



CONSTRUCTION

Project Management Guide

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PART 1 // PLANNING

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..... BROUGHT TO YOU BY.....

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CLOUD-BASED CONSTRUCTION SOFTWARE

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CHAPTER

1

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Understanding an Estimate's Influence
on Project Planning Success
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Once a bid is won, or a project is approved, the management of a project begins. An estimate influences significant aspects of the project management process. It informs the structure of the schedule, influences the processes used during construction, and determines resource use.

An estimate, in some respects, also sets up self-fulfilling prophecies born from the need to stay within a project budget.

If the budget for a portion of a project is too low, project managers will search for processes and resources that meet the budget. The same applies if the budget for a portion of a project is too high.

While project managers are typically very familiar with construction processes, there are many ways for any particular part of a project to be completed, and choosing one of lower-cost may appear to be the best solution in light of the cost estimated. Likewise, over-engineering can occur when estimating costs are high enough to allow it.

The background of the page features a close-up, artistic shot of architectural blueprints. Several sheets of paper are visible, some rolled up into cylinders and others laid flat. The blueprints show various technical drawings, including floor plans with rooms, corridors, and structural elements. Lines, text, and dimensions are visible on the papers, though some are out of focus. The overall color palette is a cool, light blue, giving it a professional and technical feel.

There are other aspects related to the estimate that require close scrutiny. Many times the estimate is prepared before submittals are completed or owner selections are made. For project managers, this means they aren't working with the complete picture and will have a difficult time matching resources, materials and processes to the tasks.

The reality of many projects is that an estimate becomes a living thing, complete with constant revisions as the actual construction nears. To be successful, project managers have to look way ahead as they plan and anticipate aspects within the estimate that are likely to derail the schedule. Identifying these in advance allows project managers to prepare for any potential delays.



DIGGING INTO THE ESTIMATE

Thoughtful estimators are worth their weight in gold, but project managers can't always expect to get the best.

And don't forget the element of time. Estimators are often in a hurry because project scopes arrive late and bid days get moved up.

Ideally, estimators would have all the time they need to consider the tasks of a project and investigate the processes they would like to use. But unfortunately, this is wishful thinking. Therefore, project managers have to assume the estimate they're going to work from is flawed, and do the necessary work to locate those flaws and prepare schedules that reflect the realities of a project, both from a cost and time perspective.

WHERE TO LOOK FOR POTENTIAL PROBLEMS:

GENERAL CONDITIONS - So many things find their way into general conditions that it can become a sort of catchall for items where there isn't a clear assembly. But it's also the place where many items end up for further scrutiny. These items might be unique to a particular area such as environmental or regulatory aspects or the costs of special insurances and permits.

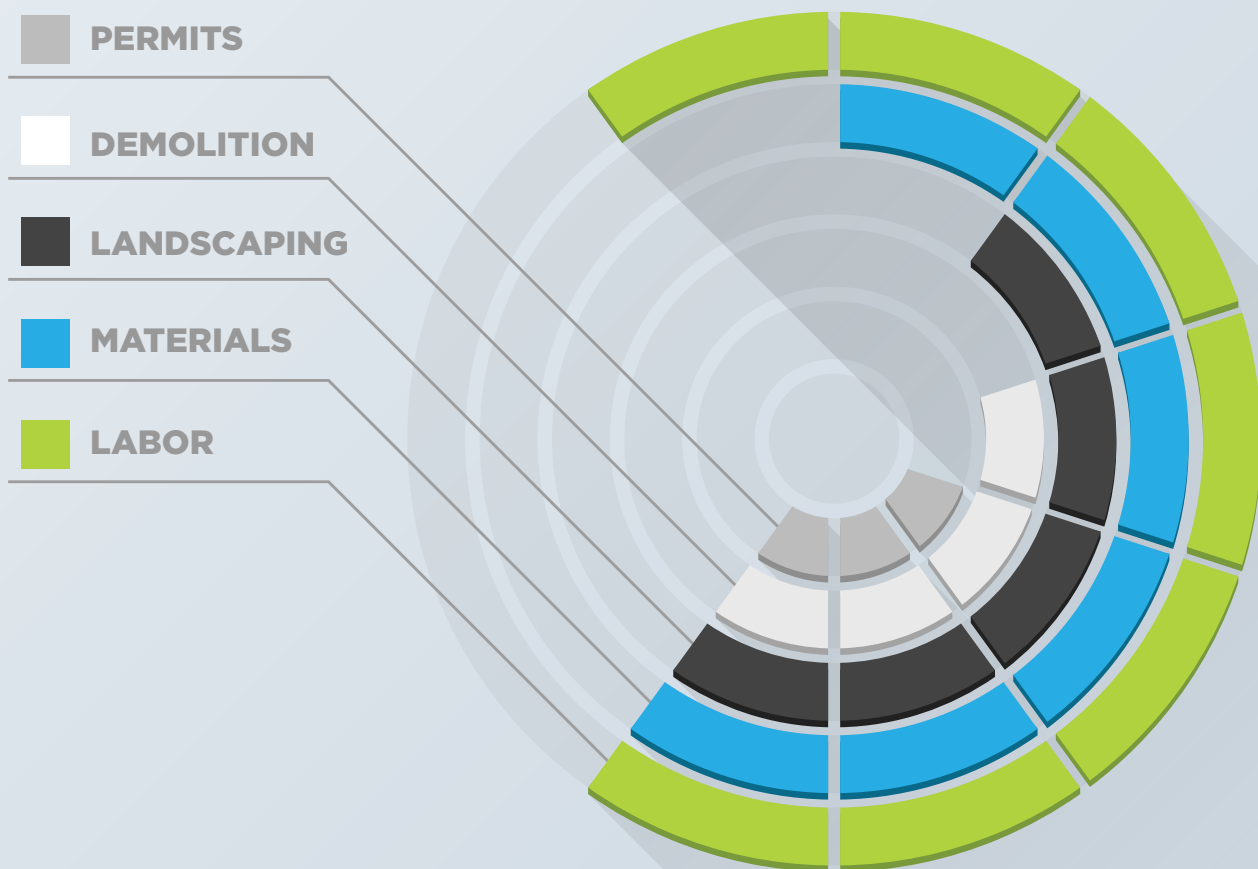
TIGHT DEADLINES - When project bid schedules are condensed you can expect a lot more planning has gone into preparing the estimate. These assumptions often center on common processes and expenses unique to the particular shop. They may include best "guestimates" based upon a long track record of costs. The problem is, those might not be accurate if the assumed supplier, for example, is not going to be involved in the job, or participants change before a project gets underway.

UNUSUAL EXPOSURES - This includes aspects the contractor has not had much experience with, and therefore, estimating might not be as up to speed as it needs to be. For example, many contractors routinely work with trenches of shallow depth, two to four feet deep. An unusual exposure might include a particular job that requires trenches six or more feet deep, requiring shoring and other protective measures.

UNUSUAL PROCESSES - In construction there is often more than one way to correctly do a particular installation. The phrase, "generally accepted workmanship," is a catchall phrase that saves time from detailing every step of a process. But when that phrase is attached to a process the contractors aren't familiar with, the sky's the limit as to what constitutes "acceptable".

AN ESTIMATE'S INFLUENCE ON THE PROJECT STRUCTURE

An estimate creates a rough outline of a schedule because a schedule is often built linearly, evolving from start to finish. The pitfalls that can arise involve the level of detail included in the work breakdown structure. When the work breakdown structure is not adequately broken down into individual tasks, and the schedule follows suit, discrepancies arise that creep into the plan. For example, a work breakdown structure item derived from an assembly can be missing components when the assembly that was used on a previous job is applied to a new job with slightly different specifications.





PITFALLS OF REASSIGNED COSTS

Ideally, estimates would remain accurate on all levels from start to finish. Cost breakdowns per division wouldn't undergo an ounce of change and the amount witnessed at the beginning of the project would resemble the amount at the end of the project. This experience, however, does not represent the norm. In most cases, expenses not only change throughout a project, but on a daily basis.

Inexperienced owners have difficulty viewing office overhead separately from profit and assume their designers' plans will finish without modifications of any kind.

These examples illustrate the extreme importance of accurate estimation that includes risk assessment, potential delays and setbacks.



CHAPTER

2

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Assessing Risk
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TAKE THE BITE OUT OF CONSTRUCTION PROJECT RISKS

In the best-case scenario, managing risk in construction begins during the project feasibility stage. Rather than hoping for the best and not preparing for the worst, your team should evaluate risk assessments as soon as possible.

Surveys from 2005 and 2007 by KPMG found significant contrasting results when examining risk assessments from an owner's perspective and a contractor's perspective. This is not a surprising result since the two parties have different relationships with the project.

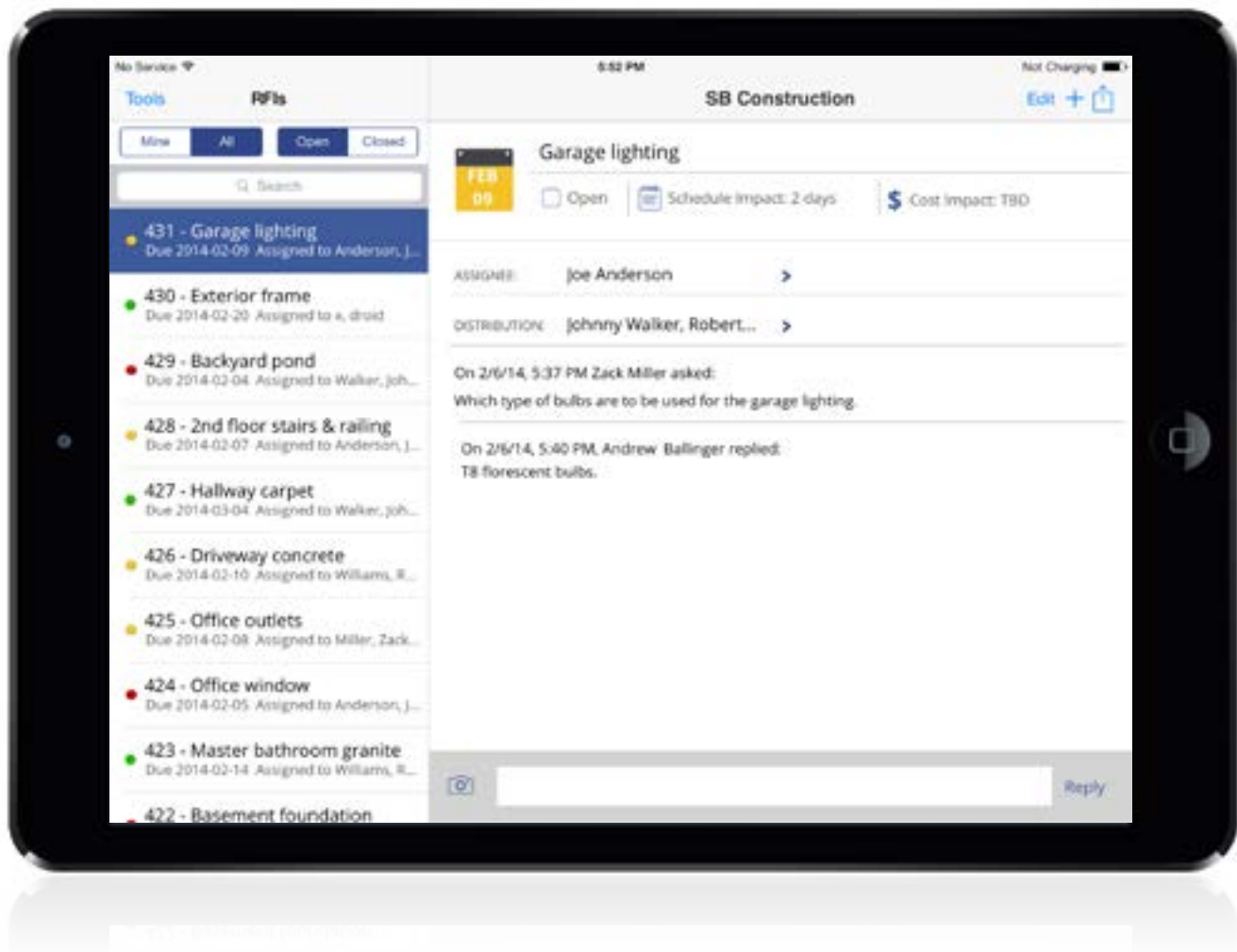
While this may seem like a problem, it can actually be a benefit if both parties communicate the potential risks from their own perspective. It is best to know any and all potential risks as soon as possible so your team can prepare for all types of risks and not just ones from a particular division.

A photograph of two men in white hard hats and business suits. The man on the left is looking down at a document, while the man on the right, wearing glasses, looks on. They appear to be in a construction or industrial setting.

CATEGORIZE AND DOMINATE

Don't simply be aware of the risks, but evaluate their significance as related to project objectives such as cost, time, quality, environment and safety. In the article, "Identifying Key Risks in Construction Projects: Life Cycle and Stakeholder Perspectives," Dr Patrick, X.W. Zou, Dr Guomin Zhang and Professor Jia-Yuan Wang, created a ranking order of project risks relative to each category.

Interestingly, "tight project schedule" was ranked as the top risk in all categories. "Unsuitable construction program planning" arising from inadequate scheduling, innovative design and/or the contractor's lack of knowledge in planning was another high-ranking risk. In order to avoid these risks, involve the contractor during the design phase.



Other risks arise from the sheer volume of information and participants involved in projects. Contractors are challenged by the number of entities involved, which can lead to gaps in communication if incorrectly managed. The best results come when contractors focus on employing skilled planners and managers and implement flexible and comprehensive project management tools.

RISK LANDSCAPE

In a perfect world, there would always be ample employees qualified to perform necessary work. Unfortunately this is not a reality. The increasing shortage of construction workers and skilled managers is having a greater and greater impact on projects—mainly increasing the risk of delays. This, in turn, increases the importance of effectively monitoring the availability of personnel and maintaining communications across all participants in order to minimize potential delays.

The litigious nature of societies today is another area with increasing risks. Disputes tend to arise when there are discrepancies or variations in the design. Mitigating these requires close coordination between the design team and contractors. Contractors should also negotiate with the owner and design teams to not only minimize their impact, but inform the design change itself.



Disputes also arise from people who are not direct stakeholders. For example, noise, dust, traffic, and environmental complaints are constantly increasing. Don't wait to receive these complaints, but rather address them during the design and planning phases.

The unfortunate reality is that contractors also have to alleviate risks posed by subcontractors. One of the top risks for subcontractors is “low management competency.” This arises from the nature of subcontract work, which requires managing people, materials and equipment across multiple sites. When subcontractors are especially skilled in their trades, they tend to attract more work than they can manage. Besides ensuring subcontractors have the required job skills, contractors should also consider their level of management competency.



ASSESS AND MANAGE

Every project is unique with its own exceptional set of risks, but the process of assessing and addressing them can be generally outlined in these eight stages.

01

Outline the process to determine and manage risks throughout the project's lifetime.

02

Identify risks. Don't only name them — describe their characteristics.

03

Determine the impacts of each risk and its likelihood of occurring. As risks come into focus, determine which ones to directly mitigate.

04

Stakeholders review the risks as a whole and consider what their overall effect will be on the budget and project completion.

05

Address the risks by describing the actions that will be taken to resolve each one.

06

Assign responsibility.

07

Monitor and control risks.

08

Identify new risks as they arise, and solve them immediately, or plan to manage them for as long as they are active risks.

Construction is a risky business and one where risks can arise at any time during the project lifecycle. But with adequate risk assessment and planning, risks that pose the greatest threat to projects can simply become items to manage.



CHAPTER

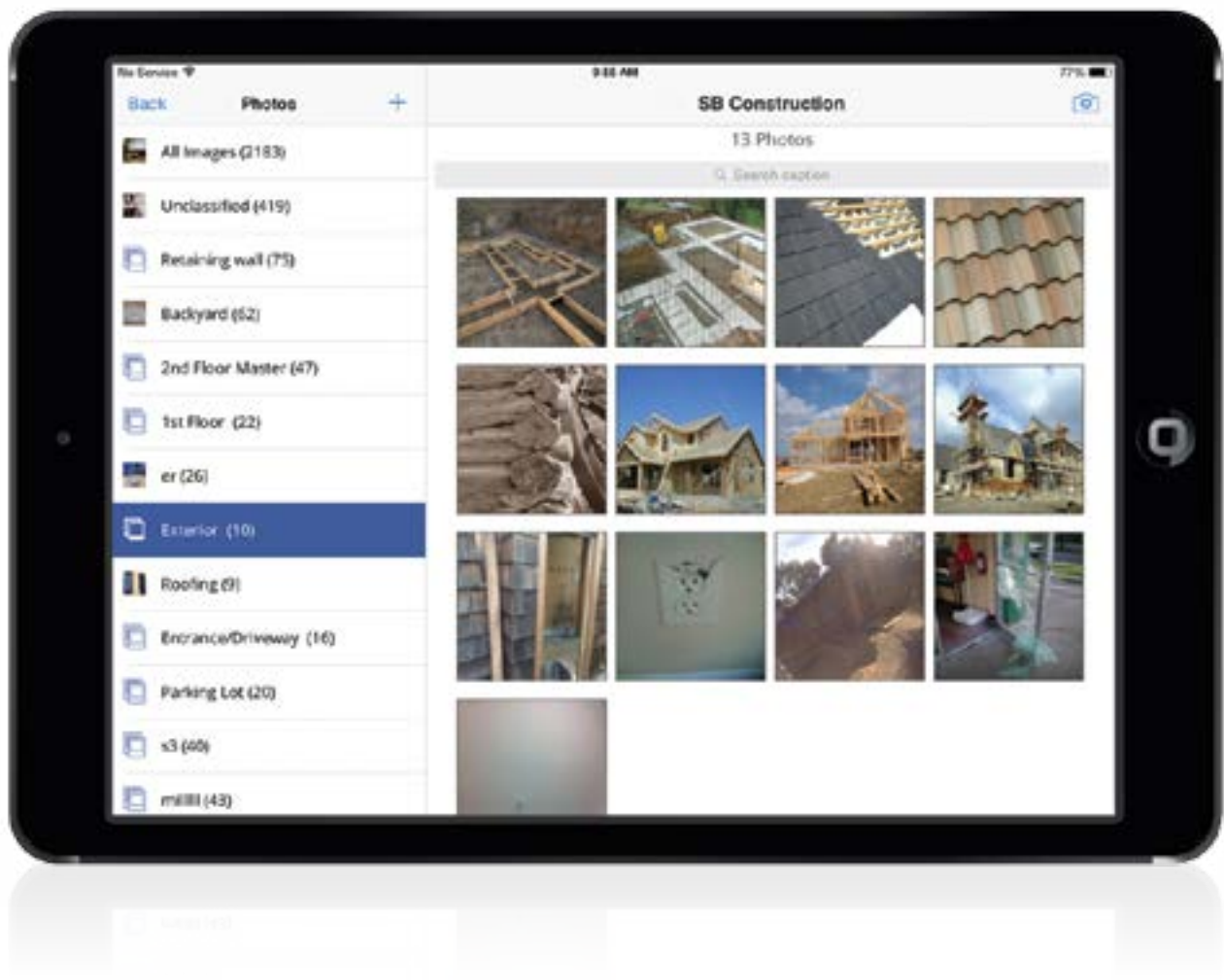
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Plan for Quality
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COMMUNICATION

The question of quality enters a project at every stage, but most experts agree that it's the quality control strategies discussed during the planning stages that set the tone for ensuring a quality project actually gets built.

Discussing quality planning at the beginning of the project also helps make sure it doesn't slip through the cracks in today's world of speed building. The core tenet of organizing for quality is communication.



Brian Wessels, LEED AP BD+C, CESSWI, and project manager at Greiner Construction says effective communication ensures the knowledge of specifications gets transferred to everyone involved in the project.

He cites cloud-based project management software such as Procore, as offering one of the best solutions to ensuring everyone has access to create, update and distribute project documentation including data such as contracts, RFIs, submittals, drawings, and photos.

Areas of responsibility are closely related to the system of communication because they establish where the “buck stops” when it comes to quality, regardless of where or when the question of quality arises during the project.

If the lead carpenter is responsible for ensuring walls are built to specification, that’s a nearly ideal situation because you want decision-making at the lowest possible level.

You have to assume the people overseeing the work are qualified and competent enough to perform that role.

If that is not the case, you should consider reshuffling personnel to make sure people exercising oversight have the correct skills and experience. Once trust is established, it stands to reason that those who are closest to where the work is performed are in the best place to also oversee quality.



You should make sure each person responsible for ensuring quality actually knows it is their responsibility.

During the planning stages it's a good idea to have a quality control meeting where roles and responsibilities for quality are decided. This meeting should include everyone with supervisory oversight, including subcontractors. But there's also a larger quality picture that relates to all people on the project.

Wessels advises that quality control really comes down to the individual and whether or not they're invested in the project. If they are, they'll be motivated to do the right thing, and if all share that investment, it's part of the culture, and will go a long way toward ensuring quality. He says it's also key to make sure people have the right tools such as the ability to easily see the latest specifications from a computer or smart device. Wessels claims there are few projects today that have budgets allowing large numbers of supervisors to be circulating around the site ensuring things are built properly.



MATCH QUALITY STANDARDS TO THE TASK

With performance specifications, the outcome is specified while the methods are left to the builder.

The performance specification for a wall might require it be structurally appropriate and sound, preventing moisture intrusion and insulated to a minimum standard.

With this type of specification, it is up to the contractor to decide how to build the wall to meet the specifications within the cost allowed. Performance specifications also provide an opportunity to incentivize quality. For example, contractors could be eligible for bonus payments when the work in place exceeds the minimum standards.

Most projects have a combination of specifications and performance standards that should be scrutinized in the planning stages with the goal of understanding what they are requiring, and ensuring they meet local conditions.

For example, there could be instances where a certain material specified for use is not available. Knowing this upfront allows you to source an alternative and have it approved long before it's needed.





MINIMIZE MATERIAL QUALITY ISSUES

Ensuring components are installed and built correctly is just one aspect of quality control.

Another, and probably more onerous aspect is verifying that materials and fixtures used for construction are the right quality themselves.

In recent years, a spate of counterfeit electrical components bearing all the official marks of certification has flooded the marketplace. Not only are these components often made of substandard or dangerous materials, they haven't really been certified by Underwriters Laboratories. Other examples include drywall made with a material that promotes mold growth and lumber with such high moisture that it not only warps and twists in place, but encourages mold growth.

A global marketplace feeds today's building environment. It is impossible to guarantee everything going into a building is of high quality, but there are steps to help minimize potential disasters.

During the planning stages, and even back in the estimating stages, there should be a commitment to source from known vendors that have consistently delivered quality. And even then, random checks on quality are a good idea.

During the planning stages, when products and materials are unknown, or are available from previously unknown sources, it is prudent to get samples and test them appropriately.

There are also highly critical components that should always be considered for testing. Concrete is one of them. Once installed, concrete carries a major cost to remove and replace, so ensuring the mix meets the specifications and is appropriate for the weather is an inexpensive form of insurance. The process of ensuring the quality of materials and products used in a project ends only when the project ends and controls should be established throughout the timeline to make sure quality remains high.



With quality materials and workmanship accounted for in the planning stages and an aggressive effort built into the duration of the project to monitor quality, projects can be successfully completed at high quality, even in today's fast-paced building environment.

From a project management perspective, the key lies in thorough planning.



CHAPTER

4

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How to Successfully Manage Information
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The amount of necessary information and documentation in a construction project is enormous.

Maged Abdelsayed of Tardif, Murray & Assoc., consultants based in Quebec, Canada, estimate a \$10 million project generates 56,000 pages of documentation, or data.

Data includes things like contracts, RFIs and submittals, which are currently accessed on an array of diverse technologies in 2014. As the ease of creating and sharing data has increased, so too has the amount of data. While sharing and updating the most current information for all participants seems daunting, the instant access and availability to this documentation from anywhere also holds promise for new capabilities.

MORE DATA, MORE TYPES OF DATA

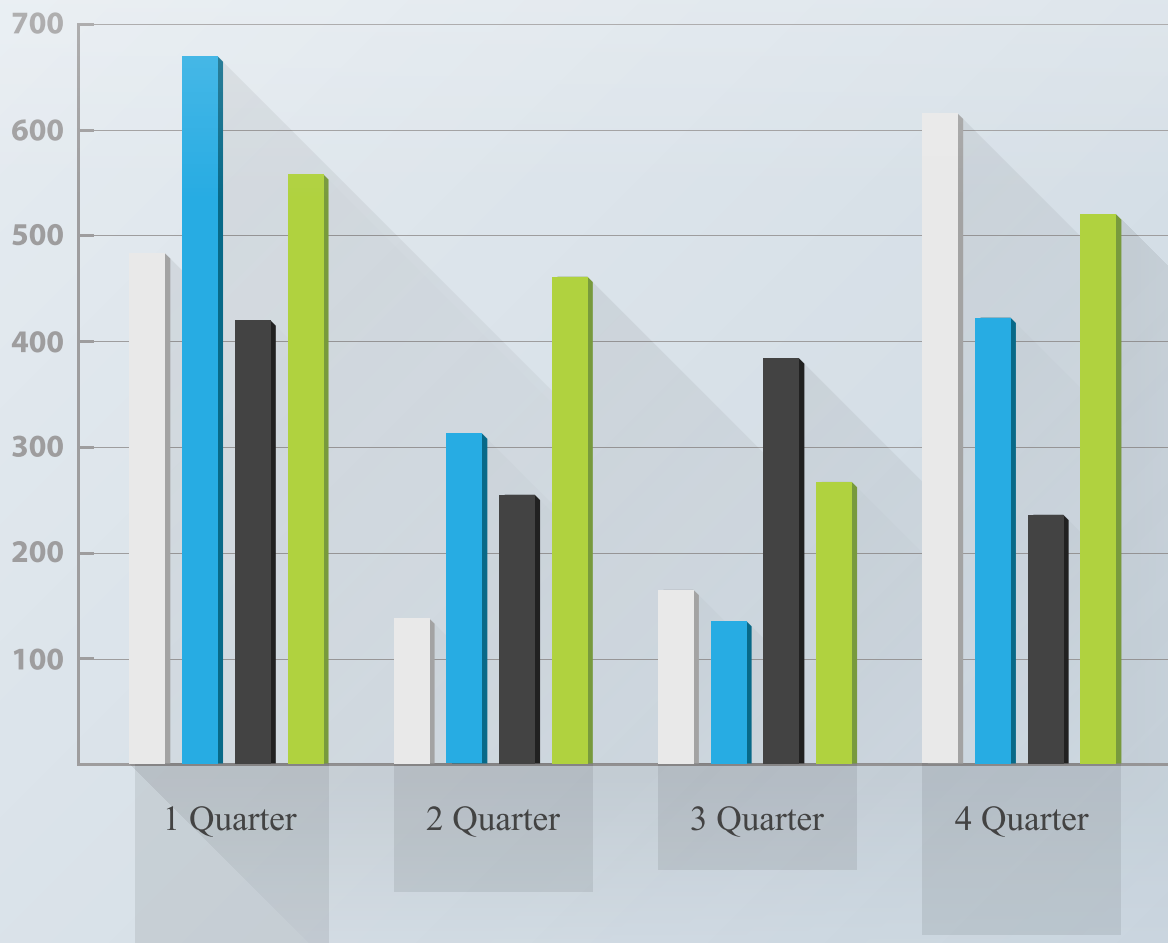
Construction professionals are discovering the real power buried in all the information accumulated by projects and its purposes beyond the project's construction lifetime.

For example, new data mining and search technologies make it easier than ever to compile “as-builts” after a project's completion.

Furthermore, harvesting BIM models, turning equipment specifications into building maintenance and repair tools, drastically reduces the cost of maintenance of a facility.

With an increase in the amount of data and growing value, establishing an information/data management system is a must. In *Digital Archival of Construction Project Information*, authors list 49 different types of documents created on a typical construction project in 23 different file formats.

Thankfully, construction software and cloud services can manage that amount of documentation and file type diversity. Cloud offerings are indispensable in a construction project as any of these files can be accessed from anywhere at any time.



WHAT TO MANAGE?

Once a project actively begins construction, the following types of information should be managed within one database:

01

Drawings

02

RFIs

03

Schedules

04

Budgeting

05

Punch Lists

06

Daily Log

07

Submittals and Transmittals

08

Directories

09

Photos

POTENTIAL PROBLEMS WITH MANAGEMENT SYSTEMS

Once you choose a management system, it's not a simple cakewalk from there.

You still need to train your team on the chosen software, accumulate and upload all necessary documentation, and continually update the project information with any changes.

Some of the most common problems experienced include:

- Inability to find the right information when needed
- Collecting all necessary data from numerous stakeholders
- Difficulties in distributing information to many stakeholders

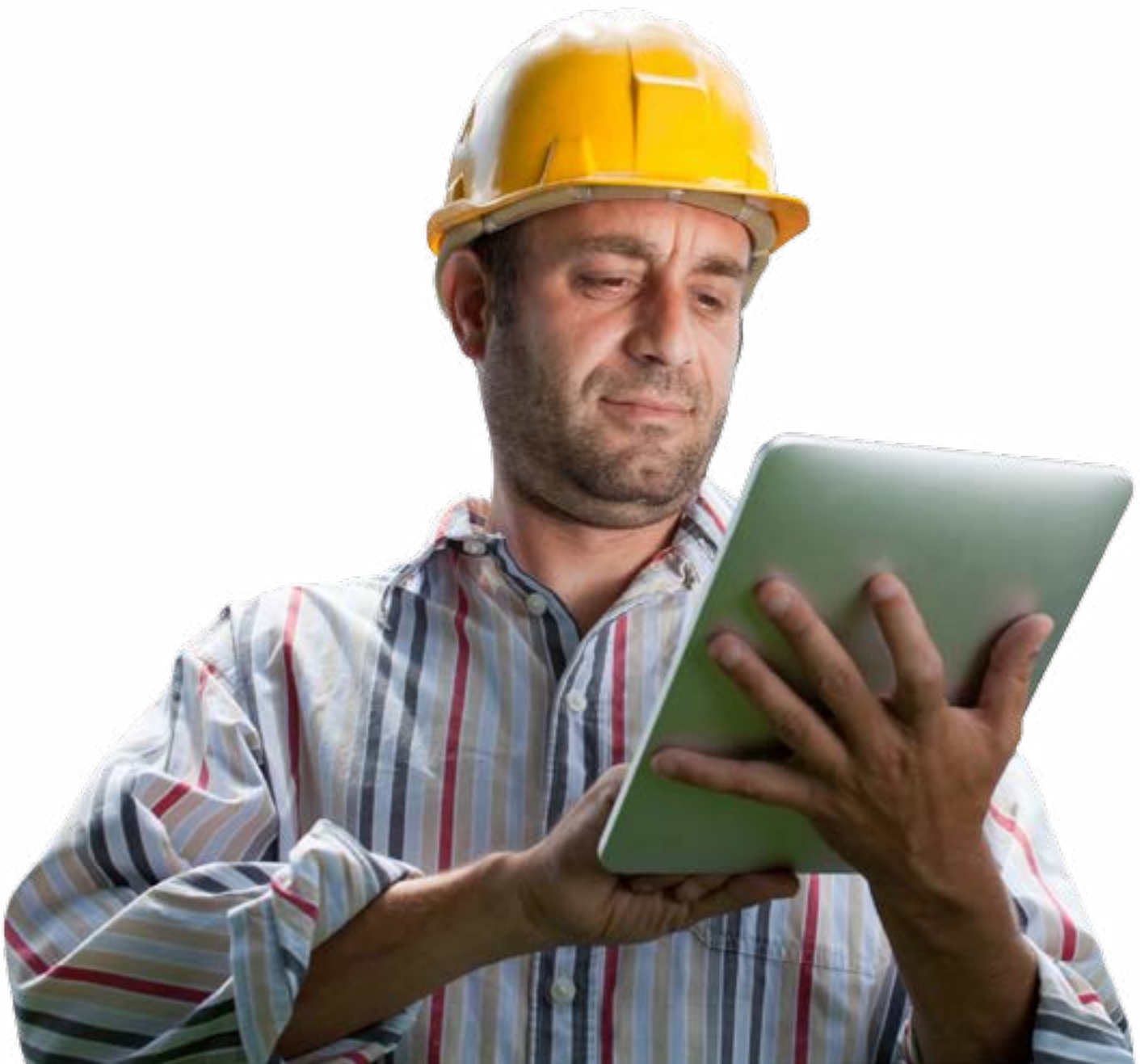
Not surprisingly, one of the chief contributors to these issues is the tendency for management solutions to operate in their own silos with little interoperability with other software. Therefore, a primary consideration when establishing information systems for a project is the system's integration capabilities and supported browsers and devices.



There is also the difficulty of granting system access to members outside the company, including vendors and subcontractors.

If a vendor can access the project schedule, they can see when specific materials are needed and better coordinate delivery to the jobsite. Likewise, a subcontractor having access to QC (Quality Control) documentation can easily locate quality specifications related to a particular operation.

For example, if the specification of an item changes, and the change doesn't make it to the vendor on time and the document record is updated accordingly, the wrong item will most likely be delivered. A more efficient process involves having only one file version accessible to everyone. That way, if any changes are made, everyone is updated immediately.



EXPLORING THE CLOUD

A popular alternative to using in-house systems for project management is a cloud-based service.

Assuming the cloud vendor exercises sound security practices and an established backup program, the benefits can extend beyond mere management. For example, cloud systems don't require IT support and are usually pay-as-you-go, allowing you to scale the service up or down based on your needs.

Look for these key aspects when choosing your project management solution:

- Status tracking
- Capacity to assign responsibility for tasks with due dates
- Permission levels
- RFIs and Submittal management
- Simplified reporting that is customizable
- Automated reminders and update notifications
- Search filters



ENSURE ACCOUNTABILITY

Once a system is chosen and implemented, the most difficult challenge is ensuring your team remains accountable for their responsibilities. The software won't simply run itself — files must be uploaded, contact directories built, and documents consistently updated.

The best defense for ensuring accountability is a good offense. Be sure to assign responsibility, monitor progress, send reminders for upcoming due dates, and appoint second points of contact to receive notifications if primary contacts are unavailable or nonresponsive.



Today's construction projects are more information intensive than ever and the trend toward greater and greater amounts of data is only growing.

In the grand scheme of things, information gathering, application, and archiving are creating new ways of information storage, use, and distribution. Construction companies that wake to the realization of information as a commodity will find new and better ways to use it and discover previously unavailable revenue streams.

The process starts with thorough project management planning with an eye toward project data uses that live long beyond the individual project.





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