

the essential guide to

RUNNING YOUR CONSTRUCTION PROJECT

why some projects fail while
others succeed

KYLE PARRY



THE ESSENTIAL GUIDE TO RUNNING YOUR CONSTRUCTION PROJECT

Why Some Projects Fail While Others Succeed

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Essential Construction

Toronto



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INTRODUCTION - WELCOME TO A BETTER PROJECT

My Gift To You

We've all been there; on the project that doesn't seem to have an end date with so many changes that it seems unmanageable. During this time your efforts may seem hopeless, you may be stressed. But how do you get out of it and where do you start?

My name is Kyle Parry and I am the author of this book. I also run a Construction Consulting Business called [Essential Construction](#), and a network of sites including [cnstrctr](#), [Construction Repository](#) and [Constructor School](#).

I started my career in construction like some of you, fresh out of school. I remember being excited to start a new role in the industry, invigorated to get out there and make a difference. And like many of you I ended up under a crusty old superintendent who gave me a crash course in construction.

The construction industry is one of the largest industries in the world. By 2030 it is expected to do over \$15 trillion in business globally. For an industry that is so large it's also an industry that suffers due to its hesitancy to change and share information.

When you start a project in construction or a new role it can sometimes feel overwhelming. A quick google search on any given topic will return a

number of articles, many of which will be unhelpful. When you read something you may think to yourself, does this person have credibility? Have they done this before? How do I know this is right?

This book is intended to be a fix for that.

This book is intended to be a fix for the person that's in over their head on changes. This book is intended to help those that have never managed a project before. This book is intended to help guide and improve upon processes for the person that is entrenched in the industry.

Over the years I've recognized that there are a number of essential pieces of information that people need to know on any given project or in their careers. I've experienced each of the lessons provided in this book first hand and the writings are a result of the mistakes and lessons learned that I've had through those experiences.

While I don't expect this will be all encompassing to the construction industry it's a start.

Whether you're an architect, an engineer, a plumber or a project manager we are all in this industry because we take pride in creating things from scratch. We love the reward of seeing people use the structures we design, develop and build.

This book is intended to assist you in developing your skills as a project manager, superintendent, engineer or architect. It will help you to understand project processes, onsite activities and help you to master your project.

Thank you for downloading this book and I really hope you enjoy!

Yours Truly,

Kyle Parry

Founder of Essential Construction

PART I.

**ESTIMATING AND
PRECONSTRUCTION**

CHAPTER 1.

CONSTRUCTION ESTIMATING - THE TENDERING PROCESS

Get Your Trades Onboard Faster and Cheaper

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 drywaller. 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 availablke in their office for the trade to come and review.

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.

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.

CHAPTER 2.

CONSTRUCTION ESTIMATING - POST TENDER INTERVIEWS

Key Questions For You To Ask

The post tender interview for a subcontractor can be a make or break moment for both sides on a construction project. A post tender meeting happens after the project tendering phase has been completed.

Often the final scope and schedule for the construction project are defined during this meeting. Below we've brought you ten questions that you can ask – or you may be asked during a construction post tender interview.

QUESTION ONE – WHAT CONSTRUCTION PROJECTS DO YOU HAVE ON THE GO OR DO YOU HAVE UPCOMING?

This is one of my favourite questions to ask right at the start of the construction post tender interview. The reason I ask this question first is that it's a lob ball and gives people the chance to talk about their successes. By allowing the other party to talk about their successes it gets them comfortable with their surroundings and the people they are talking to.

If you are a subcontractor this is an opportunity to sell to the client your work, but more importantly, how this project fits in with your current work

load. Don't be too excited to tell people about everything you have on the go.

QUESTION TWO – WHAT RELEVANT CONSTRUCTION PROJECT EXPERIENCE DOES YOUR COMPANY HAVE?

This question is asked second because it ties in nicely with the first question and will help you to understand what experience the contractor has. The subcontractor will be forced to give you projects of similar work experience. Look for projects with similar quality requirements, complexities and for clients that are your competitors.

As a subcontractor you should enter the meeting knowing the answer to this question. You may have a project list of five hundred projects, but if the job is a shopping mall and the projects are all tunnel work it won't help your case. Provide a list of work that most closely exhibits the project you are meeting for.

QUESTION THREE – WALK US THROUGH YOUR APPROACH AND ANTICIPATED CONSTRUCTION FOR THE PROJECT?

I like to jump around in my post tender interviews a bit more than most people, but the reason for doing this is to keep people on their toes. This question is designed to get the person across from you thinking. It will show you if they prepared for the meeting or not because this isn't a question that is answered without some forethought. Going into the interview you should have an idea of the number of crews and sizes the subcontractor will need to complete the project. If they are over or under

by a lot you should be concerned that they over or under estimated the project.

As a subcontractor know the number of man hours you priced into the job and discuss this. Discuss any critical phasing that was included in the construction bid documents and speak to it. If there will be multiple crews required in different areas discuss how you believe your construction crews will be applied. Even if you're wrong it shows the contractor that you've put some thought into things and educated yourself. Always leave the conversation stating that you'll work with the general contractor to satisfy their phasing and schedule requirements.

QUESTION FOUR – ANY FURTHER SAVINGS OPPORTUNITIES TO HELP CUT CONSTRUCTION COSTS?

Everyone loves to save money. The construction industry is no exception to that rule. Depending on your construction contract you may want to phrase this differently but the intent is the same. How can you save me money? This question gets asked for two reasons, one is the actual question itself, the second reason is to help you gauge the trustworthiness of the person. If you know there are obvious savings and the person doesn't bring them up it might prove to you that you can't trust the person.

As a subcontractor I'd recommend coming prepared with a list of different savings options. Even if some of them are outrageous (ie deleting scope) it shows the contractor and owner that you went the extra mile. Some of these don't even need you to put a number beside them. Just by showing that there could be construction savings may intrigue the contractor enough to continue a conversation with you if you are not low.

QUESTION FIVE – ARE THERE ANY DETAILS OR SCOPE THAT YOU WOULD DO DIFFERENTLY THAN WHAT'S SHOWN ON THE DRAWINGS?

Despite what architects will tell you, they don't always know best. By asking if there are any details that could be changed, you're asking the individual if they've gone through the drawings. This question could help to save money, save a costly request for information further down the road and speed up the project. In many instances contractors know a better way to build something, by asking them up front you're not blind siding the architect and being pro-active. If they don't have any suggestions chances are they don't know the project that well.

As a subcontractor you're the professional. Spend a half hour with the drawings and come up with some things you'd do differently to improve quality or make the project better. Even if this question doesn't get brought up you should initiate it. It will help you to show off and show the contractor that you know your work and care about the success of the project.

PRO-TIP – JUST SHOW UP

Show up to the interview, dress nice, present well and there's a good chance that as long as your number is competitive you'll get a call back. Post-tender interviews can be daunting on both sides, but be relaxed and look at it as more of a conversation than a pitch. Your level of comfort will show people you know the project and are prepared to tackle it.

What's the last post-tender interview you were part of? How did it go? Share below in the comments some of your lessons learned.

CHAPTER 3.

PRECONSTRUCTION - COMMON TYPES OF CONSTRUCTION CONTRACTS

The Foundation Of Every Construction Project

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.



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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 owner's money. Because the contractor has had the 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 over-runs 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 contractors 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 it's 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?

CHAPTER 4.

PRECONSTRUCTION - CONSTRUCTION MANAGEMENT

The Better Approach

Construction Management is a form of contract within the construction industry that is used throughout the world. Unlike lump sum contracts, construction management allow the general contractor to take on a universal role to help manage the overall project.

HOW IS CONSTRUCTION MANAGEMENT DIFFERENT?

Construction management was first introduced formally to the construction market in the 1900s as an alternative to traditional lump sum projects. To start let's define the traditional approach to a project:

- Contractor receives a set of documents prepared by a group of consultants
- The documents referred to as the “contract documents” are for the most part complete. The contractor submits a bid for the project based on the drawings and specifications.
- Any scope that changes outside of the “contract documents” the contractor submits a quotation for a change order

Under a construction management things change slightly. Some of the risk

for the overall scope of the project is placed back on the contractor. Below is a breakdown on how a construction management contract works:

- In some cases the contractor or construction manager is brought in early to assist with the design.
- The contractor develops a detailed estimate which in some cases includes tendered numbers as well as contingencies or allowances to complete the project. These contingencies are intended to help supplement the documents.
- As the project progresses contingencies are drawn down from in order to complete the project.
- Owner initiated [changes are priced in addition to the contract](#).

As you can see above the construction manager has more incentive to ensure the estimate is complete and depending on the type of contract shares some of the overall project risk.

TYPES OF CONSTRUCTION MANAGEMENT CONTRACTS

There are a few different types of construction management contracts that exist. In each region these may be tweaked or named differently:

Construction Management At Risk

The construction management at risk contract type is more onerous on the contractor. The contractor essentially takes on the risk for the financial health of the project. Depending on the inclusions the contractor takes on some responsibility for managing them within their budget. Typical inclusions can include things such as site conditions and design coordination.

Construction Management – Cost Plus

While these types of contracts don't come around often a cost plus type contract involves the construction manager assisting the owner with the construction project. Unlike the above at risk option, in this situation the construction manager does not take any of the risk. Any over runs on budget line items are the responsibility of the owner.

WHAT ARE SOME KEY TIPS FOR GETTING INTO CONSTRUCTION MANAGEMENT

The world of construction management can be intimidating if you haven't done it before but overall it creates a more cooperative project environment. Everyone is more encouraged to work together and much of the confrontational aspect of construction management is removed.

Get Involved In The Project Early

This is a key tip – construction managers are only as good as their role and what they are allowed to do. A big part of that is having input on the design development and being able to catch problem details early.

Develop A Construction Schedule Early On

[Developing a construction schedule](#) early on will help your owner and the remainder of the project team. A construction schedule will give your team dates to work towards for each of their milestones including design and permitting.

Leave Room In The Budget For Unknowns

Submitting your construction budget at the lowest possible number is

never wise. Things will typically come up in construction that you couldn't have foreseen to make sure to leave room for that type of thing. If your owner is sensitive about that type of thing, try and do it without them knowing or be upfront about it and honest with not accepting risk for unknown conditions.

Don't Do It Unless You're Experienced

One of the biggest mistakes we see with construction management contracts is inexperienced construction managers getting involved with them without realizing what they've signed on to. If the project type or concept is unfamiliar to you, consider getting some experience under your belt on traditional contract types to develop a better understanding of the risk.

PART II.

**PROJECT
ADMINISTRATION**

CHAPTER 5.

CONSTRUCTION PROCESSES - PROJECT STARTUP

Start Your Project Off On The Right Foot

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 alot 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

The project execution and construction plans are really just documents which outline the different processes you'll be following on the project.

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?

CHAPTER 6.

CONSTRUCTION PROCESSES - 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.

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.

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](#)

Need a useful construction submittal template? [Check out ours at Construction Repository.](#)

CHAPTER 7.

CONSTRUCTION PROCESSES - RFIS

Asking A Question The Right Way

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 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.

What is a Construction RFI

An RFI (request for information) is a formal way of documenting 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.

WHERE DO I BEGIN IN ISSUING AN RFI?

The number one rule when preparing the document is:

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

Too many times in my career have I seen this. Typically the reason is someone did not look hard enough at the information that is readily available. Once you're confident that the answer doesn't exist elsewhere begin the process of preparing an RFI. The following are guidelines and advice to be used when preparing the document:

STEP ONE – 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 TWO – 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.

STEP THREE – 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 Four – 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 Five – 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.

TEMPLATES AND OTHER RESOURCES

Below you will find some additional resources on this subject for you to use.

- **cnstrctr RFI 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>

CHAPTER 8.

CONSTRUCTION PROCESSES - MEETINGS

Run Your Meetings More Effectively

A construction meeting can be an important part of a project. Important decisions can be made or problems can be solved in meetings so running them correctly is important. Today we're going to share five tips with you on how to ensure your next construction meeting is successful.

SHOW UP PREPARED TO YOUR CONSTRUCTION MEETING

The number one rule to any meeting (regardless of whether it is in construction) is to show up prepared. Before you attend your meeting you should be educated in the subject and have all of the background information. Be educated when you enter so that you can be valuable to the team.

ENSURE THE CORRECT PEOPLE ARE AT THE CONSTRUCTION MEETING

Ever been in a meeting that has too many people? What about a meeting that doesn't have enough and no one seems to know what's happening at it? We've all been there. It's very important that when organizing a construction meeting and taking part in one that the correct people are

present. Too many and it can waste everyone's time. Too few and you may not have the correct resources to answer all of the questions.

Understanding the correct number of people for any given subject or meeting will take time to learn.

START WITH AN AGENDA

Prior to commencing the first construction meeting it's important to develop an agenda in order to keep people on track. Depending upon the subject and nature of the meeting it can something as simple as some hand written notes or subjects.

If your meeting is more formal it may be worthwhile to type up a full agenda that you share with those attending prior to the meeting starting.

The benefit to this approach is that it allows the people attending the meeting to educate themselves in advance.

KEEP ACCURATE MEETING MINUTES

Keeping an accurate record of a construction meeting through meeting minutes is important. Being able to reference what happened at the meeting, and, understanding who was responsible for what action items will dictate how the project moves forward.

Meeting minutes aren't intended to point the finger at someone, but rather, to create accountability and create a historical record of the meeting.

If the meeting is a recurring meeting, a review of the minutes should be performed first followed by new business.

KEEP ITEMS HIGH LEVEL UNLESS THE MEETING IS INTENDED FOR DETAIL

To avoid wasting everyone's time, keep the items for discussion high level. Unless the meeting is specifically to address a certain issue, the items should be kept to a summary, and if additional detail is required a follow up meeting or phone call can be arranged.

Construction meetings are a necessary part of every project, they do not necessarily have to be a waste of time. By following our golden rules above, your next meeting will run smoothly and be more effective.

CHAPTER 9.

CONSTRUCTION PROCESSES - FINANCIAL REPORTING

Keeping Your Project Finances On Track

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.

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

HOW OFTEN SHOULD CONSTRUCTION FINANCIAL REPORTS 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 your from both a liability and due diligence standpoint.

WHAT SHOULD BE INCLUDED IN A FINANCIAL REPORT?

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 Reports

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 atleast 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.

ADDITIONAL RESOURCES

Below are a few links to some additional resources to help you prepare your reports:

- [Additional sections that you might include in your report](#)
- [Sample progress report](#)
- [Sample progress report #2](#)

CHAPTER 10.

CONSTRUCTION PROCESSES - CHANGE REQUESTS

Every Owners Worst Nightmare

If there is one thing an owner instinctively get's 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.

ASK FOR A CONSTRUCTION CHANGE DOCUMENT

One of the biggest mistakes you can make is to blindside someone. Noone likes to be surprised and people like it even less when that surprise comes with a bill.

If you know there is goinfg to be a change on the project ask for a Change Notice, Site Instruction or even an email asking the owner or consultant for your 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 folllows:

- 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.

CHAPTER 11.

CONSTRUCTION PROCESSES - PROJECT CLOSEOUT

Leave A Lasting Impression

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)

Alot 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. A lot of times that nervousness comes in the last few months of the project when they start reconciling all of the trade values.

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.

PART III.

**CONSTRUCTION
PLANNING, LOGISTICS
AND SAFETY**

CHAPTER 12.

CONSTRUCTION SCHEDULING - FUNDAMENTALS OF CONSTRUCTION SCHEDULING

Learn To Schedule

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 schedule 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 to 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 your 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](#)

CHAPTER 13.

CONSTRUCTION SCHEDULING - PRODUCTIVITY AND SCHEDULE ACCURACY

Be Right With Your Durations More Often

Improving productivity and schedule accuracy in construction can save time and money on a project. How does the old saying go? Time is money? In an industry where we are judged by the hour, picking up time here and there can make a job more profitable.

So how do you do it?

PRODUCTIVITY AND SCHEDULE ACCURACY STARTS WITH HAVING A CONSTRUCTION SCHEDULE.

Your schedule and your budget should be your bible on a construction project. No it's not a document to "kind
o[https://www.cnstrctr.com/general-construction-knowledge/fundamentals-of-construction-scheduling/f follow](https://www.cnstrctr.com/general-construction-knowledge/fundamentals-of-construction-scheduling/follow)". This is your timeline, your story, and it's important you stick with it. [At the same time creating a schedule at the start of a project and ignoring it is just as bad as not having one.](#) You need to be constantly back checking against your schedule.

HOW CAN I CHECK PROGRESS AGAINST THE MASTER SCHEDULE?

There's a myth in the construction industry that once you issue a schedule everyone will read it. Wrong. Noone reads it and those that do likely are doing so because they are bored. You need to force people to read your schedule and the best way of doing that is by monitoring closely.

This is the big construction productivity and scheduling secret – monitoring, informing and adjusting.

This can be done using a few methods:

Highlight Drawings – seriously – good old fashioned highlighters or better yet using a PDF software that allows you to do takeoffs such as bluebeam or onscreen. Monitor progress and track it daily. If your drywaller is moving too slowly – show him why. If you think that one painter isn't quite cutting it you can have the discussion with your painting company about why.

Track Quantities – so after you've highlighted the drawings next step is to log them all. Create a spreadsheet with some of the following columns / date:

- Original Duration
- Original Quantity
- Daily Quantity (Track each day separately)
- Expected Completion (Create an equation that divides the Original Quantity by the average daily quantity)
- Total manhours (men per day)

The above will help you to better understand how many days.

Historical Data – after you've done this long enough you're going to come up with a quite comprehensive log which includes a daily list of how many men are accomplishing what. The next time you're on a project where 3 drywallers are doing the same amount of work as 1 was on your last project you'll be able to discuss it with the foreman and show him real historical data.

Tracking schedule progress and maintaining logs is not difficult to do but can improve your scheduling prowess, accuracy and can help you to improve productivity with the various crews on your next construction project.

Will you be implementing the above on your jobsite?

CHAPTER 14.

CONSTRUCTION PLANNING - PREPARING CONSTRUCTION PLAN

Plan Every Detail Before Your Start

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 companies 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.

HOW TO PREPARE A CONSTRUCTION PLAN

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:

1. Project or Work Summary
2. Milestone / High Level Schedule
3. Sequence of Work / High Level Description of Site Logistics
4. Site Summary
 1. Construction Site Safety

- 2. Temporary Protection
- 3. Interaction with Public Realm
- 5. Deliveries and Material Handling
 - 1. Delivery Management
 - 2. Vertical Access Plan
 - 3. Lifting and Hoisting
 - 4. Garbage Disposal
- 6. Temporary Services
 - 1. Electrical
 - 2. Heating
 - 3. Water
 - 4. Washrooms
 - 5. Gas (if applicable)
- 7. 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.

CHAPTER 15.

CONSTRUCTION PLANNING - MANAGING RISK

Reducing Risks Helps The Whole Project

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](#)

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!

CHAPTER 16.

CONSTRUCTION PLANNING - LEAN CONSTRUCTION AND PULL PLANNING

Improve Your Weekly Meetings

I know what you're thinking, here we go again, another blog proclaiming another lean construction technique to be "the best ever". Fear not for we at cnstrctr are generally skeptical when it comes to new methods to time proven ways of doing things.

So let's start with something simple – **what is lean construction?**

Lean construction is one of those buzz words going around the industry right now. Essentially what it means is reducing the number of processes in place either through collaboration, automation or refining processes. This isn't a new concept but it's picked up a lot of steam in the last few years.

We won't go into a lot of detail surrounding other lean construction techniques, but, if your're interested there's a [blog all about lean construction you can check out](#).

HOW DOES PULL PLANNING FIT INTO IT?

Pull planning is considered a lean scheduling technique. We'll go into

what it is in a bit but all you need to know for now is that it makes scheduling weekly and daily tasks easier through collaboration.

OKAY GREAT – WHAT IS PULL PLANNING?

Pull planning is given away by its name. Planning by pulling. Essentially rather than starting at the beginning as you would most schedules you start at the end (with an already pre-established milestone) and work backwards.

Pull Planning can be done without the use of special systems but, someone has patented the idea and you'll often hear the "Last Planner System" mentioned. The Last Planner System is an exercise using sticky notes to represent activities and it's what we will be discussing today.

The Last Planner System (aka Pull Planning) brings all of the people you need into a room (ie foremen, project managers, etc) and lets them contribute to the schedule. It begins by posting a milestone (ie project completion) and working backwards. Each trade is responsible for posting their own activities with their own coloured sticky note in the sequence.

So for example if the milestone was project completion the sticky note before it might be finished paint, and the sticky note before it might be finish taping.

Each week you review the progress that was made and remove stickies that were completed. The week ahead is then reviewed, new stickies added or reconfigured as needed.

SO WHAT DO I NEED TO GET STARTED?

There are a lot of little miniscule details that you could get bogged down with in this system but the overall concept is very easy to get started with. Your first step should be getting your foremen together on a weekly basis. The next step will be finding a wall, drawing some lines on it in a grid and buying some coloured stickies. After that the exercise is straight forward (as explained above).

There are kits and special stickies you can buy but that is over complicating the process.

The intention of the Pull Planning process is to get people communicating. So if the painter needs to paint walls he needs to be clear on what he needs. If that means having the drywaller finish tape the walls instead of just drywalling them, it can be discussed in the meeting rather than find out two weeks later.

GREAT – I'VE GOT THE CONCEPT FIGURED OUT, WHAT'S IN THE PULL PLANNING DETAILS?

The details are where the Last Planner System really stands out (and may over complicate it a bit). There are a number of other key items to do when performing this exercise, we've summarized a few of them below:

Phase Planning and Weekly Planning – on larger projects it may be necessary to have a larger session where you focus on the phase instead of the weeks ahead. This will allow you to generate a “big picture plan” and that will be followed weekly by the regular planning sessions.

Manpower, Constraints, Etc – the kits come with constraints, manpower counts and other details listed on the stickies. These are there to help trades understand where their crews are and their overall manpower requirements. The constraints allows trades to list items they need to complete their task.

Measurement – Each week the pull planning boards are updated and a percentage is taken to see how many dates were actually hit. If a trade finishes an activity ahead or behind schedule it means the activity was missed. This incentivizes people to start being open and honest about their work.

Issues – Issues are listed each week and that way management can track them and ensure they get resolved.

THIS IS ALL REALLY GOOD INFORMATION ABOUT PULL PLANNING – BUT WHAT DOES IT IMPROVE?

People that are really into the whole lean and process improvement will rhyme of a number of statistics at this point. The honest truth about pull planning is that it improves a few things:

- **Communication** is improved by each trade being responsible for their own activities and timelines. People are responsible for identifying their own activities as well as those of others so more discussion happens up front.
- **Scheduling Accuracy** – because people are encouraged to be more open about their work and the durations you won't have activities slipping forward or backward each week.

Pull Planning utilizing the Last Planner System isn't intended to reinvent the wheel and won't cut time off of your project schedule but it will help you in developing your weekly plans.

Have you implemented Pull Planning on your construction project?

CHAPTER 17.

CONSTRUCTION SAFETY - AN EMERGENCY RESPONSE PLAN

Safety Is About Planning Ahead

We work in an industry where things don't always go as planned. Even the best projects have things go wrong and in most occurrences it's how you handle that situation that determines whether or not the problem persists, or has an impact on the overall project cost and timelines. This article will help you do understand the importance of having an emergency response plan as part of your safety plan and some of the components that make that up.

There are many components that can go into an emergency response plan and according to the [IHSA](#) (Infrastructure Health and Safety Association) the following considerations should be taken when beginning to compile one:

1. hazard identification/assessment
2. emergency resources
3. communication systems
4. administration of the plan
5. emergency response procedure
6. communication of the procedure
7. debriefing and post-traumatic stress procedure

Ultimately all of the above are very important parts of an emergency response plan but there is a list of items that IHSA also outlines that I feel are far more important:

- Stay calm.
- Assess the situation.
- Take command.
- Provide protection.
- Aid and manage.
- Maintain contact.
- Guide emergency services.

Today I am going to run through a few key points which should address all of the above as well as the list of items related to putting together a plan.

CREATING A PLAN AND PUTTING IT INTO ACTION

Creating and maintaining additional documents is something we all love to do right? Let's be honest I know how much we all dislike added paperwork but putting together a formal plan is something that could literally one day save your life. It's important to create an actual document (crisis plan) because a) it's a legal requirement in some locations but b) when something happens having a plan will help prevent you from scrambling and put you into execution mode.

The seven items that were listed at the start of the article are the key items to include but I want to touch on a few of them:

Hazard Identification and Assessment – (Key behavioural items – stay calm)

The key to any plan is understanding what is wrong. One of the biggest

mistakes you can do when something goes wrong is start to panic. Staying calm is so important and difficult, it's only natural to start thinking 'oh no I'm in so much trouble'. In construction we work around dangerous situations all the time so identifying what's wrong and the severity of the situation is the first step. Start by asking yourself who, what, where when and why?

Communication System (Key behavioural items – Take

Command) Being able to effectively communicate in a time of crisis is just as if not more important than being able to identify the issue. When preparing your communication plan it's important to ask yourself the following:

- Who needs to be aware of the issue and what are the timelines?
- What is the primary means of communication (phone, email, fax, direct communication)
- What are the contacts for the emergency response (911, an emergency spill response team, a company that specializes in restoration of impacted areas, etc).
- Third party contacts that can assist (ie your HSE department, insurance, lawyers, PR department, etc)
- Who is the point person in charge of a situation that all communication will flow through or to

Each of the above is important to know as they directly impact how you communicate in the event of an issue on a construction site. Understanding how you communicate is also important, as an example, on a previous project my team had an group chat. In the event of an emergency we used the chat group messages to communicate, not only did this give us a full picture of what was happening but created a great log for the reports that inevitably follow.

Emergency Response Procedure (Key behavioural items – Guide Emergency Services)

After reviewing the situation implementing a proper procedure is important. Often when people are in a stressful situation, having something they've reviewed and written down in the past helps guide them through the difficult time. The various steps within the emergency procedure should be implemented.

If you've reviewed the situation and determined that emergency services are required don't hesitate to contact them.

The only downside to calling an ambulance or fire department when it's not required is a minor fee. When you compare this to saving someone's life or preventing massive property damage the difference is staggering.

Make sure that there is someone responsible for making the decision to contact EMS. If your site is large and confusing it would be wise to assign someone to meet them at the road or at the entrance to your project. Precious moments can be lost when trying to find the issue. Make sure all of the above, including information on closest hospital and fire department are outlined in your emergency response plan.

POST INCIDENT PROCEDURES AND SAFETY TO KNOW

So after things have settled down and work on recovering has begun start to think of the following items:

- What was the damage? What do we need to replace?
- Is this going to be covered under insurance?
- Are there any agencies I need to notify (ie services, WSIB, Ministry of labour, etc)
- How will this impact the overall project?

Each of the above items are important but its most important you document and file everything. Photos, details, reports, logs , training records etc. In the event a lawsuit is taken out against you and your company these pieces of information can be invaluable.

Information that is reported can also be beneficial in performing a lessons learned on the incident. Dont be afraid to share the incident with the remainder ornrhe company and how it could have been prevented. After all, learning from our mistakes is how we improve as a company and society.

PART IV.

**ON THE CONSTRUCTION
JOBSITE**

CHAPTER 18.

CONSTRUCTION SITE - HOUSEKEEPING AND CLEANING

A Clean Site Is An Effective Site

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 have to carry each component on the skid back and forth to its intended location.

That worker's 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 all of a sudden

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?

CHAPTER 19.

CONSTRUCTION SITE - TEMPORARY ELECTRICAL SYSTEMS

The Lifeblood Of A Jobsite

If you've ever been on a project where the electrical breakers would be constantly tripping and lighting was at a minimum, don't worry you're not alone.

Building a project without a temporary electrical network is like building a structure without concrete, it doesn't happen. Every day you hear about some new technology that's changing the way we do business in the construction industry. It's often the most simplest of things we sometimes overlook and take for granted.

Electricity on a job makes things work, from the lights that keep spaces bright to the battery chargers for your drill. If it doesn't exist it's very difficult to build anything.

There's a lot that goes into creating a temporary plan and network on your project. At no point should you be doing it alone. Input from all of your trades and co-workers is important to make sure that you're not missing anything.

This article isn't intended to explain everything about electrical design to

you, but it is intended to give you a strong understanding of how to plan your temporary electrical network on your next project.

BASIC ELECTRICAL CONCEPTS

Electricity is measured and discussed in Amps, Volts, and Ohms with each having a critical role to play. We won't go into too much depth but we found a great analogy online:

Voltage is measured in volts, current is measured in amps and resistance is measured in ohms. A neat analogy to help understand these terms is a system of plumbing pipes. The voltage is equivalent to the water pressure, the current is equivalent to the flow rate, and the resistance is like the pipe size.

Often in construction you won't hear much about resistance (that's typically designed by an engineer) but you will hear people discuss equipment in volts and amps.

For a full walkthrough on the concepts [we've found this article to be great at explaining it.](#)

In order to start your temporary electrical plan you're going to need a number of pieces of information:

A schedule – your temporary power requirements are going to change throughout construction. What you need at start up might be more or less than you need later on in the project. The other question you need to ask yourself is how long will you be on temporary power for? Will you need to run new equipment off of it or will the new building power be up before you start commissioning? [Not sure how to schedule? We can help.](#)

Logistics Plan – consider how you are getting material up and down the

building, where deliveries will be? What are the pieces of equipment you will need to perform different activities. Have a read through our [article on construction start up](#) for a better understanding of items you might need at start up.

Trade Input – what power will each of the trades need? A floor grinder might have a power requirement of 600V 100amps where your fans might have a power requirement for 120V 15A. Each piece of equipment needs to be reviewed as this will dictate what power you take to where.

There's never such thing as having too much information when planning this type of work.

Once you have an understanding of the different concepts of electricity and the above information we recommend you grab a floor plan of your building.

TEMPORARY ELECTRICAL – FEEDING THE BEAST

Start by identifying the source of power for how you will be feeding the project site. If you're in an existing building and can use the power from it, good start. If however, you're in the middle of a field and need to bring power in to the project you may need to bring in a generator. In order to figure out the sizing of the source you'll need to pull in the list of equipment you and your trades will need and add it all up.

Once the source has been determined it's time to start feeding the job site. Larger companies have [pre-fabricated temporary panels](#) but if you're a smaller outfit you'll have to have your electrician make up some temporary panels. As a recommendation we suggest building panels with a disconnect connected to an electrical panel feeding a series of outlets

mounted to a backboard. Another suggestion would be to install these on wheels so that they can be easily pushed around the job.

These should be distributed around the jobsite as needed, the frequency of them will be dictated on how much activity there is in a specific area. For example a mechanical room that has a significant amount of demolition and welding would require much more power than an open office area that needs to have a ceiling, carpet and walls installed.

Mark all of your small locations down on the floor plan.

TEMPORARY ELECTRICAL – THE HEAVY LIFTING

Once you have the jobsite fed for small equipment with your temporary panels it's time to identify the bigger load equipment. Some examples of larger equipment which may need to be independently fed are:

- Tower crane
- Welding machine
- Floor grinding equipment
- Concrete pump
- Sprayed fireproofing pump
- Elevators or hoist equipment
- Temporary electrical heaters
- Chipping guns

There are a lot more examples, but each of these will likely require independent electrical feeding them.

Mark all of these down on your floor plan.

BRING ON THE LIGHTS!

Lighting is important on a project and you don't want to forget it. Not only is it a safety requirement but having more light also increases productivity for workers. We recommend keeping your lighting feeds separate from your construction power feeds. This way if your breakers trip for your panels it won't put your building into darkness.

A big part of temporary lighting of a building is the actual fixtures you'll be using. Everyone's least favourite way of lighting a project is the classic light stringer. Always damaged, never safe and always in the way. Other options can include high bay light fixtures or fixtures such as wobble lights.

Mark all of the lighting locations down on a floor plan, and the panel locations you'll use to feed them. In general you typically want to feed around 45,000SF of space off of one panel.

PUTTING IT ALL TOGETHER

Once you have your floor plan with the locations of each of the above start by laying them out on a riser diagram. The wiring to each of the pieces of equipment will be critical for your material orders. Add each piece of equipment to the drawing and the source, then start drawing a line between it and the panels.

At this point in the process you may need to bring in an engineer to help you with the design, many panels can likely be fed off of a single line. Make sure to have someone sign off on the overall strategy and design.

Once you have the final design it's time to start installing, when you're

planning it you should be looking at your constraints. Things like elevators can limit the size of equipment you bring into a given space.

Make sure to hire a qualified electrical contractor to install all of the equipment on your project. Once the equipment is installed they will need to bring in an Electrical Safety Authority to sign off on the installation. There may be a maintenance requirement for your equipment (ie monthly inspections), make sure this is followed.

Finally, remember that things change on a job site.

Don't expect to install this and leave it the same the whole time. It will need to be modified as trades come on board and leave. Include some contingency in your plan for those inevitable surprises that will come up as you go.

Do you have any temporary electrical ideas for your jobsite that are creative?

CHAPTER 20.

CONSTRUCTION SITE - EXTERIOR AND VERTICAL ACCESS

Going Up

Picking an exterior access solution for your construction project can be a complicated decision to make. Choosing the wrong solution can create logistical, schedule and quality issues. Today we're going to walk through the different exterior access solutions you have available to you in construction, and some of the advantages and disadvantages of each.

Note that we are writing this from Canada, some of the terminology and techniques we are writing about may be different in your country. Make sure to check with local vendors on solutions they have available to you.

SCAFFOLDING

When you start in construction likely one of the first temporary structures you will come in contact with is scaffolding. There are many different types and forms of scaffolding so let's stick with the "tube and coupler" type which is used throughout North America.

Scaffolding can be defined by its ladder like look from the outside.

Scaffolding is the most common access type mainly because of it's safety

and versatility. Scaffolding can provide you consistent (key word here) throughout the entire face of your building at intervals that you define. So if you need a platform every 6' for 25 people to work off of, scaffolding is your best bet.

One of the other great advantages of scaffolding is the ability to enclose it. It is common practice to enclose the scaffolding in netting preventing tools, debris and dust from falling and hurting or disturbing the surroundings. If netting isn't enough you can use an insulated tarp and heat the cavity space, or print a graphic on a scrim and hide your scaffolding all other.

One of the main disadvantages to scaffolding is the cost. Typically scaffolding is put up when you need regular access to an area for a long duration or an intense short duration. The initial setup, dismantle and engineering costs can be prohibitive.

The weight of scaffolding can also be a deterrent. Depending on the height you need to get to scaffolding can be heavy. Weight can affect the surface you sit it on, so, depending on the structure below you may need additional shoring to support the weight of the scaffolding.

SWING STAGES

Swing stages are next up one of our personal favourites. Swing stages are commonly seen on high rise towers where window cleaners have to get access to the exterior facade. Swing stages have a strong use in commercial construction as well as they provide a flexible means of accessing the exterior.

Swing stages can be identified by a metal platform that is hung off of the

roof by cables (two cables or four). Unlike scaffolding there is no support at the ground level.

This system is advantageous for a few reasons, it is quick to set up allowing workers to be on the side of the building in a relatively fast manner. It allows continuous access to any point along a certain “drop” on a building. Swing stages are also relatively quick moving when you compare them to scaffolding or climbers.

One of the main disadvantages to swing stages is safety. Swing stages require special training and sign off by an engineer. Dealing with less reputable vendors can sometimes jeopardize the quality of the stage and it's parts potentially putting the workers at risk. Before you start any stage work make sure to check with your local vendors and ensure their industry certifications check out.

Another downside to swing stages is that they are top loaded and difficult to move. The roof system needs to have roof anchors, otherwise large counterweights need to be installed to support the stage. When you need to move the swing stage to another location the stage needs to be relocated manually by a certified vendor / installer.

CLIMBERS

When you need more capacity and something a little more rigid than a swing stage turning to a self climber system might be the answer for your exterior access needs. If you've ever walked by a construction site and seen a platform supported by a large vertical metal mast that is a motorized self climbing system.

The platform is centrally supported by the mast which is attached to the

side of the structure. The platform moves up and down the mast by a motor.

Some advantages of a self climbing system are a higher capacity and safer more stable work surface. The platform allows you to put multiple people and material on the same level. Because the platform is relatively stable it is safer for the workers and can integrate guardrails.

One of the down sides to using climbers is the weight on specific points in the structure. The brackets attach to beams or columns as it goes up the building and the point loads on those can be high. If you have an older building this may not be a suitable option.

LIFTS (SCISSOR AND BOOM)

Lifts are one of the most common pieces of equipment on a construction job site and require minimal training to operate. Using a lift on a project jobsite should be one of your first considerations due to their flexibility and relatively inexpensive cost.

Many companies in North America have built businesses on renting out lifts. They can come in many different types, from boom lifts where the arm extends to the height you need. To scissor lifts which provide you with a stable platform and are relatively compact. There are even off road variants and variants that fit through doors.

One of the main advantages to lifts is their ability to reach complex places. They have a strong safety record (as long as they are well maintained) and are relatively inexpensive when you compare them to some of the other options on this list.

Conversely, lifts can get very heavy the higher you need to go with them.

Some of the larger lifts (in excess of 50') may require shoring underneath of them if your substructure is weak. In addition lifts reach can be limited. When you get to some of higher heights their stability is limited and it can be difficult to work off of.

SAFETY FIRST

No matter what lifting solution you end up going with on your project it's important to remember that the safety of your workers should be paramount.

There are many ways that #workers can get hurt when working when working from heights in #construction, take all precautions necessary to put proper protection and procedures in place.

Remember to have an [emergency response plan](#) in place and have your [schedule](#) refined.

CHAPTER 21.

CONSTRUCTION SITE - PLANNING A CRANE LIFT

Because Failure Is Not An Option

Many construction projects have a crane lift on them and planning them correctly is a difficult process. There can be many different reasons for needing a crane on site, from moving a big piece of equipment onto site, pouring concrete, or installing windows, cranes have many different applications.

In today's article we are going to walk through some of the basic requirements for a crane lift and things you should be looking for.

WHAT YOU'LL NEED TO START PLANNING YOUR CRANE LIFTS

Getting the basic tools and parties together to start planning your first lift is important. Starting out organized will help you to be more organized as the job gets more complex.

People and Companies You'll Need

- A crane company (with an engineer)
- A safety department
- City staff (permits for roads, sidewalks, airspace, etc)
- Superintendent and Project Manager for the project
- Subcontractors and suppliers
- Traffic control personnel (if necessary)

Some tools and equipment you'll need

- A binder with tabs to organize all of the information you'll get
- A crane
- The equipment you'll be lifting

- Traffic control equipment (if necessary)
- The crane itself and any related equipment (jib, extended boom, hook, counter-weights)

Information You'll Need

- The weights and sizes of equipment you're lifting
- A city services plan
- Structural drawings for the building and surrounding structures
- Geotechnical report
- Weather report (for the day or days of the lifts)

Once you have everything in hand above let's get started planning your lift.

DETERMINING YOUR REQUIREMENTS FOR A CONSTRUCTION CRANE LIFT (S)

Weight and Size of the Items

One of the first things you should do is establish what the crane will be for. What is the object you are lifting? Are there multiple's of this object and or multiple objects?

Once you've determined what you'll be lifting pull out the information on the products. Find the weight and dimensions of the object. A two tonne item that is the size of a person is a lot simpler to lift in some instances than a two tonne item the size of a school bus.

Determining the size and weight of the items you'll be lifting will help you to determine the capacity requirements of your crane but there's a third factor to consider. The location of the lift and final location of the product will also impact the size.

Location Matters

Pull out the drawings and determine the start and end points for your product. Determine where the product will be delivered and where it will need to end up, if there are multiple locations, mark out them all out on a drawing. This needs to be done in both a horizontal and a vertical direction.

Frequency

The frequency of your lift will impact the type of crane. Need regular lifting (day to day) but don't want to close a lane, you may need to put in a semi-permanent tower crane or derrick crane. Need one large lift – a mobile crane may be your best bet.

Just in case the above doesn't quite make sense, we've included a chart below which indicates what each type of crane will be best used for to help in your decision making.

| Crane Type | Space Requirements for Setup | Frequency of Lift (Days Between Lifts) | Capacity (Amount it can carry) | Mobility (Set Up and During Lift) |
|------------------------|------------------------------|--|--------------------------------|-----------------------------------|
| Borderson Crane | Low | Frequent | Low | High |
| Tower Crane – Standard | Medium | Frequent | Medium | Low |
| Tower Crane – Luffer | Medium | Frequent | High | Low |
| Derrick Crane | Low | Frequent | Low | Medium |
| Mobile Crane | High | Low | High | Medium |
| Crawler Crane | High | Low | High | Medium |

Once you've made a selection on the type of crane you plan on going with it's time to start finalizing the location of it.

There's a number of people you'll need to start consulting at this point but some basic advice will be to get an engineer involved. They will help you to determine the correct size for the crane and make recommendations on any special attachments that are required (more on this a little later).

Finalizing the location of your crane comes next. Some things to ask yourself are: what are the site restrictions? Do I have adjacent structures surrounding the lift point that could limit the swing radius? Is there existing structure that I could need to shore? Are there subsurface services or tunnels that would need to be protected or reinforced during the lift?

If the location has been settled, put together a high level drawing indicating the crane, swing radius and final locations of all of the pick and drop off points. Highlight any surrounding structures and underground services that the operator and team need to be aware of. Distribute this to the group including your engineer for review. The engineer will need to draw up a formal document, stamped with all of the loads and lifting weights noted.

Of special note – as loads get further away from the central hub of the crane the capacity decreases and therefore a larger crane may be required for smaller lifts that have to travel a long distance.

PLANNING YOUR DAY (S) OF LIFTING

Remember that binder we mentioned earlier, open it up and begin preparing it. We recommend including the following items within the binder, a lot of these documents will need to be developed with your team and will help to keep your information organized:

Executive Summary – this is a high level summary of the lift for those interested in getting the coles notes. Include the purpose for the lift, location, time date and summary of the pick points and crane type and size.

Contact List – this is important, communication on the day or days of the lift is important and it's good to have everyone's contact information in one spot. This should include all points of contact for all companies involved in the lift.

Engineered Crane Layout and Cutsheets – include all information related to the crane layout and the cutsheets on the piece of equipment on the crane. This should include the final signed off drawing from the engineer we mentioned earlier.

Permits – there's a long list of permits you may need – this could include a permit for air rights, road close permit, even the building permit could be good to include in this section.

Safety Tab 1 – Activity Specific Safety Plan – this is a critical piece of information, and should be developed with all those involved. Include a detail job hazard analysis. Each trade should have their own JHA

Safety Tab 2 – Safety and Emergency Response Plan – Include the general safety plan for the contractors and an [emergency response plan](#) in case something is to go awry.

Schedule – develop a detailed schedule with your team. This schedule needs to include the time and duration of the lift setup. What time each of your loads will be delivered to site and the time required for each of them. A good practice for this is to also include the contact for each of the lifts so people know who to contact in the event something isn't going as planned.

Insurances – there's likely going to be some hefty insurances provided from each of the vendors. Make sure it's provided by everyone and filed in the event it's required.

Traffic Control Plan – unless you're building in an open field there's a good chance your deliveries or lifting will impact traffic and or pedestrian flow. This should be included in the binder as well and should mark all controls clearly as well as include a description for any flagmen or police.

Other Information – we like to include a tab with other information or correspondence at the end of the binder. This section can include things such as delivery routes (if you have oversized loads coming to site), communication with your owner, and other pertinent information you feel you might need on the day of the actual lift.

LET'S DO THIS – THE BIG DAY OF THE CONSTRUCTION CRANE LIFT

The big day or day's are here, and you're justifiably nervous (though if you have all of the above information in hand you're about as prepared as you can be). Start the day early (we mean 4AM early) and arrive first to site to give yourself some time to mentally prepare for the day.

Start the day off by bringing all parties into a meeting room and doing a huddle, go over who is responsible for what, what the schedule is and appoint a go / no go point of contact for the day and each of the deliveries.

Collect everyone's information including the crane drivers certifications and crane certifications. Make sure everyone fills out the site specific job hazard analysis and signs off on the safety plan.

one important thing to understand is that the crane operator ultimately has the last say on a crane lift. If they feel the least bit uncomfortable about a situation they can call off the lift. Respect their opinion. Becoming an operator takes lots of training and often times they know best.

Be mindful of your schedule throughout the day, if your permits have time limit watch them closely, make sure communication is open. Consider assigning a radio channel for the team so everyone know's what's going on.

CELEBRATE OR RE-GROUP

The big day or days have come and gone and things either went well or haven't. Take time to celebrate your accomplishments as a team. It's important to reward people for their work. If things didn't go as planned, start by understanding what went wrong and plan your next day.

A successful crane lift can be a lot of work and you should always go into it prepared. Be kind to people around you and understanding of their requirements. This will be something you'll likely do a few times in your career so take time to reflect on your lessons learned both good and bad.

Think you have what it takes to plan a crane lift? Let us know if you've done one in the past and what you think about our guide in the comments!

CHAPTER 22.

CONSTRUCTION SITE - WINTER PROTECTION PLAN

Keep Your Jobsite and Workers Warm

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.

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 canisters 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 owner's 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.

CHAPTER 23.

CONSTRUCTION SITE - MANAGING QUALITY

Do It Better Than Your Competitors

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 is the first step in preventing them, here

are just a few causes of potential issues on construction sites:

- Schedules that are too aggressive or ownerous 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 favourite 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](#)

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.

CHAPTER 24.

CONSTRUCTION SITE - TECHNOLOGY AND IT'S USE

Use Technology To Your Advantage

The move to a more digital platform for managing construction sites is one that many companies haven't yet made. For many – the fear of changing a successful formula is out weighed by the benefits of moving into the digital age. Unfortunately for the construction industry – my generation – the mellenials are here to stay, and as a result we are keeping our fancy phones and devices on us during working hours.

The construction industry is changing and new technologies are being introduced every day. Some of these technologies may be a waste of time, while others may improve productivity. It wasn't until I took over a project recently and implemented a punch list tracking software that I really saw a tangible benefit to these types of improvements.

Below I've highlighted some of the major categories of new construction technology, why I feel these benefit or don't benefit a company and some examples of each.

DOCUMENT MANAGEMENT

This is one of the older and more widely accepted technology tools. Used throughout the industry as a way of managing the RFI, Submittal and other

workflow related processes there are many companies offering these types of platforms. This should be a starting point for any company looking to move out of the dark ages, information flow is such a critical part of any job, and having something to manage much of it for you is important. Most of these types of software are managed online and allow uploading and downloading of documents, creation of RFI's (issue management) and a submittal module which sends out notifications and allows for collaborative reviews.

Advantages:

- Allows for the creation of a central document system ensuring all parties are on the same page and information is tracked properly.
- Can allow for collaborative drawing reviews.
- Track issues and automatically generate notifications.
- Results in a huge time savings for the company as a result of automated work flows and notifications. Ensures that information is accurate (ie not ten different versions of timesheets).

Some examples of this type of software include:

- [Aconex](#)
- [Viewpoint](#)
- [Jonas](#)

CLOUD BASED FILE SHARING

Cloud based file sharing technology has been in the consumer market for a number of years now and is only recently making its way into our industry. Personally, I live and die by this and it has made my clients jealous of how quickly and easily I can access information anywhere.

Some examples of this software that you may instantly recognize include Box, Dropbox, OneDrive, Google Drive and Apple's own iCloud.

Essentially what these services do is provide a mechanism to sync files between your different devices. For example – all of my files sync through box to my desktop and are then immediately available on all of my devices through apps.

For single users or small firms this software can be relatively inexpensive and storage upgrades won't break the bank.

Advantages

- Allow users to remotely access drawings and documents on any device (for firms with a lot of remote work this is a great way to collaborate)
- Instantly keep all of the most up to date information in one spot for users, mark up drawings and have it reflected on the files.
- Users can use any device to access information from phones, to tablets, to desktop computers.
- Saves a lot of time running back and forth between the drawing board and site to review drawings. Pull them up at the location and review instantly.

PUNCH LIST TRACKING TECHNOLOGY

Punch List tracking technology and software is something I've begun experimenting with recently. I will start by admitting I am no expert on the subject, but, in my my experiences with it to date the benefit provided has been significant.

In previous lives during inspections deficiencies would be logged in a

spreadsheet or word document or some other form of manual entry program. The trades and consultants would need to be manually notified of issues and the working document had to be kept up to date. Deficiencies were also vague, pictures that provide specifics were difficult to keep in line with deficiencies.

Apps or software that assist with this process help to do away with a lot of the manual data manipulation. Take a photo in location, pin it on a drawing, assign it to a trade and have everyone notified via email automatically. This may seem like it saves minimal time, but when you repeat this process hundreds or thousands of times the time adds up. What makes these systems even better – if your trades and consultants are on the same system they are able to login and assign deficiencies or reassign them as they are completed.

Advantages

- Speaking from personal experience these systems can save up to 50% of time compared to traditional systems.
- All issues are kept on a central server that keeps all comments synchronized so you don't end up with five versions of 'the list'.
- Automates notifications and reporting requirements speeding up the time between when an issue is identified and when the corresponding party finds out.

Some examples of this type of software can include

- [Autodesk BIM 360](#)
- [Fieldwire](#)
- [Procore](#)
- [PlanGrid](#)

PART V.

**ESSENTIAL
CONSTRUCTION
TECHNICAL KNOWLEDGE**

CHAPTER 25.

TECHNICAL KNOWLEDGE - RENOVATING EXISTING BUILDINGS

Surprises Around Every Corner

The construction industry is changing and a higher percentage of construction companies work is related to renovations instead of new builds. Renovations are often more complex than green-field projects because the work you are performing can impact existing occupants or negatively impact the building itself.

Today's article will help to outline some of the common challenges found in renovation work and how to overcome those challenges.

EXISTING SERVICES

If you've ever done any renovation work you will know the number one rule before your start any removals is to know what you are cutting in to. Existing services can or could have been the life blood of the building and cutting into them could have serious consequences.

Before starting your job ask yourself one of the following questions:

- Do I know what this is?
- Is it a dead service?

- What did this do before?
- Does it need to be temporarily fed while I do my work?
- Is there a possibility that there is something concealed behind this thing that I am taking out?

If any of the above make you say ‘I don’t know’ stop, check existing drawings, do further investigation, scan, X-ray or trace the lines to find out.

EXISTING CONDITIONS

The number one rule in renovations is that no matter how great the drawings are, you will always find something that is different than the drawings.

In in order to mitigate the impact of existing conditions on a project investigation should be undertaken as soon as possible in a project to expose all buried or concealed surfaces or objects.

Enough can’t be said about the value of investigation. Whether it’s opening access doors in ceilings, doing core drill samples to test bond strength and substrate of flooring, measuring door opening sizes, checking where plumbing feeds come from and the quality of the pipe downstream. All of these activities can identify problems up front so you can spend more time later on worrying about execution of the work instead of that problem you found that now requires the ceiling be redesigned. Some examples of good investigation include:

- Open or cut access panels in the ceiling to identify existing structure and services

- Core drill floors and do pull testing to determine substrate type / integrity and bond strength
- 3D scan existing structure to confirm dimensions and locations
- Measure all existing opening sizes to confirm delivery routes
- Cut openings in walls to determine wall makeup and framing details
- Where possible have mechanical and electrical trades trace all existing services
- Xray or scan to identify services within existing slabs
- Check all as-built drawings on hand

DEVELOP A CONSTRUCTION PLAN TO MINIMIZE IMPACT FROM RENOVATION WORK

The Impact to a property, whether it's open or closed during renovation work can be huge. When planning your work look at the full property and understand how certain activities will impact each other. Some examples of good planning include the below:

If you're performing flooring and ceiling work consider starting in different areas and taking different routes through the property. Keep in mind you should finish your ceiling work before starting you floor (that way you aren't ruining your new floor!).

Mechanical and Electrical services need to be traced and routing understood. Removal or re-work of them may require alteration to the service in areas you were planning on touching. Understand what the impact of this is.

On the same note, understand what type of structural work is required. Structural drawings have a way of not fully communicating the impact on existing ceilings / floors etc required to install something. I've been

caught a number of times tearing out ceilings I wasn't planning on tearing out because an engineer wanted a beam reinforced from the bottom.

CHAPTER 26.

TECHNICAL KNOWLEDGE - RENOVATING A HERITAGE BUILDING

Old Becomes New

The large glass skyscrapers we see dominating the skylines of today's cities weren't always a staple. In the past people utilized stone and brick to create buildings with character. Heritage buildings are part of every city. If you're like me and your project experience has included renovation of a heritage building you'll understand that there are some key challenges related to them.

So what exactly is a heritage building, how does one go about renovating a heritage building and what are some of the complexities related to it? To start let's define what exactly a heritage building is?

A heritage building is any structure of sufficient age that it retains some historical value within the city. A heritage building doesn't need to be 100 years old, but it should have some form of historical value. These types of buildings are designated as "heritage" and protected under city by-laws.

While the above doesn't necessarily give the heritage building a formal definition it does help to understand what that means.

HOW IS A HERITAGE BUILDING DEFINED ?

There is no sound way to define whether a building is heritage or not. When most people think about heritage buildings they immediately think “old”. That may not however always be the case. Buildings as recent as the 70s, 80s and 90s can have historical value and can be considered heritage.

To start let’s define who classifies heritage structures. In larger cities the infrastructure may support a “Heritage” division which seeks out and protects properties which retain some historical value. Smaller cities may require residents and the city council to implement law protecting various properties.

In the first case, often times, the heritage society or council will perform an assessment on a property. That assessment can include the things like:

- How Old Is The Building?
- Is it architecturally significant?
- Are there any historical events that occurred at the property?
- Does the building represent a specific era?
- Did someone with historical significance own the property?
- Does the building feature an innovative engineering component for its time?

Once they’ve assessed the building the heritage society typically prepares a report which goes before council and the building is typically adopted as a “heritage protected building”.

TYPES OF HERITAGE BUILDINGS

There are different types of heritage buildings and many of these buildings

can be renovated. According to the Federal Conservation Association the percentage of buildings that are houses is over 50%.

Based on the above, if you are a contractor that is looking at work to renovate buildings you may want to focus on specific types. For example, renovating a church, is significantly different than renovating a house or office space.

WHAT DOES BEING HERITAGE MEAN?

Defining a building as heritage comes with a lot of complications and impacts. To better assess what becoming a heritage building means let's break it down by what it means to different people. Starting with the building owner.

Owning a Heritage Building

Owning a heritage building means that you are responsible for a piece of history. That responsibility comes with a lot of catches. Including the fact that you are responsible for proper maintenance and upkeep of the building. Ensuring that the heritage components remain in good condition.

Fortunately for you, having a building retained as a heritage structure also means that you receive some tax breaks and can apply for grants to help with this. Many societies and charities offer grants and loans to help protect the city's history.

Lastly, many heritage buildings can be old. As the building owner it is your responsibility to ensure that the structure is safe. UNESCO (the global association overseeing heritage structures) identifies management as one of the leading factors to a building's decline.

We'd recommend you hire an engineering firm to do annual building assessment reports to help identify any building envelope and structural concerns.

Impacts to the Designer or Engineer

If you're an architect or engineer and you've been contracted to renovate or expand an existing heritage structure you will be impacted. Once a building is protected, certain parts or all of it will have restrictions on what you can do to it and modify.

A starting point for any designer is to read the heritage conservation report that was prepared for the building. This will outline to you what exactly needs to be retained and protected during any design work.

Once you as a designer have established what can and cannot be touched it is your job to understand the how. As the designer you need to know that not all old building components can be touched. As an example, [a building may contain asbestos](#) which needs to be properly identified and treated. Ensure you hire the correct subconsultants that specialize in these materials.

How Is the Builder Affected?

The builder is perhaps the most affected of all of the various parties because failing to properly understand the various restrictions related to a heritage property can mean major fines.

When you take on a project as a builder that has a restoration component to it, it is important that you read all of the drawings, specifications, contracts and heritage preservation assessments. Understanding who is

responsible for what could mean making or losing money but more on that later.

We're going to dig into a lot more details related to renovating these types of structures later in this article, but to reiterate education is the most important part of a contractors job when taking on these types of projects.

In our next section we're going to visit the types of heritage renovations and how to approach them.

TYPES OF HERITAGE BUILDING RENOVATIONS

When approaching a new project that involves a historical element it's important to (as I noted above) review the heritage assessment report. That will dictate what can remain and what can go in a renovation.

Understanding this is absolutely fundamental to the program.

Heritage buildings are typically renovated in one of three ways:

- **Basic** – Restoration Of Historical Elements (face lift)
- **Intermediate** – Selective removal of non heritage elements and restoration of heritage elements
- **Advanced** – retention of only heritage elements, removal of everything else

We are going to walk through each one of the above below:

BASIC – Restoration Of Historical Elements

This approach can be taken if you have selective building elements you want to restore. For example, if there is old millwork in a hallway that is aging you might choose to restore that. Repainting of heritage elements to restore the original colour.

These are typically smaller and more localized repairs intended to bring out the character in the building.

Some project examples include:

- [TD Centre Facade Restoration](#)

INTERMEDIATE – Selective Removal of Non Heritage Elements

The next step up essentially involves removing all non-heritage elements or part of them from the building.

As an example of this, you may only have facades or sculptures that are of historical value, you may be able to demolish all of the interior finishes and systems, upgrade them and retain the heritage elements untouched or restored. The structure remains.

The construction projects tend to be much larger in size. Some examples include:

- [Selective Building Demolition](#)

ADVANCED – Retention of Only Heritage Elements

This is the most invasive and involved method yet there is a large movement towards this especially in urban centres.

Advanced methods of heritage restoration involve removal of all building components that aren't protected.

As an example, the facade might be retained and all other building components removed. New structure and backup elements are all installed to support.

Regardless of which method your team chooses to move forward with there are a number of steps you need to take in your project and these are the items we're going to walk through next.

APPROACHING A RENOVATION

Once you've decided on your approach to renovating the building (based on the above), it's time to start working on the project. I'm going to walk through each of the stages of a project (from conceptual design through permitting and into construction).

Conceptual Design Phase

It's important to remember at this phase to review the heritage conservation plan I noted above. Depending upon which elements of your building are protected it will drastically alter the design approach.

At this phase in the project, if you aren't a heritage specialist, you will want to consider engaging one. A heritage professional or consultant will help the project team in dealing with the critical components of the project. When reviewing firms you want to ensure that they all have

experience dealing with heritage structures similar to yours. Furthermore, you want to ensure the heritage consultant is local and has connections with the governing body within your city. Having a heritage consultant that can manage the city, their requirements and expectations will help to streamline your project.

When designing ensure you take the following into consideration:

- What are the heritage elements and what are the levels of protection assigned to them.
- Ensure that the protected elements aren't covered up or reduced in value. They should be a centre piece and focus of the development.
- If there are elements that were there previously (ie old photos showed metal trimwork in the lobby) consider reinstating them and bringing the building back to a closer representation of what it was originally.
- Always keep a running budget on the project. It's very easy to get carried away on heritage projects. Make sure to leave room in the budget for unknowns as they will inevitably creep up.

Investigation of Heritage Buildings

During the conceptual design phase you will also want to be doing a number of investigations to confirm design assumptions. These investigations should be widespread and thorough enough to help reduce risk. As an example some investigations you can do include:

- Investigation of exterior masonry condition with drones and physical checks off of a swing stage.
- Thermal reviews of the interior and exterior to determine where and if leaks are occurring.

- Coring of concrete to test the strength of the existing structure, scanning and xraying to determine reinforcement bar
- Hazardous materials assessment and survey to determine what if any material contains asbestos and lead.
- Selective demolition to determine conditions in concealed areas (ie roof structure)
- Roof cuts to determine condition of the existing roofing.
- Bore holes to check soil and ground conditions in the area

These are just a list of a few of the many investigations you can perform. When performing them ensure you are thorough and check in multiple spots. Remember that old buildings were built as consistently as new projects are. Because of this assemblies and structure can change quickly.

Permitting Phase

Many builders nowadays will know that projects are typically delayed at the permitting phase. In busy cities where development is growing, city planners often can't keep up with the influx of projects.

To solve this problem there are a few key items you and your project team can do up front to avoid delays in dealing with the city and getting your building permit.

- **Start the Conversation Early** – bring in the historical society early on in the project to review your designs and concepts. By including them in the design early on there's less risk of a major change coming out of the building permit application.
- **Start the Application Process As Soon As Possible** – leaving lots of time in your schedule for a building permit review is important. There are more opinions on the reviewers side when dealing with a heritage building building permit application so account for that.

- **Hire A Professional** – as I noted above, make sure to hire an outside consultant who is familiar with the people within the city doing the reviews.

Once you have your permit in place it's time to start building.

Construction Phase

The construction phase of the renovation can be just as challenging as the design phase. The contractor should have been brought in early, and should be familiar with the project in advance of starting construction.

When planning the work it's important to review elements that need to be retained or protected. Heritage elements often have strict requirements relating to temperature, humidity, dust and potential damage so they will need to either be removed or protected up front.

Once you know the items you can begin planning the remaining work around them. During this time you should be mindful of how it could impact heritage elements:

- Will work above cause damage to concrete and hit the heritage element?
- Do I have new services that need to run above a heritage ceiling?
- Do I need to install new supports for a heritage element

It's challenging to do work within an existing building, it's even harder to do so in a building with elements requiring protection.

Sequencing and Temporary Services

As you progress through the construction phase it may be necessary to

sequence your work to ensure that certain elements are managed. One of the challenges with renovating an existing building is the space you have.

Some areas that you need to consider are as follows:

Elevators – does the building have elevators, if so will they be used for construction? What are the capacities and sizes and will that limit material. If elevators will be utilized consider protecting them.

Existing Services – will all of the existing services be removed from the building? If they will how will you support construction during the project? Will temporary electrical need to be brought in?

Bathrooms – if the bathrooms are being removed how will you manage the bathroom requirements for a construction project. Often times portapotties will not fit up the elevators so temporary risers may have to be run.

Access Requirements – if your work is on the sides of the building how will you access it. Consider checking out our article on [vertical access in construction](#) for some useful guidance.

Temporary Protection – if large parts of your project involve removal or interference with the building envelope (roof, windows, walls etc) than you'll need to be mindful of the interior space of the building. Heritage components can be susceptible to damage if left exposed.

Construction of an existing heritage building can be complicated but by [preparing a proper construction plan](#) at the start of the project it will help to eliminate many of the risks related to the build out and put you in a better position to deal with issues that arise.

INSPECTIONS AND DOCUMENTATION FOR HERITAGE BUILDINGS

During the construction phase of a heritage project there are a number of documentation requirements that may be outlined by the city. Along with the regular monthly report from the architect a separate report may be required to be prepared by the heritage consultant. This report outlines progress on site with a focus on the elements that matter the most to the preservation society.

Along with the heritage consultants report other independent reports may be required to properly document the work – as an example a report may be required for any hazardous material removal required on the project.

Lastly – it's important to get an understanding of what the city needs to sign off on during the project. With heritage elements the city may ask to review them prior to production. In this instance it will be important for you as a contractor to arrange for mockups to be completed and reviewed before commencing work.

PRESERVING OUR PAST FOR OUR FUTURE

While renovations of a heritage building may be a challenge, and during the project you may start to ask yourself why. It's important to remember that preserving buildings for future generations is important.

The stories that buildings can tell are powerful and the causes behind them can be instrumental in understanding our past. Ensuring these are preserved and maintained is an important function of our job as designers and builders.

CHAPTER 27.

TECHNICAL KNOWLEDGE - SAW CUTTING AND CORING

New Openings Can Mean New Beginnings

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 or 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.

CHAPTER 28.

TECHNICAL KNOWLEDGE - MODULAR CONSTRUCTION

A New Innovation Not Yet Widely Adopted

Modular construction, it's one of the hot words in construction right now and rightfully so. For the last hundred years we've been building the same. Put up a crane, pour a foundation and stick build the remainder of the building. Modular construction is a way of re-thinking how we typically build.

WHAT IS MODULAR CONSTRUCTION?

Modular construction or off-site construction involves removing some of the on-site production and instead, fabricating components of a building in a factory. Once the component is complete off site it is then shipped to the job site where it is installed in place.

Some of the benefits to constructing using a modular construction technique involve:

- **Increased productivity** (material is always stored nearby and you're working in a controlled environment)
- Reduced costs due to the repetitiveness

- Improved quality as the inspection and process can be monitored much more closely

WHAT ARE SOME EXAMPLES OF MODULAR CONSTRUCTION?

While there are many examples of this building practice in use throughout the world some of the most extreme examples are the most interesting. When you consider that entire buildings are being constructed in China off-site you start to understand just how revolutionary this building practice is.

You likely don't have the facility to build an entire building using this practice so what are some examples of things we can all fabricate off site? For that we recommend reviewing your drawings and specifications for repetitive components.

Some easy examples are temporary construction type items:

- Temporary Hoarding
- Ramps and Stairs
- Temporary electrical panels

Beyond those you can consider actually pre-fabricating permanent building components, some examples are:

- **Doors and Hardware** (mounting hardware on doors and painting them before they arrive on site)
- **Bathrooms** – if you're building a high rise consider fabricating them entirely off site
- **Facade components** – building wall panels which include the stud, window and any cladding completely off site, and securing them in

place on site

- **Stairs and Ramps** – fabricate entirely off site and drop in place

These are just a few examples, essentially anything that is repeated enough to make it the gained efficiency of doing the work off site is worth it.

WHAT ARE SOME OF THE DOWNSIDES OF MODULAR CONSTRUCTION?

You're probably thinking that you've read this type of article before. Upselling the benefits of this new construction methodology. The truth is modular construction isn't the greatest in all circumstances. There are a number of instances where it makes more sense to build on site:

Existing Buildings – existing buildings provide unique challenges. The main two that hamper off site construction include access and tolerances. Fabricating off site requires that you maintain tight tolerances on site, an existing building can vary a lot and may pose a challenge to fabricating off site.

Non-Repetitive or Unique Work – if the number of times something is repeated is less than ten it may be faster and easier to construct them using typical construction methods.

Maintaining the Work Flow – one of the main challenges with off-site construction is that you need to employ a separate crew at a different facility to make it work. Keeping that crew busy the five days a week can be a challenge if your work log isn't substantial.

WHAT DO I NEED TO GET STARTED IN MODULAR CONSTRUCTION?

One of the most important things you need to know about getting into modular construction is that it takes up a lot of space. Companies such as Ford or Tesla make more money by refining each step of their fabrication process. Making each step a second quicker can mean greater returns on each vehicle. Modular construction is no different, and creating the assembly line to allow those types of changes requires space, lots of it. To start you will likely need a small factory space to start setting up your assembly line.

Once you have your assembly space you'll need a few other critical components, these include tools and machinery and people. These are the main tools you will need in your arsenal to make your modular construction yard a reality.

WRAPPING UP

Modular construction is not an easy construction technique to get into, however, if done right it can help to boost your construction business and give you an edge of the competition. Are you using modular construction techniques in your business?

CHAPTER 29.

TECHNICAL KNOWLEDGE - FIRESTOPPING SYSTEMS

Fire Safety Is A Building Inspectors Best Friend

One of the first projects I was on the architect asked us if the firestopping material was installed in the movie theatre. Because I was new I had no idea was this crucial element to the building life safety systems were. So what exactly is firestopping and how is it used in construction?

Through my investigation I discovered that firestopping can be a range of materials that are installed in joints within walls, ceilings and floors that have a fire rating to slow the spread of fire throughout a structure.

There are many different forms of firestopping so let's jump right in and review where it is found, types of materials, how it's detailed and what it actually does.

WHERE CAN I FIND FIRESTOPPING IN A BUILDING?

Firestopping can be found within a building at many different locations. Some of the most common locations where firestopping can be found include:

- Horizontal gaps between floors (ie at expansion joints)

- Penetrations in fire rated walls where services run through
- Around door frames
- Tops and bottoms of fire rated walls
- Joints in fire rated shaft walls

These are just a few of the examples of where it can be found. The important thing to remember is that any time there is a room that requires a fire rating firestopping is most likely present to seal any of the cracks and openings going in and out of the room.

HOW CAN I IDENTIFY WHERE IT'S REQUIRED?

An easy way to identify where firestopping needs to be applied in a building is to review the fire separation plans. Don't know what a fire separation plan is?

A fire separation plan is typically prepared by the architect and defines, based on the building code, where fire rated walls occur. It identifies the separation and the required rating by highlighting them on a floor plan.

By reviewing which partitions have fire ratings you can easily determine which walls and slabs require firestopping to ensure the continuation of the fire rating.

WHAT DOES FIRESTOPPING DO?

Firestopping is considered a form of passive fire protection in a building. It's intention is to help slow the rate of fire throughout a building by containing it within a room. But what exactly does that mean and how is it done?

The materials used in the assembly are all governed by UL / ULC laboratories in both Canada and the USA. Products going into the assembly need to be designed together (ie insulation and sealant material) and must be tested to provide the rating. Because materials melt at different levels it's important that they be selected and designed to survive in high temperatures.

According to the [Firestopping Contractors International Association](#) materials in a building that are unrated start to melt at 300 degrees fahrenheit. By introducing new materials it helps slow fire penetration.

MATERIALS TYPICALLY USED IN FIRESTOPPING SYSTEMS

Firestopping assemblies have been designed by companies throughout the world. Some of them are special products others are a combination of products to make up an assembly.

One of the most common types of firestopping assemblies involves installing mineral wool rated insulation in the cavity space to stop the spread of fire and installing a smoke seal on both sides of the seperation. Mineral wool insulation does not melt until around a temperature of 1000 degrees fahrenheit (compare that to the 300 noted above). By applying the smoke seal to both sides of the penetration you ensure it is always in tact on the opposite side of the wall of the fire.

Many companies that provide firestopping materials will do designs with their products for you and provide visual guides on installation that will comply with their designs. As an example – [USG one of the major drywall suppliers provides a catalog which includes details](#) on how to seal pipe penetrations, tops and bottoms of walls and many other common

construction situations. While this isn't a requirement it is designed to help teams simplify their on site work.

Other examples of firestopping include more module products that are engineered and designed to be installed in certain situations without the need for complicated installs.

Expansion Joints – rated expansion joints that are prefabricated exist on the market. Rather than require complicated insulation and smoke seal these are rubber assemblies that are simply installed in a joint. [As an example Emseal offers these.](#)

Cable Penetrations – rather than install a custom joint around cables or pipes vendors have started providing manufactured products that can be installed on partitions to provide an equivalent rating. While these products are typically much more expensive they do provide an ease of installation and cleanliness. [Hilti has many different cable penetrations available.](#)

These are just two examples, there are hundreds of products available on the market for many different applications. A simple google search or asking an industry professional will help you to discover them.

INSPECTION REQUIREMENTS FOR FIRESTOPPING

Because of the importance of firestopping and it being part of the fire protection system within the building it's important that the system be inspected and tested before the work is completed and or covered up.

The first step in the process is that the location of all joints is defined and designed by Local, State and National building codes. Other associations

such as the NFPA (National Fire Protection Association) also have guidelines with respect to the design of assemblies.

Once that's been completed it's important to select products which are designed in accordance with industry standards. The products must comply with UL and ULC standards (in North America). Each product must be tested to ensure conformance. Prior to application you need to ensure that your products aren't expired.

As we I noted above – assemblies are designed by companies and certified by the ULC. That being said you may run into instances where a typical design just doesn't work. I had this occur on a past project – the expansion joint was an atypical design. When this occurs you may need to engage an engineer to prepare an engineering judgement for you.

What is an engineering judgement?

Through my project experience I have required a number of these. An engineering judgement is where a typical assembly design does not exist. Because your specific application is unique an engineer will review existing assemblies and materials and prepare a detail or proposal for you that meets the code requirements of your site specific design.

Because an engineering judgement is unique to your project the building department may want a copy. Ensure that you keep a copy readily available.

Once you've completed the work, you'll need to ensure your local building inspector is reviewing the firestopping application. If the work is behind drywall you'll want to bring them in before you close the wall. If the

application is out in the open you can bring them in at a regular interval to inspect the work prior to turnover of the building.

Besides the building inspector, you may want to bring in a manufacturer representative to ensure that the application is in conformance with their details. This ensures that in the event of an incident and / or product failure the applicator cannot be blamed.

TIPS FOR CONTRACTORS AND FOR FIRESTOPPING

There are a few general tips for contractors looking to ensure that the firestopping scope of work is covered in their project:

- When awarding scopes of work include firestopping through walls and slabs within the trades scope of work. For example the plumber should be responsible for their own firestopping and smoke seal.
- Keep an allowance aside for miscellaneous firestopping. There will be details missed on any project where it is required and not noted on the drawings. It's best to keep a small allowance to deal with these issues.
- Engage a known contractor – finding a contractor that is quick and provides a quality service is like finding gold. When you find one ensure you keep them in your rolodex and utilize them on your projects.
- Make the review of firestopping something that is done at an early stage in the project. This way you don't end up closing a wall early and have costly re-work to add it after the fact.
- Keep a catalogue of typical fire stopping details from CGC or UGC on hand and check trades work regularly to ensure they are complying with the standard details.

- Bring your building inspector in at regularly intervals and have them review the work. This gives them a better comfort that you know what you're doing and can help to identify major concerns early.

There are many other great pieces of advice regarding this scope of work. But the most important is really just to pay attention to the details for firestopping and don't overlook it.

WRAPPING UP (LITERALLY)

Firestopping is a critical part of any project and requires attention to ensure it is both captured within a trades scope and installed properly in the correct locations. Make sure that you pay attention to the firestopping details on your next construction project!

CHAPTER 30.

TECHNICAL KNOWLEDGE - WASHROOM PARTITIONS AND ACCESSORIES

Common Installation Questions and Issues

I know what you're thinking, washroom partitions – what a riveting subject. Washroom partitions may not be the most exciting of subjects but they are something that is installed in every building no matter the construction type. So what exactly are washroom partitions, what do they do and what are some of the various types?

Through my experience in the construction industry, a washroom partition is any divider that is installed within a washroom that divides up the space into separate stalls. Washroom partitions act as a both a visual and physical barrier between people using the lavatory.

A BRIEF HISTORY ON WASHROOM PARTITIONS

During the 16th century public toilets were invented and started to become a common sight around Europe and other civilized societies. During this time toilets were typically isolated in single rooms.

As time progressed throughout the Victorian Era and into the 19th century toilets began to be grouped together where multiple were installed in

public spaces. During these early days toilets were still either group together or installed in independent rooms.

One of the major challenges with a washroom of this nature is cleaning, keeping the nooks and crannies of a washroom clean were challenging. It wasn't until around 1904 that Frank Lloyd Wright introduced the concept of a hung or floor installed wall and hanging toilet to allow cleaning activities to be simplified.

Within the Larkin Administration Building in Buffalo, Wright developed wall hung toilets, and overhead hung partitions that sat off the ground. This allowed for mops and brooms to pass underneath and the modern day washroom partition was developed.

TYPES OF WASHROOM PARTITIONS

Since the time of Wright washroom partitions have obviously come a long way. In my career I've seen all sorts of crazy designs from architects. Some of the most common types of washroom partitions include:

- Ceiling Hung Washroom Partitions
- Floor Mounted Washroom Partitions
- Urinal Screens

Ceiling Hung Washroom Partitions – are typically hung from the ceiling of a washroom and sit clear of the floor (creating a clear gap between the partition and the floor). These are designed for providing the most access for cleaners and maintenance staff.

Floor Mounted Washroom Partitions – are typically installed by pilasters which are floor supported. There may be a connection to the

ceiling as well or to an intermediate bar which is tied into the adjacent walls.

Urinal Screens – are a small partition that is either floor, full height or wall mounted that serves to separate men's urinals.

WHAT ARE THE DIFFERENT MATERIALS FOR SEPARATORS

The above types of washroom partitions typically come in various materials. As I mentioned above, architects can create washroom partitions out of different custom materials. That being said there are some fairly large vendors that have developed some fairly standard product lines over the years. These product lines help to [maintain quality standards across the industry](#).

There are four primary materials that you'll often hear about washroom partitions:

Metal or Stainless Steel – are the most durable of the group and (in my opinion) offer some of the best looking. Basically partitions are hollow with the outer layer being made of a painted (powder coated) metal or stainless steel.

Plastic Laminate – plastic laminate partitions are common in schools and other institutional facilities. Plastic Laminate (or P-Lam) for short are a core board core with an outer layer of hard laminate that can have any pattern you want.

Solid Plastic – solid plastic are the easiest to clean and replace of the group but can be damaged easier than others. Solid plastic is often found in areas where a bit more give is required and budget is a concern. Solid

plastic are exactly what the name says – a solid plastic core with painted outer layer.

Phenolic – phenolic are a hybrid between plastic laminate and solid plastic. The benefit to the phenolic is that you end up with a core that's more waterproof than a plam core and have the out layer as customizable (ie you can include wood grains). These are a great option if you don't want to splurge and go with the metal or stainless options.

Each of the above materials has it's pros and cons, each is better suited to different applications. As an example – stainless steel, holds up well and is easy to clean, you may use these in a truck stop. Plastic laminate or solid plastic can be used in schools.

DESIGN CONSIDERATIONS TO CONSIDER

There are many things that you need to consider when designing and selecting washroom partitions. One of the biggest things you need to consider when designing them is the layout of the bathroom. Each stall requires a specific dimension according to the local building code.

Spacing and sizing is more than just a code requirement, the minimums can feel cramped. Is your building a luxury building? Consider making stalls wider to allow for more arm room. Do your patrons need a place to change? If so make them deeper and consider extending to the floor. Consider your end user and pick partitions that suit them.

Other more technical things to consider are related to the other items you'll find in a bathroom. What type of [washroom accessories](#) will you have? Are they large or small and do they need to mount to your

partitions? Where are your sinks and which way do the door handles need to swing?

Lastly handicap stalls may be a code requirement in your building. If so you may need to increase the size of one of the washroom stalls to allow for a wheelchair radius. The space between your toilet and your washroom partition must exceed 1500mm.

TIPS FOR CONTRACTORS INSTALLING WASHROOM PARTITIONS

I've learned a number of very important lessons about installing and ordering washroom partitions over the years. **Some of the most important tips for contractors when installing washroom partitions include:**

- **Take Site Measurements**
- **Don't Forget the Blocking and Support**
- **Install at the end**
- **Don't Over Complicate**

Take Site Measurements

Site measurements are important when ordering your partitions. The dimensions that are listed on the architectural documents may not be the same as what you have on site. For this reason it's important to verify the location of all your drywall partitions and ceilings before ordering. When [completing a project that is a renovation](#) this becomes even more important as existing walls can change from location to location.

Don't Forget Blocking and Support

Washroom partitions require inwall blocking to mount them. This can be done with sheet metal or plywood. The screws which support the brackets and side panels will screw into this material. If you have overhead partitions you need to remember to install engineered steel above the ceiling.

Install At The End

Washroom partitions should be one of the last products that gets installed on your project as they are susceptible to damage. Install them after the tile and drywall has been completed in each of your bathrooms and have trades avoid using them. Scratches and dings can be touched up though they need to be completed by a specialty contractor.

Don't Over Complicate

I've seen all sorts of fancy designs from architects looking to reinvent the washroom partition. The challenge with these designs is that they complicate a product that's already been refined. Stick with pre-manufactured products wherever necessary and if you can't keep materials simple: glass, corian or wood.

ADDITIONAL RESOURCES ON WASHROOM PARTITIONS

There are plenty of really great resources out there on washroom partitions. Industry corporations and books help to make them simpler. Here are some of my favourite resources on the subject:

- [Amazon](#) – Toilet partitions are listed on amazon and alot of times you can get them cheaper than ordering them from the supplier if you're willing to do some self assembly.

- World Outlook (Industry Forecast) – if you're in the business of selling toilet partitions [this book is perfect for you](#), it forecasts where businesses will need them and the types.

WRAPPING UP ON TOILET PARTITIONS

In my career I have not built a single building that did not have toilet partitions in them. They are a standard part of our industry and because of that it's important that you know as much as possible about them. While their dollar value on a project may not be large, they do pose a risk if done incorrectly.

CHAPTER 31.

TECHNICAL KNOWLEDGE - BASICS OF BUILDING ENVELOPE

Keep The Water Out

The envelope of your building is just as important as the interiors. Keeping the weather out and the comfort in is the primary role for your envelope. As a builder you should be focused on quality to this vital building component, holes and improper installation can lead to discomfort for the building occupants.

We won't pretend to be fancy building scientists, we're far from it. But as a project manager or site super intendent it's your job to know the basics and the right questions to ask. We're here to help with that.

WHAT MAKES UP THE BUILDING ENVELOPE?

The building envelope is really any exterior facing component of your building. It can be the walls, slabs, roof and parapet. It could be clerestory windows or skylights. Anywhere the weather could come in your building envelope is there to protect you.

In general the building envelope is made up of three components – slab, walls and roof.

WHAT THE VARIOUS CONSTRUCTION TECHNIQUES FOR EACH BUILDING ENVELOPE COMPONENT?

For each component there's a long list of materials and systems that can make up your assemblies, so lets list a few of them:

Slab

- Concrete
- Metal Deck
- Insulation
- Air Vapour Barrier

Walls

- Curtainwall
- Window Wall
- Panelling or Siding System (ceramic, metal, composite, precast etc)
- EIFS
- Studs
- Insulation
- Air Barriee
- Vapour Barrier
- Metal Flashing
- Bricks / Masonry
- Stone
- Exterior Sheathing

Roof

- Slab
- Metal Deck

- EPDM Roofing
- Inverted Roof System
- Green Rood
- Mod Bit Roof
- Vapour Barrier
- Flashing

As you can tell theres a lot to know about the different types of systems. The terminology can really add up and get confusing so just try to keep things within the three main components until you get more comfortable with the terminology.

FOCUS ON QUALITY IN ENVELOPE CONSTRUCTION

Given there's alot to know your main focus should be constructing with quality in building envelope construction. If this is your main purpose you'll stand a better chance at doing so. How do you start, there's a few main concepts you can follow or generally always keep in mind.

Vapour Barrier On The Wet Side, Air Barrier On The Warm Side – one of the golden rules of construction. The intention of this is to keep the insulation free from moisture. By putting the vapour barrier on the outside of the wall cavity it keeps any vapour from the exterior from getting inside. The air barrier is intended to stop the movement of air. Because warm air condensates when it gets cold, you want to block the cold air from getting warm. Therefore if you live in a cold climate it goes on the inside (warm air gets cold on its way out) and in warm climates it goes on the outside (warm air tries to get in).

Focus On Transitions – how many times have you heard of a roof leaking at a joint in it, or a window leaking around the perimeter casing? 90% of

all facade problems originate from where two materials meet. Generally products that are applied across large areas, unless applied incorrectly, are designed to perform well. Where you run into issues is where two different products meet. Spend extra time on these details and focus on making sure they are water tight and sealed. Before installing the products it's recommended you check with both to make sure they are compatible. For example – asphalt that is used to apply blueskin can eat away at certain PVC products used in roofing.

The Newest System Isn't Always The Best – in construction vendors are always trying to sell their newest system. The newest isn't always the best. Sometimes proven systems are the best way to go. You never know what the elements will throw your way and taking a chance on something that is new could go horribly wrong. In envelope construction replacing a product if it's failed can be incredibly costly so relying on something that has a proven quality and track record can be a good thing.

Mockups Are a Man's Best Friend – seriously. Everyone always wants to see what the interior lights or finishes will look like but doing mockups to understand how different products will fit together can be equally useful. Leave time in your schedule to build samples and mockups to get sign off and allow your trades to coordinate between the different vendors.

Envelope construction is a challenging task and getting it right can be a trial and error process. By focusing on quality, understanding the basic concepts and relying on the expertise of others you can succeed in your building.

What's your biggest lesson learned in facade or envelope construction?

CHAPTER 32.

TECHNICAL KNOWLEDGE - BUILDING EFFICIENCY

Make Your Building Operate Better

The environment matters and a lot of building owners are taking steps to ensure their property operates more efficiently. There are a lot of recommendations out there, but, after working in the industry for several years we've been able to see where the most bang for your buck exists. These are some of the simplest solutions which will help to improve your property:

SWAP OUT OLD LAMPS FOR LEDS

The capital cost of LED technology is decreasing, it hasn't quite hit the price of traditional incandescent or fluorescent lamps but it's getting better. Re-lamping your building with LED bulbs is perhaps one of the easiest and most cost effective ways to reduce your impact on the environment and the operational costs of your buildings. The cost savings come not just from the energy reduction but also from the man hours saved on paying someone to go around once a month to replace bulbs.

If you want to take it one step further there are retrofit kits for fixtures to make them even more efficient. In a recent project we installed a Philips LED kit for the pot lights in an 80 year old building. Not only did it clean

up the look but the performance and heat improvements were immediately noticeable.

CHECK YOUR MECHANICAL UNIT FILTERS

Seriously, this is a mistake we see all the time. Mechanical units can only put out as much air as the filter medium will let them. We've seen so many occurrences of building owners complaining that an area is cold only to go in and find out the filter hasn't been changed in years and the unit is only performing at 30% of its capacity because of it.

Implement a filter replacement program on all of your units and replace them at least once a year. Consider high performance filters. These things protect your mechanical units from damage so it's best to keep them in good condition.

CAULKING, CAULKING, CAULKING

For those of you that have heard the mantra, caulking fixes everything. While it's far from the truth caulking can help to seal a building envelope. If your building is aging it may be best to hire a building envelope consultant (more on that later) and implement a face sealing program as a short term solution.

If you're concerned with drafts in your small commercial building or house, caulking can help. Consider renting a thermal camera (get a good one it's worth it) and do a scan on your house. If a window is leaking you'll be able to see it right away and fix the problem.

[Check out our article on caulking to try learning it yourself.](#)

RETROFIT

This is a bit of an open ended suggestion but retrofitting your building with new components may pay themselves off. Things get old and wear out over time just like we do! Retrofitting can come in many different shapes and sizes, below are just a few suggestions for you:

- Roof replacement – upgrade the insulation and the roof membrane if leaks are occurring
- Mechanical Unit Upgrade – have someone come in and replace the belts and bearings in the motors, this may help them to operate at their original efficiency. If that fails replace the motors and internal guts or replace the unit in it's entirety.
- Seal Ductwork – ductwork leakage has been said to be cause for 15-20% of air leakage in buildings, consider hiring someone to seal ductwork in your ceilings.
- Window Replacement – many companies are starting to specialize in glazed unit replacements, if your windows are single pane consider upgrading them to an IGU (hint this can be done nowadays without replacing the frame itself).

HIRE A PROFESSIONAL

There are people that do this work for a living (trained professionals). Consider hiring an envelope consultant to make recommendations on your building and perform a building assessment. Likewise for mechanical and electrical systems.

Make sure you check out their fee structure, we'd recommend paying a flat fee rather than percentage of the work, this way the consultant is not incentivized to choose the most expensive repairs.

Be open, let them understand your budget and the report and recommendations that come out of it may be tailored towards your budget. To be wary though, bringing a professional in to review your building may give you bad news so don't be surprised if their recommendation includes replacement of all of your failing windows!

PART VI.

**YOUR CONSTRUCTION
CAREER AND BUSINESS**

CHAPTER 33.

CONSTRUCTION DEVELOPMENT - STARTING YOUR CAREER

Begin At The Start

If someone was to have asked me fifteen years ago what I would be doing I could not have guessed a career in construction. Building really cool structures is not something that everyone gets the opportunity to do in their life. When I graduated high school I didn't even know this opportunity existed for me, so today I thought I'd write an article about the different opportunities for people to get involved in this industry.

There are many approaches to getting involved in construction management or construction in general. It's one of the few industries where a PhD is not necessarily valued heavier than a college diploma and experience. Because so much of what we do is dependent upon knowledge typically that is valued more. So below I've compiled some tips or advice for someone looking to get into this field!

START WITH SOME WORK EXPERIENCE

Seriously this is the best advice for any young person I see interested in the industry. Do some labour or surveying work prior to getting involved. Help your dad put a roof on, frame your basement, starting a painting business. The really cool thing about this is that it will teach you about

different aspects about the industry while providing you with detailed knowledge about a trade.

For me, I worked in the as a surveyor for a summer job and after that I got a job in a machine shop fabricating car parts. At the time I thought the job was monotonous inspecting and grinding down welds, but now steel and layout are one of my stronger scopes of work and I can fully understand them when someone says the weld is poor.

The really cool thing about this is that it will teach you about different aspects about the industry while providing you with detailed knowledge about a trade.

TAKE SOME SCHOOLING

Ultimately getting into the industry in Canada or the United States means taking some schooling. As I mentioned above, school in this industry is not given the same importance as it would be as a doctor or a business consultant. Many companies value experience and knowledge over schooling. Rightfully so, you can learn much more in an afternoon with a carpenter than you can in a semester of courses at University.

That all being said school is an important part of everyone's education and learning the fundamentals and some of the theoretical knowledge related to why we do things is important. In addition schooling can sometimes provide you with the contacts you need to land a job, which brings us to our next point...

COOP OR APPRENTICESHIP

A coop placement or apprenticeship can be one of the most valuable experiences in a persons life. I was fortunate enough to get a placement at

an incredible company which then opened up into a full-time position. Through the co-op I was able to meet people in different industries, and build relationships early on in my career. Some of my best contacts are people I met during this time in my life.

Ultimately if the full time job hadn't have been offered to me, I likely could have moved on and been offered a job through one of the people I knew through the placement. This is why I value this as the highest opportunity for people looking to get into the industry, the experience, insight and contacts you build in the industry during a coop or apprenticeship are invaluable.

Ultimately if the full time job hadn't have been offered to me, I likely could have moved on and been offered a job through one of the people I knew through the placement.

INDUSTRY EVENTS AND NETWORKING

Yes I know it sounds like I'm a recruiter but the honest truth is getting to know people is a huge part of industry. I can't count the number of times someone's handed me their card or I've given them mine only to pass along their resume to my human resource department. These types events are really important to not only sell yourself but just to meet people.

Maybe you can learn something about roofing at an event, or a new lead on a project, maybe you can find someone that shares the same struggles as you. No matter what comes out of these types of situations it's rarely bad.

JUST JUMP IN

Ultimately no matter what you do just getting involved and showing

interest is the first step. There are a lot of really good people out there who are happy to pass along their knowledge and stories, so just finding those people and listening is a good first step.

CHAPTER 34.

CONSTRUCTION DEVELOPMENT - PROJECT MANAGEMENT AS A CAREER

Construction Managers Are The New Doctors

When I first started my career in the construction industry I had no idea what a construction project manager was or did. School doesn't always do a great job of educating you on what careers exist in the wider world and this was one of those examples. So what exactly is a construction project manager and what do they do on a project?

I found the answer to that through experience and hard work. **A construction project manager is someone who is responsible for the execution of a construction project. They manage the trades, financials, schedule, quality and administration. Construction project managers are at the center of every construction project.**

WHAT DOES A CONSTRUCTION PROJECT MANAGER DO?

Above I provided a bit of a synopsis of what a construction project manager does on a project but let's dig into more detail. They are ultimately the person that is responsible for a construction project or part of one. Typical responsibilities on any given project can include:

- Project Document Administration – managing all submittals, RFIs and documents on the project.
- **Financials** – managing the overall costs as well as contingencies, changes, forecasting, contractor billings etc.
- **Schedule** – managing the overall schedule including preparation, updating and dealing with issues.
- Coordination – coordinating and managing trades and designers during the project.
- **Startup and Closeout** – managing the startup and closeout process of a construction project.

The above list is of course just a high level list. A construction project manager performs many of the essential tasks of running a construction project.

PEOPLE ARE CENTER TO THE ROLE

One of the primary duties of a project manager in construction is managing people. Every day I go into work, and while a portion of what I do involves managing financials and construction details, a significant part of what I do involves dealing with people.

There are many different ways your day will involve dealing with people. The first and most frequent will be managing other people within companies that aren't your own. Our industry relies on multiple companies working together to achieve a common goal. Those companies are made up of different people.

As the project manager it is your job to manage those people. Regular phone calls, meetings or discussions will allow you to set goals for the project. There will also be many difficult conversations that need to be had

– as a project manager it's your job to present these to the individuals required.

Outside of external project participants it's very likely as a construction project manager you will have an internal team. This may involve having direct reports, but it will also be your job to manage the goals and objectives of that internal project team.

THE PATH TO BECOMING A PROJECT MANAGER IN CONSTRUCTION

As I noted above, the path to becoming a construction project manager wasn't clear and for many it's an unknown option as many career counsellors won't recommend it. Careers such as a doctor, an electrician and a scientist are all well defined. Construction project managers are able to enter the industry through a variety of means that have changed over the years. SO how doe one become a construction project manager?

There are many different ways to become a construction project manager, the first and most common is through schooling. Another way to become one is to work in a trade and show interest in management, if you demonstrate that you are effective and able to learn many trades will promote from within.

A third and final way to become a project manager is to transfer in from another or similar career. Many architects or engineers make the jump after being in the industry for a number of years. One of the keys to being good at this career is knowing how projects are run. By getting experience within the industry you're better able to understand the nuances of a project.

WHAT DOES A CONSTRUCTION PROJECT MANAGER MAKE?

The big question – how much money can I make in a job? The answer should always be more! I’m only kidding of course but it is an important question and one that will vary greatly depending upon your region and responsibility.

Because I work in Toronto I am going to use this geographical area as an example, but I do know that throughout Canada these numbers vary by 15-20% in all major city centres.

Total Compensation Of A Construction Project Manager By Years Experience

| | |
|-----------|-----------------------|
| 50k-75k | 0-5 Years Experience |
| 75k-125k | 5-10 Years Experience |
| 125k-250k | 8+ Years Experience |

Total compensation for the role can be made up of a number of thing, these

include your base salary, a stock options or share offering, regular bonuses, flexible hours, medical and personal benefits, travel and vehicle allowances and many more.

As with most careers, your compensation is indicative of your time in the industry, competency and responsibilities. Over time your package will grow and you may be promoted beyond the role of just a project manager.

HOW TO GROW AS A PROJECT MANAGER?

Once you're in the role it's important to grow as a project manager. I've been a project manager for 12 years now and in that time I've progressed from a junior level to a senior project manager, none of that could have been done without constant learning. So how can you grow and progress as a project manager?

There are a few ways to grow and progress as a project manager, these are the most effective that I've found:

- **Networking and Relationships** – through your project work meet new people, build relationships. These relationships will teach you new things and provide you with a network of people you can rely on.
- **Read Books On Project Management** – there are plenty of [Construction Project Management Books available on amazon](#) or through our own [Construction Repository](#). Maybe even consider downloading our [free construction e-book](#).
- **Take A Course** – one of the easiest ways to grow quickly under the guidance of a professional who knows what they are doing.
- **Industry Events** – industry events such as trade shows and speaking series are a great way to learn about new products and technology.

- **Project Experience** – new and challenging projects will allow you to diversify as a project manager.

There are so many ways to grow as a project manager and this is by no means a complete list. The important thing to remember is that you should always keep challenging yourself and learning new things.

ESSENTIAL SKILLS FOR PROJECT MANAGERS

Through industry experience I've learned that some skills are more valuable than others as a project manager. While many careers focus on things like mathematics and knowing the periodic table construction focuses on some of the soft skills.

Soft Skills

The most notable areas for project managers to develop their soft skills in are negotiating, presentations and leading meetings. Every transaction you have with an owner, subcontractor or architect will be a form of a negotiating. Becoming approachable and apathetic to the other side is important.

Hard Skills

Areas that project managers should focus on include estimating, scheduling, technical knowledge (building envelope, finishes, mechanical and electrical systems, etc) and software such as excel and microsoft excel. [Quality management](#) is another area that needs to be focused on as a project manager.

TOOLS FOR CONSTRUCTION PROJECT MANAGERS

There are many tools available for construction project managers to manage a variety of tasks. The below are some of the best tools I've found for a construction project manager:

- **Note Taking and Keeping** – Microsoft OneNote
- **Team Management** – Kanban Tool
- **Scheduling** – Primavera P6
- **Tablet** – Ipad Pro (for drawings)
- **Laptop** – Microsoft Surface

Note Taking and Keeping

I'm a huge proponent of tools such as Microsoft OneNote or Evernote to keep your notes. The best part about these tools is that even if you prefer writing you can always scan your documents into the app once you're done and it will use OCR technology to scan your notes and make them searchable.

Team Management

Prior to the last two projects I typically ran my team with internal team meetings. That changed when a colleague recommended Kanban Boards. Tools such as Kanban Tool and Trello allow you to manage your teams through collaboration. These tools can replace your meeting minutes and streamline meetings.

Scheduling

All of my projects are scheduled through Primavera. This is really the best solution for large project scheduling in construction.

Technology

I've already posted previously about the use of new technology in construction but there are many great tools that make your job as a project manager better. I personally prefer using an Ipad for reviewing drawings, when you utilize it with Bluebeam or Good Reader it makes life simple.

For day to day computer use I prefer [the Microsoft Surface](#). As a laptop it is light weight and offers all of the power you'll need for some of the more demanding applications.

Lastly for file sharing I lean on two or three different programs but Box and Microsoft Onedrive are my personal favourites.

OUTLOOK FOR CONSTRUCTION PROJECT MANAGERS

Construction is one of the busiest sectors in the modern day economy. When the economy of a country starts to slow down, governments typically invest heavily in the construction sector to help boost jobs. For this primary reason the career outlook for construction project managers is very strong.

In cities such as New York, Dubai, Hong Kong, Toronto, Sydney construction forms more than just a small portion of the economic engine and becoming a project manager can mean you are able to live a lifestyle only lawyers and doctors typically get to enjoy.

I have been a project manager now for more than ten years, and in that time I've had the opportunity to meet some of the most incredible and inspirational people. Becoming a project manager means you get to change more than just the city skyline but peoples lives.

CHAPTER 35.

CONSTRUCTION DEVELOPMENT - RELATIONSHIPS

Build Your Empire

This past week I was out for lunch with one of the vendors we do business with regularly and they said something that surprised me, “it’s great you and your team know the owner so well and all of their business but don’t forget that it’s the trades that help you to build your business and it’s just as important to know them the same way you know your owners”.

The statement surprised me because I know how important it is to know your trade partners but it was interesting to hear the other sides take on it. Relationships are a very important part of not just the construction industry but many other industries and the way we all do business.

WHY IS IT IMPORTANT TO BUILD STRONG RELATIONSHIPS

I am still developing my career but the one key thing I tell all of the younger people that come in and do work for us is to build relationships with the people their own age. If you plan to stay in a market for a period of time, relationship building is critical.

Strong relations with someone can help you to be handed new work (instead of competitively bidding) or on the flip side help you beat out those other vendors on a competitive bid. They can also make your job

easier by giving you someone you know you can always rely on, to be the driving force in a project, to get you out of a messy project or just someone to bounce ideas off of and get the honest truth from. A strong relationship with consultants can make the design and construction process less combatative.

Those are really just a few of the many benefits of a good relationship with people in the construction industry.

HOW DO I START?

As I mentioned above, the new members on my team are strongly encouraged to build new relationships with people their own age. Some of the strongest relationships I have are ones that I've developed over the years with people my own age. As we've both grown in our organizations so have our responsibilities and the things we can help each other out with. There's a special bond people gain when they see each other growing together.

Beyond that method there are plenty of ways you can build relationships with people besides just working with them regularly. The simplest is inviting someone out for a coffee or drink and getting to know the person. That's an easy way to start, showing someone you do what you say you will is a good way of developing that further, if you promise someone something follow through on it, people will learn to trust you.

Meeting people can sometimes be a challenge, you will inevitably meet new people throughout your career just through exposure to various projects, however if you're looking for other opportunities consider industry nights or networking events. Trade shows, talks and other events

that bring together large groups of individuals that have similar interests are great ways.

Lastly, the biggest thing I've found to help build relationships with people is just to ask them for their opinion on something, make people feel like they matter to the process and to how you approach their work.

WHO SHOULD I FOCUS MY RELATIONSHIP BUILDING ON?

The simple answer to this question is anyone.

The longer and more complicated answer is that it depends on what your goal is and what you want to get out of it. Here's a list of just a few people you can build upon.

New to the construction industry?

- Trade foreman
- Entry level employees at other firms (consultants, trades, etc)
- Operations personnel (you'd be amazed at all of the things you can learn from these folks)
- Tenant coordinators, managers etc
- City staff, building inspectors

New Business Owner?

- Other industry business owners (consultants, trades, etc)
- Clients or partners in consulting firms to help finding new work easier
- Building inspectors, councillors, city staff

CHAPTER 36.

CONSTRUCTION DEVELOPMENT - LEARN MORE ABOUT CONSTRUCTION

Grow As A Person

When I started my career in construction one of the biggest challenges I faced was how to learn about construction and the industry. Initially I looked into taking university or college courses, then resorted to reading books and finally to online blogs and articles. What I found was that the industry is fragmented and there's no magical pill to learning about construction.

The following are the ten best ways that I have found, throughout my career, to learn about construction:

- **Construction Experience**
- **Online blog posts**
- **Industry Publications**
- **Youtube and other video resources**
- **Mentorships**
- **Online construction courses**
- **University or college programs**
- **Books or E-Books**
- **Conferences and Events**
- **Observation**

In this article I'm going to walk through each of the above in depth to help you learn more about construction.

CONSTRUCTION PROJECT EXPERIENCE

How many of you have worked for that old superintendent that kept saying the only way you'll learn is through project experience. Well, things have changed alot since they came through the industry, but that old superintendent wasn't wrong. Construction project experience is one of the best ways to learn how to build.

There are various ways to get more construction project experience, the simplest is to get a job with a contractor. Depending upon the [industry or specialization](#) you want to focus on you should narrow your job search to companies that specialize in it. This way you don't waste your time learning about how to build retail stores when you really want to build power plants.

Another way for you to get more construction project experience is through volunteering. Organizations such as Habitat for Humanity will place you on jobsites to perform tasks. By putting up drywall on a weekend you'll learn more about the trade and what it takes!

USING ONLINE BLOG POSTS TO LEARN ABOUT CONSTRUCTION

When I first started writing for cnstrctr I thought that the world of online blogs that focused on the construction industry was really large. What I quickly learned is that the number of quality blogs is small.

What I did find though is that there are some really great blogs that focus

on niche areas within the industry. Whether it's [Construction Marketing](#) that you're interested in or [Blogs about Drywall](#) there are so many great resources that people have created.

Each year I publish a list of my [favourite construction blogs](#). Keeping up to date on these by becoming a regular reader will help you to learn about the construction industry.

CONSTRUCTION INDUSTRY PUBLICATIONS

Construction publications come in many different shapes and forms. From newsletters to magazines the benefit to a construction publication is that they are typically run by industry companies and professionals.

Some of my favourite construction industry publications include:

- [Professional Constructor Central](#) – is an online newsletter which aggregates a lot of online publications and distributes emails on a daily or weekly basis.
- [Constructor Magazine](#) – is a monthly magazine which covers various subjects that contractors deal with regularly.
- [Contractor Magazine](#) – another construction industry magazine which deals with current events in the industry.

Whether it's a magazine or a newsletter construction publications are a great way to learn about construction.

YOUTUBE VIDEO RESOURCES TO LEARN ABOUT CONSTRUCTION

My generation (millennials) are notorious for our sharing and one of the

best platforms that has been created to do so is youtube. Learning construction through video is an easy way to retain information and learn while you're doing other activities.

Simply by searching for construction on youtube returns hundreds of thousands of videos. Narrowing your search more means you can learn about construction and many more niche subjects.

A few tips for making your youtube experience more valuable.

Create playlists – by creating playlists as you find videos that you like you can save them. This will allow you to pull up videos more easily on subjects.

Listen While You Work – just because you don't want the video you can have videos on in the background and listen to the audio. Learning something is better than nothing.

Be Specific With Your Search – looking for just construction returns too much. Be very specific with your search so that the most relevant resources are returned.

Youtube and other video resources are one of the easiest passive ways to learn about construction.

FINDING A MENTOR TO TEACH YOU ABOUT CONSTRUCTION

Early on in my career I learned that people with experience are typically happy to teach you. Finding a mentor who has spent years in the industry and is willing to invest time in you is key to learning more.

When searching for a mentor in construction consider who the person is, are they respected? How long have they been in the industry? What have they done during their career? These questions will help you understand who the person is and what they have done. Don't be afraid to approach someone and ask.

Finding a mentor can help you to learn by avoiding mistakes. Sometimes mistakes are the best way to learn, but I've found that avoiding them all together by learning from someone elses mistakes is far easier. Finding a mentor can help you to speed up how much you learn about construction.

ONLINE CONSTRUCTION COURSES

Online construction courses are a new method of learning that many people have taken to. During my career I have registered in a few – all of which have provided me with valuable knowledge and skills.

Where can you find online construction courses and what are the best? Here are some of my favourites:

[Constructor School](#)

Okay I am more than biased about this. We've been working on [Constructor School](#) for sometime now and will be launching in the coming months. We will offer plenty of [online construction courses](#) for you to enjoy and learn from all at an affordable price. **Our online courses will help you to learn about construction.**

[Constructor-Ed](#)

This website allows people to submit online courses for others to

purchase. The benefit to this is that there are plenty of online courses for you to choose from that are all fairly light on the pocket.

[*Linkedin Learning*](#)

Linkedin has hundred and thousands of courses with a wide range of topics. With a simple search you can narrow the subject down to construction. While some of their courses to border on the more expensive side there is plenty of content and a monthly membership.

Whichever option you choose – **online construction courses are a great way to learn more about the industry and techniques.**

UNIVERSITY AND COLLEGE CONSTRUCTION PROGRAMS

When most people think of university and college programs they think of young people. That doesn't need to be the case. There are many university and college programs that you can take that will help you to learn about construction.

Today, many university and college construction programs can be taken online or part time through in person classes. The benefit to these types of programs is that they provide structure and guided learning. Many programs often come with certifications or provide hours that you can put towards certifications.

The downside to university and college construction programs is that they are typically more expensive and time consuming. Unless you are dedicated to learning these can feel overwhelming with a full work schedule.

USING E-BOOKS AND BOOKS TO LEARN ABOUT CONSTRUCTION

I might be a bit biased about using e-books and books to learn about construction (I've wrote a few of them. So why are e-books and books a great way to learn? The reason is that they make you do it yourself.

When you're registered for a course you decide when you want to pay attention. You may miss part of the lecture. A book is a choice – if you choose to read it's because you want to so there's a greater chance you'll enjoy and appreciate the subject.

According to Statista over \$1 billion in sales were done on e-books in 2017. That's enough money to build and run a hospital for 30 years. Since they are becoming more mainstream people are taking to self publishing and of course amazon.

**So what e-books are worth your time to learn about construction?
Through my experience some of the best construction related e-books are:**

- **Guaranteed Project Success (authored by me)**
- **Over Budget and Behind Schedule (authored by me)**
- **The Profiteers (History of Bechtel)**
- **101 Case Studies in Construction Management**
- **Lean Construction – Practical Insights**
- **Breakthrough Project Management**
- **Inside Commercial Construction**

Of course you could check out our [full line of construction e-books](#) if you really want or download our [free construction e-book](#).

CONSTRUCTION CONFERENCES AND EVENTS

Construction conferences and events are setup to specifically help people learn more about construction. As a professional in the industry you should use this to your advantage. Often times your employer will pay for you to attend these events.

Construction conferences are typically specific to a niche. For example Las Vegas offers an annual “World of Concrete” event and California plays host to a “Technology in Construction” event. A quick google search will pull up events and get togethers which focus on what you want to learn more about.

When looking for new events make sure to do your research. The main thing to look out for is annual attendance. Conferences can be a bit “flighty” meaning that if it’s their first year they may not have the best attendance. If a construction conference or event has been recurring for multiple years chances are they are making enough money through a large attendance.

OBSERVING OTHERS IN CONSTRUCTION

One of the easiest (and cheapest) ways for you to learn about construction is just to observe and watch others. Some of the best ideas I’ve had while planning projects I’ve seen on other jobsites and stolen. Hoists in New York city all land on the roadway with large temporary loading docks built for easy access – this was implemented on my last project.

Simply by watching other projects as you walk around the city you live or while visiting others you’ll see new techniques and procedures. Taking a

photo or keeping a notebook will help you to track these ideas and utilize them in the future.

Another way to observe is by arranging for tours of other jobsites. Companies often encourage you to communicate internally and share information. Make a point to visit other jobs to understand how they approached problems. Visiting completed buildings can also help you. Looking at complex completed structures can help you understand what architects and engineers are intending with their details and drawings.

Just by watching and observing you can learn a lot about construction.

WRAPPING UP AND FURTHER READING

The construction industry is massive and can be a confusing place if you don't know where to look or start. The process to learn about construction can feel overwhelming. By starting with some of the above processes and spots you'll set yourself for a solid foundation in construction.

When you start your next construction project look at the drawings and ask yourself "what don't I know?". Make a list of everything you come up with. Take the list and google the subject. You'll be surprised with what comes up. If you can't find what you're looking for on google try searching one of the many resources I have noted above.

As some further reading for you, check out some of our blog articles to help progress your career:

- [Starting your Construction Career](#)
- [Construction Manager – A Field Guide](#)
- [Communication in Construction](#)

CHAPTER 37.

CONSTRUCTION BUSINESS - STARTING A CONSTRUCTION BUSINESS

Build Your Legacy

Starting a construction business can be a daunting task; we know this has been some of the scariest years of our lives. We've talked to a lot of people through the years, and it's actually incredible how many people are too afraid to start something on their own. But, despite that there are hundreds of entrepreneurs starting their own business each year in the construction industry. Some failing and some succeeding.

I'm going to walk you through some of the basic steps to starting your construction company and what to look out for on the way.

DON'T START YOUR CONSTRUCTION BUSINESS TOO EARLY

Let's all be honest, we learned a lot in our first few years in this business. After school the industry can seem ruthless at times and your first few years are critical. Get a job with a larger company and as bad as it is to say, make mistakes with someone else's money. You'll learn what you hate, and what you need to know.

Starting a construction business is going to be a challenging task and take

persistence, you don't want to find out you hate the subject when you're two years into it.

PICK A NICHE AND PURPOSE

There are hundred's of different areas that you can start a business in construction. From drywalling to mechanical work to general contracting. Any industry can be a source of income for you. Our recommendation is to pick something you're good at. For example, if you're a plumber, don't start a painting business. You know the trade, (one would presume) you know how to do it well. So use something you've mastered already.

Once you have an idea of the area you'd like to focus on next step is to understand what you'd like to do with it. Not everything needs to be on the tools, there are lot's of different categories to start with. Starting a construction business in any one of the following can be successful:

- **Consultant** – make recommendations to people
- **Designer** – design whatever it is you're good at
- **Contractor** – build and install your niche
- **Supplier** – supply products to the niche you've chosen
- **Service Provider** – provide a service to your niche – as an example provide an online course to plumbers

HAVING A BUSINESS PLAN (PRO-TIP: IT PROBABLY WON'T BE RIGHT THE FIRST TIME)

If someone had of told us that we'd be running a consultancy when we launched this website we'd have called them crazy. Our initial business plan was to conquer the world of construction social media. How wrong were we!

A business plan is a document which will outline what you are going to do with your business and how you are going to do it. A lot of people will tell you it's crucial to starting a business, but the honest truth is it's not. Yes it is important and yes it's good to have a clear idea of what you will be doing but it's not essential.

That being said, do spend the time to put together a document, we won't go into too much detail on how to prepare a business plan, there are [lots](#), and [lots](#) and [lots](#) of great articles on the internet to help you with that!

What you need to take away from this exercise is how you will make money. That needs to be one of your primary goals and the path to do that needs to be clear.

THE M WORD (MONEY)

One of the biggest hurdles for people that we've seen trying to get into the industry is money. People are always afraid that by giving up their salary they risk not bringing in money. And for some, that fear is a reality. Your first idea may not be a money maker and because of that you need a contingency plan. Here are a few ways you can start a new construction business and deal with the money issue:

Start The Business Part Time – by maintaining a full time job and starting the business part time you're leveraging your salary and not placing all of your eggs in one basket. If the business fails you have something to back you up.

Save Your Money Up – if you save your money up over a number of years and build yourself an allowance, it may not matter if your business does

well in the first year. You will have an allowance to rely on and can always go back to a job if it doesn't work out in the first few months.

Financing – banks love small businesses and are more than willing to throw you heaps and heaps of money if you have the equity. Depending on the type of business you decide to start (more on that later), you can leverage your own assets. This should be done in caution, as if your business fails so could your own personal life.

Crowdfunding or Investors – this has become a more popular route in the last few years. Sites like [GoFundMe](#) have made getting large amounts of capital much easier and approachable. If you have an interesting product or service, consider launching a campaign on [gofundme](#). Find a friend or relative that may be able to invest in your business for a percentage.

Whichever route you decide to take, make sure that you have a breaking point. A breaking point is a defined spend amount or date whereby if your business isn't returning its target goal it will be time to change strategies or pack it in.

REGISTERING A CONSTRUCTION BUSINESS

This is one of the easiest tasks and most exciting, the day you decide to register. If you live in the United States or Canada starting your own construction business is fairly straight forward. Simply go online ([USA](#) / [Canada](#)) and fill out a few forms and presto, you're a business owner. Before you do though, there are a few things you need to know:

Sole Proprietorship or Partnership – In most countries these only require a small fee and you can register a business number. These are the most common and easiest to start. If you're not sure what to start with you

should start with this. Don't branch out if you don't need to. With either of these your personal assets and credit are on the line, so if the business fails so do you.

Corporation – A corporation in business is basically creating independence for your business. To get incorporated it typically costs more money and you need to get a lawyer involved. What this means however, is that your business is its own entity and separate from your personal finances.

GIVING YOURSELF A PRESENCE ONLINE AND IN REAL LIFE

Before you start a construction business you're going to be forced to pick a name. Whatever that name is you need to create a brand for yourself and your company so people know who you are. If you need to engage a graphic designer and web developer we recommend you do that. We've wrote a whole article on why [creating an online presence is important for construction companies](#), essentially having one allows people to find you.

Having a brand and website or office allows people to recognize who your company is and recommend it to other people. Word of mouth is one of the best types of advertising, whether it's done online or in person. Leveraging this method requires the above. There are lots of other ways to [grow your construction business](#) as well, make sure you try them all!

STARTING A CONSTRUCTION BUSINESS? LEARN TO FAIL

Above we've provided you with some of the basic lessons to starting a construction business. The amazing part about this is you don't need to be an expert to jump in.

One of the biggest pieces of advice we give to small business owners and budding entrepreneurs is don't be afraid to fail. It took months to actually get our first customer and a year before we ever even came close to turning a profit. Three ideas and initiatives later we finally have a method that works. But guess what? We failed many times before finding a solution and you need to be prepared to adapt and fail. Don't get discouraged it's all part of the process.

CHAPTER 38.

CONSTRUCTION BUSINESS - GROWING YOUR COMPANY

Grow Your Company Faster

Growing your construction business is one of the most important parts of any company. Maybe you're just starting your own construction company, or maybe you're already part of a medium sized business but want to help it grow. Building your business in construction takes hard work and regular fine tuning.

Many people start and fail, but following the below steps you'll find success in no time.

NETWORK LIKE A BOSS

Our industry is built on relationships and some of the best opportunities in my career have come from people I know who are already in the industry. Knowing people not just in positions of influence but also people who are up and coming in the industry can win you work. Just because someone doesn't have work now doesn't mean they won't in a few years time.

For networking focus on a few areas:

Foster existing relationships – for the relationships you've already built

continue to stay in touch with those people, keep notes on all of the people you come in touch with in order to build a more personal relationship.

Build New Relationships – construction always has people looking to meet others. To find them consider attending networking events for your local construction associations. Join a local leadership club, or take part in events which are for industries you are interested in doing work in. For example – if office fitups are your thing look for banking networking events or accounting networking events. Alternatively events for architects and interior designers can often give you the lead or heads up on upcoming projects.

Social Network Is For Construction Too – sites like LinkedIn and Facebook offer valuable networking opportunities (check us out on instagram, linkedin and facebook at the links at the bottom of this page). They offer an easy way to stay in touch with people and cold call new people. Use these tools to expand your reach and make sure people know you beyond your immediate umbrella. Things such as blogging can make people see you as an expert in your field and approach you for new work.

Below are a few resources for your to check out:

- [10 Tips for People Who Hate Network](#)
- [Network Tips for People in Construction](#)

BID AND PROJECT REGISTERS

All public works must be publicly tendered in Canada and North America, as such there are extensive tender call lists available online through the government. In addition, often times your local construction association typically helps to facilitate tenders. These are great resources to help you

find new construction work available in the industry and submit pricing for it.

While these lists aren't always free to join, they are useful and can put you in touch with people you may not have had the chance to work with in the past. As always, when pricing this type of work, there will be a wide range of clients so risk will be hire. Make sure you do your research before taking any project.

Below are a few links to examples of bid registries:

- [Ontario Works Registry](#)
- [Merx](#)

FOLLOW UP WITH PAST CLIENT

Repeat work is always the best and just because someone didn't hire you back right away doesn't mean they wouldn't be interested in working with you again.

A great story of mine is a client who I thought didn't enjoy working with me. After the project was completed the client then went and worked with several other contractors. Throughout those experiences the client would constantly call me and ask me for advice or my opinion. After the projects were completed we then became someone he trusted and in turn were award much more work.

Repeat clients can give you some of the most reliable and lowest risk work. Stay in touch with people, meet up for coffee, lunch etc. If not for a business opportunity than just to see how someone is doing.

DO WHAT YOU SAY AND SAY WHAT YOU'LL DO

This goes for any business but is especially true in the construction world. Our industry (like it or not) has a reputation for taking advantage of people. Part of the reason for this is because not everyone understands our industry.

By doing exactly what you say you're going to do and breaking down the steps to your clients in easily understandable chunks you can set yourself apart.

No one likes a contractor or subcontractor that goes over budget or gets behind schedule, but things change and these sorts of things happen. Be honest with individuals when these challenges creep up and you'll find repeat clients.

Ultimately doing well in the construction business comes down to delivering projects, building trust with individuals around you, working hard and not being afraid to be social.

Do you have any other recommendations for building your business? Share them with us below in the comments!

CHAPTER 39.

CONSTRUCTION BUSINESS - ONLINE PRESENCE

Let People Know You Exist

Whether you are a subcontractor, supplier, general contractor or a consultant, not having an website and online presence can be a lost revenue opportunity. But why does your construction company website really matter? If you're just starting out your business chances are you've read a few articles on why it's so important to have a website.

Today let's dig into the five most no-nonsense reasons it's important for your construction company to have a website and online presence.

REASON FIVE – YOUR CONSTRUCTION COMPETITION ALREADY HAS ONE

Seriously – what construction company do you know now adays that doesn't have a website? Most companies by the time they are a year old already have one set up. Make sure you do the same. In the 21st century it looks unprofessional and unorganized for you to not have one.

If you you were a client with the choice between two contractors. Both with the same price and same reputation but one has a great website with lots of images of past and current work, which would you choose?

REASON FOUR – GOOGLE LOCAL SEARCH LOVES LOCAL CONSTRUCTION COMPANY WEBSITE’S

This may or may not be something you’ve heard of already but when you google “drywall contractors toronto” there’s typically a list of companies that come up at the top. This is called google local search and it’s basically a free way for you to get your company noticed more.

Typically when someone who is unfamiliar with the trade landscape needs advice they turn to google. By submitting your business along with contact information to Google Local Search through this link you’ll get yourself listed on that group of companies and avoid having to do some cold calling.

REASON THREE – DO IT FOR YOUR EXISTING CLIENTS

One of my biggest pet peeves in the construction industry are medium to large companies that still utilize their “google” or “hotmail” email addresses. Show some pride, buy a domain name that matches your branding and utilize it for email.

A construction company website is a great networking tool as well. [The construction industry values the old fashioned “I know a guy” method of getting new work](#). By establishing a website you’ll have a portal to send people when they get the “I know a guy” contact information from someone.

It also let’s people show you off – perhaps your clients have blogs or social media. By establishing these accounts you can share in the glory of a successful project and the pathway to it!

REASON TWO – SOCIAL MEDIA HELPS SPREAD THE WORD

Facebook, Instagram, Twitter, the social media options are endless but the one thing each has in common is that it's an easy way to spread the word about your business. By posting relevant content to your industry and utilizing hashtags and tagging your location you can reach out to people who are interested in your industry in your area. It's a great way to skip having to pay for advertising and just do it yourself.

The second benefit to having these accounts is that there are lots of accounts that have thousands of followers that are more than happy to share your content. Groups such as Insta Builders, Contractors of Instagram and even our own account will happily help out the community of contractors.

REASON ONE – IT'S MUCH EASIER THAN IT USED TO BE

This is number one for a reason and it's the honest truth. Getting or making a website for your construction company and getting online is easier now than it ever was. Gone are the days where you need to learn complicated code to create a beautiful layout and graphics.

If you choose to make a construction company website yourself, platforms such as wix allow you to make beautiful websites with a drag and drop editor. If you choose to have someone make it for you, there are plenty of developers out there to hire (we even offer some managed website services). Hiring someone to take your website from idea to creation is relatively inexpensive in comparison to other construction costs and can benefit your company tremendously.

CHAPTER 40.

CONSTRUCTION BUSINESS - THE LABOUR SHORTAGE

It's Coming Whether You Like It Or Not

It doesn't matter where you look nowadays there are headlines in the news daily telling us about the labour shortage. It's a real problem and one that likely won't be going away anytime soon. Since this is the case, we thought we'd help you out with an article on ways you can help to combat the industry labour shortage.

The first thing we need to do is identify what the problem is. The labour shortage is a problem because the number of skilled workers is reducing as older workers retire and fewer younger workers come on board.

One of the ways you can combat the shortage is by making your existing work force more efficient by implementing lean techniques.

Lean construction techniques have been around for many years now. They've recently become the buzz word around the industry but some of the concepts are actually useful. We've implemented a few of them on various projects, and, found increases in employee and trade productivity.

Kanban Boards – one of the coolest (and our favourite) lean technique is to utilize a Kanban board to manage your team. The tech industry uses these but they can be adapted to construction to help you manage your teams

tasks. Essentially these group sections of tasks into different streams (not started, started, on hold, out for review and completed). It allows you to keep track of your team and make sure that they are focusing on what you need them to.

Pull Planning – another new technique, this involves planning projects directly with the people at the field level. Pull planning involves putting stickies up on a board on a weekly basis with the tasks for the week being provided by the trades themselves. This makes everyone responsible for their own dates and ensures everyone is working together.

TECHNOLOGY MAKES THINGS MORE EFFICIENT

Lean initiatives may be a start but a lot of industries have been improving their efficiency for years on the back of technology. Technology allows us to take tasks and automate them. This means jobs that used to take a team of people to complete can now take just one. A few areas you can incorporate technology and see drastic improvements include:

- Accounting Software – to automate your billing procedures and generate invoices for your clients
- Health and Safety – automate form and data collection across your company reducing administration time
- Deficiencies and Issue Management – software such as Plangrid, and Autodesk's BIM360 can help to reduce the time not only correcting issues but managing them and following up with the correct people
- Documentation – Solutions such as Procore specialize in streamlining the construction process, RFI's, Submittals etc. These programs greatly reduce the time spent administering documents

Have a read through our [technology on the construction job site](#) for more examples.

HIRE AN INTERN AND DEVELOP THEM

What are some of your most memorable days in your career? Who was your first mentor? These are all strong memories we have, and just as someone once took a chance on you, you should take a chance on someone. Interns or Co-Op placements can be one of the most cost-effective ways of developing people. In addition to having the satisfaction that you've helped someone, you get to build in some loyalty into someone as well.

One of the only ways we are going to make it through this labour shortage will be by developing our young people, through internships and work programs. Be a part of developing our future!

Are you just starting your career in construction? Consider reading our [article on starting out in the construction industry!](#)

WORK PLACE LABOUR TRAINING

There are lots of great programs available for people to develop their employees. These are courses available across the industry from training on safety to training on more technical skills. If your work force isn't as talented as you need them to be why not invest in them and grow them to the place that you need them to? Invest in training to improve efficiency and help with the lack of skill within our industry.

Investing in your people is one of the strongest investments a company can make.

Consider online courses, or lunch and learns. Some companies will offer training for free as a way to up sell their specific product. For example, a lunch a learn on a specific type of air handling unit may be for free for a certain manufacturer. That training however, may have points about equipment in general and will help your team to understand the advantages and disadvantages of the different pieces of equipment.

CHAPTER 41.

CONSTRUCTION BUSINESS - BE MORE PROFITABLE

Make More Money The Right Way

Construction is a cut-throat industry, and making your construction business more profitable can be a challenge. Making more money isn't rocket science, by following our five tips you'll be increasing your profits in no time!

EVALUATE YOUR COMPETITION AND CHARGE COMPETITIVE RATES

Understanding your competition is key to making your construction business more profitable. You may have set up your business and thought what you were charging is fair. There may be a disconnect between your knowledge of your industry and what the industry charges.

You should not feel bad for making more money, and increasing your rates to match an industry standard is not a crime. Don't miss out on valuable lost profit because you think what you're charging is too much.

ENHANCE YOUR SERVICES TO HELP MAKING YOUR CONSTRUCTION BUSINESS MORE PROFITABLE

Sure you do drywall installation really well, but do you offer drywall

taping as well? Maybe you do plumbing installation but do you do retrofitting and maintenance? Look at your existing services and see how you can supplement them using skills you already have.

By adding additional services you can reach new customers who may not have heard of you before. This can help you with future work. For example, if someone hires you to do plumbing maintenance, the next time they are building their house or doing a renovation you may be top of the list to call.

CHANGE ORDERS ARE OPPORTUNITIES

One of most common stereo types of the construction industry is that change orders are a key part of making a construction business more profitable. People aren't wrong, but in order to make your business more profitable you don't need to be a criminal on changes.

Changes are a natural part of any project and can seriously disrupt your business. It's only fair that changes are priced differently than the competitive price you gave on the main project. To avoid conflict with owners, agree on rates and what you're allowed to charge up front with an owner. That being said, consider adding items such as markup (fee), insurance, office and computer allowances, and of course project management and staff costs.

REDUCE YOUR PROJECT COSTS BY SHORTENING YOUR SCHEDULES

If you self perform work you'll know that the faster the project get's completed, the faster you can move onto the next one. What that also

means is that you use the money earned in a more efficient manner (you've spent less time on a project).

Essentially what the above means is you're making more money for every hour you spent on a project. If you're looking for ways to improve your [schedule and increase productivity make sure to check out our article](#).

CREATE TRUST AND PEOPLE WILL PAY YOU MORE

By doing a good job on your project or task people will begin to trust you. In our business, repeat customers are a regular thing. Often times with repeat customers you don't need to tender or submit a competitive bid. Most instances you can name your price which will allow you to get paid more.

For obvious reasons you don't want to take advantage of others kindness, however this does help you to make a few extra dollars on a project. This is also a really [great way to get more construction business!](#)

CONCLUSION - THE DEVIL IS IN THE DETAILS

Adopt a Sharing Mentality

I opened this book with the example of someone who was on a troubled project, someone who as on a project with too many changes, a delayed schedule, a lot of complexities.

By now you've had the chance to learn about all of the different aspects of a construction project. Our industry is notoriously closed off and isolated. We don't communicate with other companies, we don't communicate with one another well.

With everyone's work being primarily judged by how many percentage points it's challenging to share knowledge in fear of losing our competitive edge.

I challenge you to take what you've learned in this book and share it with others, through sharing we can all improve. As an example, Microsoft in the early 2000's tried to create a closed ecosystem of apps and programs. The company was troubled and began losing ground within their market. When they adopted a more open approach of sharing through open source their company began to thrive again. Ideas were openly shared both within the company and outside. Today it has regained the market share it lost and expanded upon it.

Hopefully you've learned atleast one thing from this book that can benefit

your project. One challenge I want to leave you with is to share this knowledge. Grab drinks with a competitor, an owner, a subcontractor or a colleague and share what you've learned. if you don't drink have a coffee (it's our industry's best friend).

Sharing knowledge will make us all stronger individuals and help to propel our industry forward. Together if we all care about our industry we can make it better.

I thank you for reading this book – and encourage you to check out the additional resources section after this conclusion for other great books, websites and courses on offer from my team.

Lastly – if you have any feedback feel free to reach out to myself via email at mail@cnstrctr.com – I will be more than happy to return any questions or comments from you!

Thank You Again For Downloading This Book and May All Of You Build Well.

Kyle Parry

Founder @ Essential Construction

CONCLUSION - ADDITIONAL RESOURCES

Continue Your Learning

Thank you for taking the time out of your busy life to read through this book. Below are a list of additional resources offered by Essential Construction:

WEBSITES

- [**ESSENTIAL.CONSTRUCTION**](#) – our online hub for construction consulting services and marketing.
- [**CNSTRCTR**](#) – an online blog dedicated to bringing news and information to the community. Includes an online business directory.
- [**CONSTRUCTION REPOSITORY**](#) – database of construction templates, procedures and documents for use by individuals and companies
- [**CONSTRUCTOR SCHOOL**](#) – online courses with a focus on project execution and excellence.

SOCIAL MEDIA

- [**cnstrctr \(Instagram\)**](#)
- [**cnstrctr \(Facebook\)**](#)
- [**Construction Fails \(Instagram\)**](#)
- [**Bob Fails \(Instagram\)**](#)
- [**Essential Construction \(Linkedin\)**](#)

OTHER NOVELS BY KYLE PARRY

- [Guaranteed Project Success](#)
- [Over Budget and Behind Schedule](#)
- [How To Renovate Your Home Like A Pro](#)
- [Construction Project Mastery](#)

CONCLUSION - ABOUT THE AUTHOR

So You Can Be Sure I'm Legit



Kyle Parry is the Founder of the Essential Construction website and group of companies. He was born in the small town of Burford Ontario where he learned about hard work and determination.

Kyle started his construction dream at Mohawk college where he completed an Architectural Technology Diploma with a specialization in Construction Management. From there he went on to finish his degree in trades and technology management at Thompson Rivers University.

Kyle started his career with one of the largest construction companies in North America. There he participated in projects from all major sectors including institutional, commercial (office and retail), existing building

restoration, light industrial and residential. He grew in his career to Senior Project Manager before leaving the company.

During his career he has led numerous complex projects from the estimating and pursuit phase through to project completion.

Since founding Essential Construction Kyle has gone on to consult for some of the leading developers in North America on construction projects.

Kyle enjoys working on his business and spending time with his family. He currently resides in Toronto and Vancouver both in Canada. In his spare time he enjoys snowboarding, running and learning new things about construction.