I get asked all of the time how are tower cranes erected? how does the operator get into the cab? How do they make the crane go higher in the building?

Despite their widespread usage people (even the workers on site) know very little about the machines that move us. We are going to answer some of the most basic questions as well as dive deeper.

What Is A Construction Tower Crane?

A construction tower crane is a **common piece of lifting equipment** found on construction sites. It is **called a tower crane because of the large tower like structure the crane pivots around**. The tower mast supports the jib and counter jib which in turns supports the cabling, trolley and hook which does the lifting.

Why Are Tower Cranes Used?

Tower cranes are used because they are efficient at lifting and moving heavy materials while having a relatively small footprint on site.

Tower cranes are **great at lifting material and moving across long distances**. Their reach allows them, in a lot of locations to have unencumbered access to the entire job site.

Why Use a Tower Crane Over A Mobile Crane?

Traditional mobile cranes require large setups at the ground level. If setup in the middle of a project this would have a large impact on the surrounding construction activities.

While the reach of the crane (jib and hook locations) are large the actual physical space a tower crane takes up on site is relatively small (think how small the tower is relative to the reach).

What Are The Different Types of Construction Tower Cranes?

By driving through a city like Toronto or New York you will quickly realize that tower cranes come in many different shapes and sizes. **The different types of tower cranes are:**

- **Hammerhead Crane (Jib Type)**
- **Luffing Jib Tower Cranes (Jib Type)**
- **Derrick Cranes (Jib Type)**

- Self Supporting Tower Cranes (Mast Type)
- Travelling Tower Cranes (Mast Type)
- Self Climbing Tower Cranes (Mast Type)

What is a Hammerhead Tower Crane?

A hammerhead tower crane is a common type of tower crane found on construction projects throughout the world. The **hammerhead tower crane is recognizable through it's vertical mast (tower) with a horizontal jib which supports both the cab. A trolley runs along the mast horizontally carrying the cable and hook.** This allows the hook position to be in any position along the mast.

Luffing Jib Tower Crane

A luffing jib tower crane, often called just a luffing or luffer crane is another common type of construction tower crane. The crane is **recognizable due to its diagonal arm which extends out from the top of the mast (tower) on an angle.** Unlike the hammerhead the hook point is located off the end of the jib. The crane counter weights are located closer to the tower, when combined with the angled arm the luffing jib tower crane typically has a higher capacity then the hammerhead crane.

Unlike the hammerhead crane, the diagonal arm can move in and out (from vertical to a 30 degree angle). This movement allows them to fit within tight spaces which is why you often see luffing jib cranes within downtown urban environments.

Derrick Cranes

Similar in nature to the luffing jib type you can think of Derrick cranes as their little brother. These cranes are unique in nature as their **size is typically designed to sit on rooftops or small spaces. Derrick cranes are unique in nature because of their outriggers which allow them to sit on a surface.**

They are assembled in pieces and are often used to either assemble or disassemble tower cranes. Derrick cranes are unique because often times they do not have a cab for an operator. Instead they are operated by remote control which is either wired or wireless.

Mast Type – Self Supporting Tower Cranes

A self supporting mast type is a typical tower crane that is put to use in shorter structures where tower extensions are not required. Self supporting tower cranes are anchored at the base with a weight or reinforced concrete block. Piles may be required to anchor the base to bed rock.

Self supporting tower cranes are anchored in place, have a tower extending out of the anchor point and they rotate around the tower. Considerations for the tower's reach need to be made prior to installation as they cannot be moved easily once in place.

Mast Type – Travelling Tower Crane

A travelling tower crane is often used on projects which have a large footprint that require equipment be relocated regularly for lifting. **A travelling tower crane is either track mounted or rail mounted. The tracks or rails allow the crane to travel horizontally along a path.**

Depending upon the base or track design loads may or may not be able to be carried during the travelling period. If using this type of crane you need to ensure that you leave a path clear enough and flat enough on a project site to allow the crane to travel. If a path is not completely level and clear of debris you could risk the crane tipping over.

Mast Type – Self Climbing Tower Crane

Self climbing tower cranes are one of the most fascinating pieces of equipment that can be found on a construction site. A self climbing tower crane starts its life as with a typical self supporting tower crane. A tower is erected and anchored to a concrete reinforcing base.

As the building extends vertically the tower is anchored to the existing structure. When the building reaches a point where the crane will not clear the structure the crane then increases its height by inserting a piece of tower within the existing tower and “climbing” upwards.

The below video will help to explain the process of self erecting a tower crane.

What Are The Various Parts Of A Tower Crane?

Tower cranes are incredibly complex machines. When you look back to structures of the past it's amazing the scale that we as a species were able to achieve without them. Today tower cranes allow us to reach new heights.

Tower cranes are broken into several different parts, each of which is crucial to the operation of the machine. There are hundreds of parts on a tower crane but the **major parts on a tower crane can be broken down into the following:**

- **Base Support**
- **Tower (Mast)**
- **Operator's Cab**
- **Turntable**
- **Counterweight**
- **Jib and Counter Jib**
- **Trolley and Hook Block**

The below is an illustration on the various parts of a tower crane.

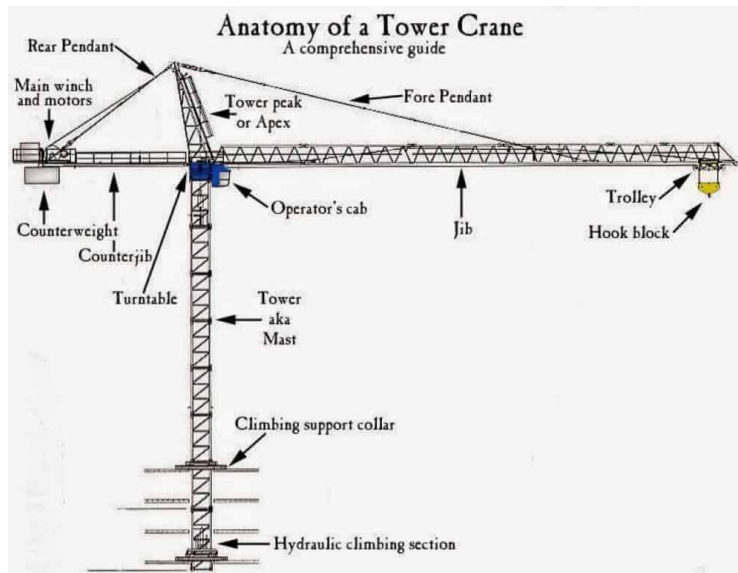


Image illustrating parts of a tower crane.

Base Support

The base support is the part of the tower crane that attaches the tower to the ground or surrounding structure. When a crane is attached to the ground this is typically done with reinforced concrete as well as piles to extend the support to bedrock. It's important to engage an engineer to design this component of the tower.

Tower (Mast)

The tower or mast of a tower crane is the vertical portion of the crane that extends upward from the ground. Its purpose is to support the cab, mast, hook and counter weights as they rotate around it. Towers or masts are typically fabricated using a square lattice work of steel similar to an open web steel joist.

Tower Crane Operators Cab

The operators cab is where the crane operator sits in order to make the crane function. It is recognizable as a glass box on the side or underside of the mast. The cab is typically attached to a computer which feeds information to the operator and allows them to operate the crane with a pair of joysticks.



Turntable

The tower crane turntable is the part of the crane that allows the jib and counter jib to spin on top of the mast. The mast is made up of two plates which insert inside of one another and rotates with bearings. The actual circular component that rotates is called a slewing bear ring – it's a technology which is in use in windmills.

Counterweight

When a crane lifts a heavy object it needs a counter weight to balance the load of the lift. Without the counter weight in place the tower crane's capacity would be significantly reduced. The counter weight is located on the opposite end of the jib as the hook. Counterweights are made from a variety of materials including reinforced concrete, steel and other heavy materials. Their weight is calculated based on what the capacity of the crane will be during it's final use.

Jib and Counter Jib

The jib and counter jib are the most recognizable part of a tower crane. The jib and counter jib are the lattice work of steel that you see extending out horizontally from the top of the tower or mast. The purpose of the jib is to carry the trolley, cabling hook and load of the crane. The purpose of the counter jib is to offset the weight of the jib and hold the counter weights in place.

Trolley and Hook Block

The trolley and hook block to alot of the work on the crane. The trolley moves back and forth across the mast extending as needed to place the hook ovetop of whatever load requires lifting. The hook block

acts as a pulley system to go up and down depending upon how much cabling is released or pulled back into the spool. The hook block supports the hook which allows loads to be attached to the crane.

With all of the above components being made up of hundreds of parts it's not hard to see why there are companies that are dedicated to crane installation. Maintenance on the tower cranes is crucial.

How Are Construction Tower Cranes Erected?

One of the most common questions I get asked by family members is how are tower cranes erected. When a crane is in place it's a massive machine so it can be hard to comprehend how this piece of equipment made it into place.

Like a jigsaw puzzle a tower crane is erected in pieces. The various components are delivered on transport trucks one at a time and assembled utilizing a mobile crane. The tower is first constructed, followed by the turn table and cab, then the jib and counter jib are hoisted and attached. Lastly the counterweights and cables are installed to complete the erection.

The process of erecting a tower crane can take many hours and sometimes days depending upon the location and size. For this reason the erection of a tower crane typically requires shutting down adjacent streets if in a tight urban environment.

[While setting up your mobile cranes for erection it's important to have a proper plan for your crane lift.](#)

Below is a video which shows how a typical tower crane is erected:

How Are Tower Cranes Dismantled?

More than how are tower cranes erected, I get asked how these monster machines get removed? Seeing a tower crane on top of a 50 floor tower it's hard to imagine how someone would begin to safely remove one. Yet, the construction industry has come up with some incredibly creative ways to remove a tower crane.

Tower cranes are traditionally removed by other cranes. Component are taken apart one piece at a time starting with the hook, cables and counterweight which is followed closely by the jib, cab and tower. In general there are two types of cranes used for removal of a tower crane:

- **Mobile Crane**
- **Derrick cranes**

Mobile Crane Tower Crane Removal

If your site allows a mobile crane can be utilized to remove a tower crane from your site. In this situation a mobile crane is brought in and set up close to the base of the crane. The mobile crane takes the crane apart one piece at a time. The mobile crane hooks onto a piece and workers remove the fasteners allowing it to be freed and lowered to the ground.

This technique is typically used in low or mid-rise construction though some mobile cranes have a reach of hundreds of feet and can be used on lower high rise construction.

Derrick Cranes

If a tower crane is out of reach from mobile cranes then Derrick cranes need to be utilized in order to remove it. Because some derrick cranes are too large to be brought up in an elevator typically a progressively small set of derrick cranes are used with the largest being used to remove the tower crane. The next smallest then removes the large derrick, and another smaller one removes that derrick. This goes on until the parts can be lowered to the ground using either an elevator or electric hoist.

While this method can take longer it also has less impact on the surrounding site as a large mobile crane does not need to be brought in. This method is fascinating to watch. Below is a video showing the progressive removal of a tower crane using derricks:

In areas where flight paths are not a concern another method that can be used to take apart a tower crane are helicopters. These represent a challenge in high rise settings as a result they are rare to see.

Things To Consider When Deciding On A Tower Crane

If you're planning a tower crane on your project site it's important to take a number of key factors into consideration. **The key considerations to take into account when planning for a tower crane are:**

- **Capacity Required**
- **Space availability (Surrounding structures and infrastructure)**
- **Pick Locations**
- **Flight Paths**
- **Installation and Removal**

Capacity Required

Depending upon what your tower crane will be used for you may require a different model or design. If your crane will be lifting things like formwork and buckets of concrete your crane will be a relatively light model. However, if you need your crane to lift equipment such as a generator or large steel members you may need to reconsider.

Cranes have typical lifts and lifts that are designed as critical. Critical lifts are typically those that are within 10% of the cranes total capacity. These lifts require special engineering. If you only have one heavy lift on the project it may be worthwhile to engineer your crane to accommodate all other loads except the one and have it engineered as a critical lift. Your other alternative could be to bring in a mobile crane to complete the lift.

Space Availability

This one is critical. No one wants to put up a tower crane only to find out that it can't travel where they wanted it to. It's important when planning your tower crane location that it's not being impacted by surrounding buildings. If it is and there's not much you can do about it having procedures in place to ensure it doesn't hit them is equally important.

Try to plan your crane location away from structures and critical infrastructure such as overhead power lines.

If your tower crane is located near sidewalks or a public roadway be aware that overhead protection or special procedures may be required to protect the public.

In instances where more than one tower crane is on site the swing radius of each crane should be considered. Optimizing the area of each lift to provide the most coverage while not hitting the other cranes towers while rotating.

Pick Locations

Why put up a tower crane if it's lowest capacity is at your loading dock? Planning your pick locations around your tower crane OR planning your tower crane around your pick locations is important. Loading docks are important – they help material come into and out of your jobsite. Cranes get weaker the further the load is from the mast – plan your crane close to these locations to maximize the capacity of your crane.

Flight Paths

While most people wouldn't be concerned about planes flying into tower cranes aviation authorities typically are. If your crane is located within a certain distance to an airport it may require a special permit and restrictions on its operating time / height. Review with your local flight authority to ensure that you take out the proper paper work prior to erecting your crane.

Installation and Removal

As I noted above, the installation and removal can be a very intensive process requiring large pieces of equipment. While planning out your crane location it's important to consider this. You don't want to put your crane in a location that will make it challenging to get off the site. This could delay your finishing phases.

If you have more than one tower crane on site, it may be worth sequencing the removal and installation to allow one or two of the cranes to remove or install the others. This will save time and allow areas of your building to be finished in advance of the complete crane removal.

Who Operates A Tower Crane?

A tower crane's operation is not just a one man job. Picking materials is a team job which requires both an operator, a swamper or lift director and a rigging crew.

The operator's job is to run the crane from the cab. They are responsible for the movement and lifting operations of the crane. When lifting loads are typically out of vision from the operators direct line of sight. Cameras are used but they must also rely on their swamper or lift director.

The swamper or lift director's job is to supervise the lifting from the ground. They typically have direct communication with the operator via radio. They're role is to ensure the load is safely attached and

within the capacity of the crane. They are also responsible to ensure that the path of travel is clear for the operator.

The **rigging crew are the team that actually attaches the load to the hook of the crane. They are responsible for safely tethering the load and ensuring it is safely attached to the crane.**

Together this group of individuals is essential to the operation of the construction site.

Tower Cranes Future In Construction

Tower cranes have and will continue to be the work horses of the construction industry. They have allowed us to reach new heights building higher and faster then we ever dreamed. Construction companies will continue to rely on them due to the minimal space required on a construction site and their versatility when it comes to lifting things.

Snow Removal Procedures

How will snow be removed from the various areas of your jobsite? There's a misconception that snow removal is a simple process. If your jobsite is a tight site getting a bob-cat or piece of equipment in to remove the snow may not be an option. In addition, slab capacities need to be checked constantly when bringing in equipment. Make sure the plan outlines how you'll be removing snow and where it will be stored / how it will be dealt with.

Type of Heating

What is the type of heating you'll be using in your winter protection plan? This is one of the most important items of the list. Will the existing building units be used to heat the space? If so what type of protection should be installed on them to protect them from construction dust and debris? Will you be using temporary heaters, if so what will they be, propane? Natural Gas? Electric? Steam? Each of the above requires different safety requirements be in place.

Fuel and Frequency

Once you've decided on what type of heater you'll be using understanding the fuel source and frequency of re-fuelling / inspection is next up. Will the heaters be fed from the existing building service, temporarily from a main tank or individual tanks or fed from existing building power? Do heaters need both power and fuel or is it a fuel only item? There's a lot to consider when choosing a fuel source. Make sure to read the regulations on dealing with the fuel type, empty and full cannisters and any inspection requirements.

One final item to understand is who pays for consumption. Many construction contracts will put the consumption of services on the owners plate to pay for. If you're buying the propane or natural gas through temporary tanks there may be an opportunity to go back to the owner for a hand out in paying for some of it.

A Proper Emergency Response Plan

Consider updating your emergency response plan that you should have developed at the start of the project . If you haven't done so, don't worry [we've got an article to help you out with your emergency response plan](#). But let's face it, things change in winter and your emergency response plan should be updated to reflect those changes and your most recent winter protection strategies.

Inspection Requirements

Your winter heating protection plan should include a regular inspection for all of the components in your plan to make sure they are in place. The checklist should include fuel storage requirements, heater requirements and making sure they are clean and free of debris, temporary construction requirements in place and maintained. Anything critical to the survival of your building should be included in this inspection.

If you don't have temporary fire protection in your building, maintaining a fire watch may be a requirement. If so know the frequency and come up with a way of monitoring progress for it.

That's it for our items to include in your winter protection plan, what are some of the items you include in yours? Leave them in the comments below!

Asbestos and Abatement

During my time in construction I have worked on a number of jobs that have asbestos containing material (ACM). The safe removal and treatment of this material often involves a lot of extra work. In this article I will cover basics of identification, removal and shed some light on different disposal methods.

Asbestos Identification

Asbestos has been around for a very long time. Truth be told, aside from the health drawbacks, it's pretty amazing stuff. Asbestos is a light, strong and fire retardant material which make it ideal for building components. Unfortunately, all of those benefits come with a catch, it's main drawback is that it's a carcinogen or cause of cancer.

Asbestos was used in buildings and all sorts of every day materials up until the 60s and 70s. The material has since been banned in most country's but many of the structures we now work in (and renovate) contain old materials. Below is a list of just SOME of the materials that can be asbestos containing:

- Ceiling tiles
- Drywall compound
- Brick Mortar
- Roofing membrane
- Insulation
- Fireproofing

If you have a building that was built or renovated prior to the 2000's there is a good chance that there may be some form of asbestos lingering in your building. Below is a helpful video which identifies the harm of asbestos.

Asbestos Processes and Procedures

Your first step if you think you may have an ACM in your building (or even if you don't suspect it) is to hire a consultant. The consultant will do a survey of your property and identify anything that is containing, by both destructive and non-destructive testing.

Once you have an understanding of what is within your building, it's important to treat it properly. If the asbestos is not disturbed it does not pose a problem. For example, if you have a wall that is asbestos containing and it is never touched, there is relatively little risk with the material. The issue comes when it is altered or moved in some way, causing the asbestos particles to be airborne.

In order to remove the contaminated material properly it is time to call another professional. There are plenty of demolition companies that specialize in hazardous material removal. These companies and their workers are trained and certified on these contaminants in order to safely remove them.

There are many requirements for the safe removal of asbestos, and these will change based on your region and local requirements, however in general removal includes the following:

- Construction of a barrier or enclosure to limit the exposure of materials to surrounding areas this barrier includes poly, rip proof poly and negative air units to create a negative pressure within the enclosure reducing the amount of airborne materials that make it out of the space.
- Application of water or material to reduce the amount of dust created by removal.
- Proper PPE by workers (including a HEPA mask, bodysuit, gloves etc).
- Construction of a showered area to allow workers to wet down after working within the enclosure.
- Containment of removed material in two layers of rip proof bags properly labeled to illustrate contaminated materials.

Disposal of Asbestos

If you have hired a company to properly remove the asbestos containing material they will be responsible for the proper disposal. There are a few ways in which asbestos is disposed of which I have outlined for your below:

- Landfill – the most common method is that the material is disposed of in a landfill. The landfill that we reference though isn't the one you drop your dryer off with your dad in your car. There are specialized landfills that deal with toxic and hazardous materials. These landfills require special paper work and applications to be submitted before even sending the material away. The material is typically either buried or stored in containers.
- Incineration – one of the newer techniques on the market is destruction by incineration. Because the properties of asbestos make it a natural fire retardant the material does not burn easily. As such – asbestos needs to be exposed to extreme temperatures in order to ensure the fibres are burned and not just displaced. This can be done using a plasma.
- Chemical Bath – another newer approach is to utilize a chemical bath using an acid or base material to essentially eat away the fibres. The ACM is drenched in large containers and any sediment is then sent to a landfill or recycled.

Asbestos – Beware

Asbestos in all situations should be treated properly. The negative health affects related to exposure include lung cancer and death. Often times these effects don't appear until many years after. Always be sure to consult professionals every time you need to deal with building materials in order to ensure it is properly identified and dealt with.

Sawcutting and Coring

All construction projects will require saw cutting and coring. The risk involved with these activities can vary depending on the location, phase in the project and scope of the actual work. This article will walk you through some of the best practices for saw cutting and coring in construction that we've picked up.

Saw Cutting and Coring Terms

As a formality let's first get you up to speed on the different terminology that we'll be referencing throughout this article.

Sawcutting – is the act of removing structure or material by way of a mobile saw system.

Coring – the act of drilling out a hole or section of a slab in the structure or building. Holes are typically round in nature.

X-Raying – the use of an X-Ray machine in order to scan underlying materials within a wall or slab.

Scanning – the act of using a scanner to identify materials inside or underneath of a wall or slab. Sometimes done with GPR.

Preparing For The Coring and Saw Cutting

There are a number of best practices to follow when preparing for the work.

Identify The Work

The first step you need to take is identifying what exactly is the new opening going to be required for. If the opening is for a duct and is large, you will need to saw cut. If the opening is for a smaller penetration such as conduit or piping coring may be the best approach.

Determine The Location

Once you have the scope of work defined you need to determine the location. When reviewing the location make sure to review it on site and on the drawings. Look for some of the following issues or concerns:

- [Access to the space](#) requiring coring and how equipment will be moved into place
- Surrounding interferences that would prevent proper setup
- Mechanical and Electrical services running underneath or nearby
- Other ongoing construction activities nearby
- Structural Interferences

- Location of the core on the under / backside and any surrounding issues (ie is it public space)

Engage a Sawcutting and Coring Contractor

Once you've identified what the work is, it's time to get a professional engaged. You'll be able to find local saw cutting and coring contractors in your yellow pages or online ([consider checking out our business directory](#)). At this point we'd recommend bringing someone out to do an initial review of the site conditions and prepare a quotation for your work.

Scanning or X-Raying

Your contractor that you engage will likely have the recommendation to scan or X-Ray. We'd recommend doing one or the other but both are very site specific. In general scanning is the "lighter" option of the two. Often times it won't be able to pick up everything in a slab or structure.

If X-Raying is required there are a number of precautions you should be aware of. X-Raying requires the use of an x-ray machine and the waves it emits can be detrimental to people's health. In Ontario best practice is to clear the area from people within a 100' sphere surrounding the work. As you can guess this can be quite challenging to do if there is a lot of work ongoing nearby so planning this work out well in advance is important.

With either option you need to have this completed before the work commences in order to ensure the work is being performed safely.

Completing the Sawcutting and Coring Work

Once you have a proper plan it's time to commence the actual work, below are a few rules for you to follow on the day of the cutting.

Rule 1 – Have a Pre-Job Orientation and Safety Meeting

A pre job orientation and safety meeting before the sawcutting and coring will force you to look at some of the hazards surrounding your work area. In your review the site team should be included. Make sure to pay attention to anything that has changed since your initial review. Check out our guide for having an [emergency response plan](#) and incorporate it into your safety review.

Rule 2 – Make Sure Nothing Has Changed For the Sawcutting and Coring

Has new conduit been installed in the area, furniture, etc. If something has changed from your previous review no matter what chances are that something was added or adjusted. Check above and below your cuts so you don't end up hitting anything you don't expect.

Rule 3 – Clear The Construction Work Zone

After checking above and below for interferences rope off the work area and work areas below your cutting and coring. If material falls you don't want it hitting someone below. You may want to consider having a spotter if it is practical.

Rule 4 – Remove the Sawcutting and Coring Waste

Leaving waste in your work zone will cause you to slow down your work and inhibit progress. Remove construction debris and material as it is created to keep everything running efficiently.

Rule 5 – Enjoy Yourself You’re Making A Change

Whether it’s for new work, or fixing something you’re doing something that wasn’t originally intended and something that may have a meaningful impact on someone’s life. Enjoy your work and don’t be afraid to show off the finished product.

Housekeeping and why it's important

Ever walked a construction site and it's a complete mess, housekeeping is lacking? We all have, and it's easy for workers to get caught up in the hecticness of a scheduled date and forget about cleaning their areas. But why is keeping your jobsite clean so important? Today we're going to answer a few reasons why for you.

First off, let's define what housekeeping is. Housekeeping is the act of keeping your jobsite clean and tidy. It means garbage is put where it needs to be, material is stacked and organized in an organized fashion. And access and egress points are kept clear of debris and material.

Housekeeping Reason One – Safety

This should be an obvious one but for some people it isn't. Safety is an important aspect of any construction project and trip and falls are a leading cause of incidents in our industry. If a slab has material lying all over it chances are it's more dangerous. If there is material everywhere there's a very good chance that someone could trip and fall over something or rub on a sharp object and cause an incident for your project site.

Housekeeping Reason Two – Productivity

Picture this – you're a worker who has a skid of material to deliver to a jobsite. You want to pull the material on a skid steer to a location a hundred feet away. Unfortunately, the jobsite is a mess. You can't get the skid there. So now you must carry each component on the skid back and forth to its intended location.

That workers time could have been reduced for material movement and they could have spent that doing actual work if the jobsite was clean. Keeping material organized not only allows workers to move their material better but it also allows people to find things quicker therefore improving productivity on your jobsite.

Housekeeping Reason Three – Attitude

Messiness can affect your attitude – if a jobsite is messy the workers may think that the leadership doesn't care. A lack of caring can lead to poor quality and people trying to take short cuts. A clean and organized jobsite indicates that the leadership team cares and is looking out for the workers and their work space. Morale and happiness can improve!

Housekeeping Reason Four – Perception

I can't count the number of projects I've walked through that are four months from occupancy, are a mess and look like a disaster. Typically everyone is in doubt that the project will finish on time.

One of the first recommendations I make to them is to do a clean. Once the clean is complete people's perception changes and suddenly people start seeing the job as nearly done. Just because we create mess with our work doesn't mean it needs to be that way.

Housekeeping is critical in construction and maintaining a clean jobsite can increase productivity and improve perception of your overall jobsite. How do you manage housekeeping on your project?

Quality on the jobsite

Quality, quality, quality. I hear this word in the industry more than any other. In an industry where schedules are decreasing, and budgets are becoming more lean the quality requirements seem to be going up.

You may have heard someone say, “things used to be built the right way” and while that may in some ways may be true a lot of driving true quality also means providing the time and budget to do things correctly.

In this article we will be addressing a few issues surrounding quality:

- What can be done early on to address quality?
- Can quality issues be prevented?
- What and where can investments be made to improve quality?
- What does the Punch List process look like and when is the best time to start?
- What other innovations and techniques can be used to improve the process?

What Can be Done Early on to Address Quality?

The preconstruction phase is where the whole project starts and the precedence and expectations for the project are set. One of the first things I recommend to clients to help deal with issues and reduce risk is to bring the team together very early on.

Bringing on all of your consultants (Architectural, mechanical, electrical, structural, LEED, building envelope, etc) at the start of the project allows everyone to start working together and coordinating early. One of my biggest pet peeves is the owner that signs up the Audio Visual consultant one month into construction (of course all of the openings and rough ins are going to change!).

Not only should you consider bringing on the consultants but a construction manager or general contractor should be involved as well. They can leverage their resources and knowledge to identify constructability problems early on potentially avoid costly change orders once the job has been awarded. In addition to providing the above the contractor can also provide schedules, costing and overall review of the documents being issued to ensure they have the information that they need to properly build it.

Can Quality Issues Be Prevented?

The short answer to this is no. Despite all of your planning and effort there will always be deficiencies or work not installed per the drawings and specifications. It's part of what we do and the entire reason the punch list process exists.

We can however be mindful of what the issues are and make efforts to improve or reduce the occurrence of quality issues significantly.

Understanding what causes issues the first step in preventing them, here are just a few causes of potential issues on construction sites:

- Schedules that are too aggressive or onerous on a single trade
- Poor contract documents and design
- Overly complicated details and design
- Site conditions
- Incorrectly selected contractors, subcontractors and consultants
- Poor building materials

What and Where Can Investments Be Made To Improve Quality?

This question is a good one because there are lots of really great areas where time and money can be spent to improve on quality to help prevent issues. This can start from very early on in the project and doesn't necessarily mean spending a ton of money on expensive materials.

One of my favorite areas to start is in the document and design stage. Having a general contractor do document reviews at the milestone submissions (ie schematic design, design development and various contract document submissions).

Another good idea both in preconstruction and during construction is investing in mockups. Mockups provide everyone with the ability to build a physical sample of what the drawings are calling for. This let's everyone see it and any tricky details will come to light before the project goes into full production.

Spending a small amount on a mockup up front could save significant time and money correcting issues down the road.

Selecting quality vendors is also an important part of delivering a good product. If a glass guy only does window wall there's a good chance that contractor is not going to be able to deliver on the custom glass ceiling that is specified. Understanding what vendors are good at and awarding to them accordingly is important. If something is a specialty item find the specialty company that delivers it and give the work to them, don't give it to a generic trade and hope things work out.

The same comment can be said about general contractors and consultants. Not all consultants and contractors are good at offices, or residential, retail, etc. Choose a vendor that is specific to what you're doing, they'll have experience and the know how to get the project done right and on time.

What Does the Punch List Process Look Like and When is The Best Time To Start

The Punch List process has been around forever, it's main goal is to catch and correct issues related to quality of the build.

There should be no project big or small that finishes without this process taking place. And the process is not limited to the consultant or owner, before an inspection is called for the contractor, subcontractor and supplier should be doing their own (formally or informally).

In days past there were numerous ways of performing this task and no matter who you talk to it's always the most feared and dreaded part. In recent years technology has made this process much smoother and easier to manage. We will touch on this a little later on and we have actually outlined some products in our technology on the Jobsite article which we featured last year.

There are a number of items which should be logged during the punch list process, for your use we've linked to a few great examples of punch lists below:

- [Punch list template – BridgitEverything To Know about Punch Lists](#)

As far as starting the process it should be implemented as soon as possible on a project. From outlining deficiencies surrounding layout to pointing out incorrect rough in it's important that identifying issues early on is implemented.

What Other Innovations and Techniques Can Be Used to Improve the Process

For the last part of this article I wanted to touch on some new technologies that are out there that can be helping us in this process. From monitoring site conditions, to automatically reporting data, to making the construction punch list easier technology is improving many of the processes we use and making them simpler.

Some of the best examples of this are the punch list process, don't believe us? Just run a google search for punch list software. You'll get hundreds of hits, but we've listed some of the best in our technology in construction article.

So where else can technology be used to improve quality? How about drones and HD cameras. On a recent project of mine we surveyed the entire building with a drone and high definition camera to give our historical consultant a chance to view areas he may not otherwise be able to see. Elsewhere drones are being used to survey projects and provide progress updates automatically to the team.

The last area I wanted to touch on is point cloud scanning. If your project is within or attached to any sort of existing condition point cloud scanning can be immensely useful. Basically a laser scans every point and provides an accurate survey of any surface. This technology used to be very expensive but in

recent years has come down in cost quite substantially. The ease of use has also decreased. This service allows you to understand details about a project and easily verify existing dimensions.

Quality In Construction

While safety, schedule and budget are all very important a lot of times it's quality that keeps customers coming back and paying more. Just think, all of the best brands in the world don't make things the quickest but make them the best. The next time you're doing something on a project. Ask yourself how can I do this right.

Section Five – Closeout and Operations

Building can be complicated. Helping people to understand what you're doing can help in reducing the stress of your clients.

Documents and Templates Included in this section:

- Executive summary report
- Weekly status report
- Financial Report
- Lessons learned

Reporting and Closeout – Featured Article

Financial Reporting

When someone thinks of the excitement of constructing a new building, financial reporting immediately comes to mind. We're kidding of course. For a lot of people financial reporting is something they don't enjoy. Nevertheless it is an important part of any construction project.

Throughout my career I've been on projects with both good and bad reporting structures and methods. Keeping an owner, and your own company informed of the financial status of a project is just as important as quality and schedule.

In order to determine who your report will be distributed to you need to first determine who your audience will be, there are two main audiences for reporting:

Internal Reporting – is important for two reasons. The first and most obvious is knowing how much money you will be making. Contractors charge fee on a project, and that fee is intended to go into the business. Reports help to monitor that fee and make sure the company limits exposure. The second reason is for cash flow. A project that doubles in value will have a significantly different impact on the organization.

External Reporting – is equally if not more important than internal reporting. Ensuring your client is aware of their costs is important. These reports should summarize the overall budget, potential change orders, cash flow, risks and more. These reports get distributed to your client and consultants.

[bctt tweet="Knowing your audience for your #construction #financial report is important as you'll want to tailor the information you'll be providing to the audience's needs" username="cnstrctrdotcom"]

How Often Should Construction Financial Reporting Be Issued?

The contract is the first place to start when determining how frequently your construction financial reports should be issued. There may be information outlined in the specification or the contract itself which dictates both frequency and timing of the reports. Consider issuing your reports on a monthly basis if the contract doesn't specifically outline it in detail. This will typically cover you from both a liability and due diligence standpoint.

What Should be Included In Internal Financial Reporting?

There are a number of key items which need to be included in your internal financial report, below we'll walk you through each and provide some examples.

Internal Reports

Forecast – the forecast needs to at a bare minimum identify what your budget numbers are, costs or committed costs to date and anything left over or any over run. You should break this report down by division including soft costs from hard costs (your costs vs costs that are subcontracted out).

Staff Forecast – if you're part of a larger company staff planning is important. Provide forecasts for the staff you have on your project including how long they have been on the project vs how long they have remaining. You can use this as a staff loading chart to tell you how much money you have to spend on staff.

Fee – we are all in business. Part of running any business is making money. Identify how much money your project will be bringing in for your company in a separate report.

Schedule – Provide a schedule. Don't know how to prepare a schedule sorted by WBS? Don't worry we have you covered with this article on construction scheduling.

External Financial Reporting

Forecast – depending on your contract type the reporting requirements here will vary. For example, if you have a lump sum contract the amount of information you're required to provide is minimal. On a construction management contract you'll need to be more transparent. Regardless, as a bare minimum you should outline all of your budget line items for each division.

Changes – identify changes by a reference number, status of them and the value. Identify if they have been issued by consultant, quoted or if a change order has been issued and fully executed.

Risk – this is one of our favourite parts. [Identify any major risk items that are out on the project right now](#). For example, if there's a chance you'll find asbestos, identify what that cost could be. These are "might happens" but at least you're identifying it early rather than forcing your owner to make a last minute decision. As part of this report you should identify the likelihood of it happening again. For more on risk check out our managing risk in construction article.

Cashflow – ensuring an owner knows how much money they will need to spend at certain points in the project is important. Providing a cash flow graph should be mandatory in every report.

Schedule – your contract likely has a legal requirement to provide a monthly schedule update. This is a great way to easily satisfy that requirement. To take it a step further, provide a written summary.

Submittals and RFI's – provide a log and summarize outstanding submittals and [RFI's](#) from your trades.

Putting Your Construction Financial Report Together

This report will take time to put together. Be proud of the work that you've done and make sure other people are aware of your pride. Put a nice cover on it. Make sure there are headers on each of your pages, page numbers go a long way.

Just because we work in an industry that isn't always the fanciest doesn't mean we can't prepare professional looking documents.

Take the time and prepare a professional looking report. It will go a long way to getting your client to appreciate the report. Add images and graphs where you can to help simplify the communication of data. Things such as pie charts and bar graphs are always useful.

Managing Risk In Construction

Construction projects are full of risk. From the start of the project a schedule and budget can be impacted by issues that arise. Having an understanding of what those issues could be, and having a proper contingency plan could mean the difference between success and failure.

There are many articles online about dealing with risk in different ways. Below we've included some high level ways to manage risk on your project.

Create a Risk Registry

Risk registries are essentially a list of items that could go wrong or impact the project. These registries are then used to track issues throughout the project and put extra emphasis into those activities to make sure they don't impact the project.

A risk registry can contain the following item:

- Risk Item
- Impact to Project
- Mitigation Method
- Likelihood of Occurrence

The link below is a great resource on developing a risk registry for a project.

- [Key Elements to a Project Risk Register](#)
- [Purchase Our Construction Risk Register Template](#)

Manage Your Schedule, Identify Areas with Lots of Float

Managing your schedule is important. Understanding your critical path is a huge part of that understanding. Knowing what items are critical and what items have more float and therefore more room for flexibility is key. Your's and your team's time is limited, when you get into the weeds it's important to know where your time is better spent and if some things can slip in the interest of the critical path.

For some good articles and understanding float refer to the below links:

- [Understanding Float](#)
- [Project Critical Path](#)

Cover the Costs

Whether you're a contractor, subcontractor or owner it's important to put money aside for a rainy day. With the risk register established you can assign values to each item at the start of the job and set aside some money within your estimate to deal with these issues. If you're an owner, you can create pools within your overall budget to deal with these types of issues.

- [Contingency – what is it and who owns it](#)
- [Contingency – 7 Key Things to know](#)

Don't Lose Your Cool

It's important to remember that life will continue on even after something happens. Managing an issue on the job takes a clear head and calmness.

Use logic to solve the problem, not rage or anger.

Utilize people around you who are more specialized than you. There will always be someone who knows more about a specific subject than you and can help out.

Managing risk in a project is not easy and is difficult. There are many different approaches and the items above are just some of the things you can do to help reduce the likelihood of risks impacting your project. Utilize even one of these items will help to reduce impacts more than doing nothing!

Logistics – Featured Article

Project Closeout

We've all been there, stuck on that job that everyone has left, construction project closeout is not fun, but it's a necessary evil of every project. Depending on what type of project you are on, project closeout will look different, but depending overall there should be three main areas you need to be focusing on:

- Turnover and Permit Closeout
- Quality and Issue Closeout
- Financial Closeout
- Warranty Period

Focusing on these areas won't necessarily guarantee a successful closeout but will put you on the right track.

Construction Turnover and Permit Closeout

Construction Turnover, Occupancy, Substantial Performance (incase you're not sure what each of these are we've added them to the glossary). Project turnover and can be a confusing process but there are a few main procedures to follow.

Project occupancy means that people can begin using the building. In order to get occupancy you need a number of documents from your consultants and various agencies but ultimately it's the building inspector who grants occupancy. Some of the documents they will be looking for include:

- Letters from each of the consultants confirming that the project is built to drawings and specs
- Letters from fire alarm vendor
- Letters from Electrical Safety Association in your area
- Documentation on flame spread rating and firestopping / fireproofing material
- Signoff from third party inspectors
- Sign off from elevator inspectors

There are many different documents which can affect occupancy – your best bet is to discuss these with your building inspector well in advance of the date of turnover.

The Day of Construction Turnover

On the day of turnover, ensure that all of your consultant walkthroughs have been completed, that your life safety systems are commissioned and all of your fire separations are completed. Exits need to be in conformance with the building code.

Construction turnover should never be a surprise, regular walks with your building inspector in advance of the date should set the expectation in advance for what the building will look like come the big day.

Post Construction Occupancy

Once you have occupancy, there will likely be a list of items the building inspector wanted complete or that were deficient. Getting these items completed so the building inspector can close your permit. Getting these items completed in a timely manner can help to avoid complications with operation of the building in the future.

To help manage these issues create a master list of all of your deficiencies, highlight these as a critical item and assign them to yourself.

Quality and Issue Management (Construction Deficiencies)

Lot of owners have high quality expectations and as part of your business model you need to deliver. If the contract documents and your budget don't reflect the quality that you think your owner will be expecting you need to level with them up front and discuss with them the requirements to deliver that level of quality.

As you near the end of the project it's time to start implementing your deficiency process. Start this process several months in advance of the turnover date.

We've already written a really [great article on quality and how to manage the deficiency process in construction](#) so check it out here.

The most important part about issue closeout is that you don't let things linger. The longer issues sit outstanding the harder they can be to resolve.

Financial Construction Closeout

There's a part in every project manager's project where they start to get nervous about over running the budget. Lot of times that nervousness comes in the last few months of the project when they start reconciling all of the trade values.

[bctt tweet="Having an effective construction financial closeout plan can help to eliminate risk, reduce the amount of time a project lingers and increase profit on a project. #construction #finance #architecture #projects " username="cnstrctrdotcom"]

Typically on projects I like to start this process a few months before turnover. There are a few good practices to start with:

- Send an email all trades requesting any outstanding quotations by a certain date. If they fail to submit them by that date indicate that they will not be accepted. This way you put the trades on notice to ensure all quotations are submitted.
- Request quote logs from each of the trades – this way you can be sure that the ones you have match their list and there are no surprises down the road on a quote you may have overlooked in your inbox.
- Review your change notice log for completeness. Ensure all quotations are submitted to the owner well in advance of the project completion date.

Substantial Performance on Construction Projects

There's a requirement in most contract types to apply for substantial performance. Essentially substantial performance is a mathematical calculation that if granted begins the 45 day holdback period. Check with your local construction association or architectural association for the guidelines in your area.

- The submission typically involves identifying a few items:
- Amount billed to date
- Value of work outstanding
- Value of deferred work (work that was delayed by the owner and agreed not to be included in the initial turnover date)
- Value of deficiencies

Assuming the amount of outstanding and deficient work falls within a value as dictated by the calculation you'll be granted substantial performance on your construction project. Once granted it's your responsibility to send it to your local construction association for publication. This will notify subcontractors on your project and begin the lein period.

A lein can be applied at any point on your project, however after the 45 day hold back period expires the project can no longer have one applied to it that would otherwise affect occupancy of the project.

The Construction Warranty Period

You've turned over the building and achieved substantial performance but the job isn't over yet. Many contracts have a warranty period. One year is typical for the industry but your contract may stipulate longer periods. During this period you and your subcontracts are responsible for fixing defects that arise in the workmanship for the project.

It should be made clear to your owner that the warranties don't cover damage or improper use of equipment. In order to protect yourself we recommend issuing a letter to your owner and architect outlining the procedures for warranty claims and what is covered.

During this time it's important to keep a log of warranty issues. This was if the same issue reoccurs you can identify it more easily and keep track of problem trades.

People's time can be valuable and sometime this task get's assigned to people on new projects. If you are the owner of your business it may be worth hiring someone dedicated to resolving warranty issues on other projects.

Construction Closeout Done Better

Construction closeout will be the last experience your owner has of you, and doing it poorly can mean a loss in return business.

Spend the time to do construction closeout right, be diligent and follow up regularly on outstanding items. Doing these things will help to turnover and deliver a strong finished product.

Thank you for reading the Construction Toolkit

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