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Deltek Special Edition

Project Information Management

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- Organize and archive project documents and contracts
- Track evolving design deliverables
- Create a system that's mobile and convenient

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Introduction

Project information management, or PIM, is pretty much what it sounds like — the management of information on projects. Simple as that seems, there's much more to the subject than one might think. Though it's not relevant for every company, it means the world to project-centered businesses, because it has to do with the communication, control, and contractual processes that take a project from conception to completion.

In managing professional projects, whether large or small, project-centered organizations are going to create a great deal of information, and that information needs to be managed. That information takes the form of documents, emails, drawings, contracts, reports, and various other deliverables involved.

Multiple players across your organization and with outside partners need access to this information, sometimes from the comfort of an office, sometimes from a site in the middle of nowhere. They need the correct versions of documents, they need to know what was delivered and when and to whom — and for that matter, why it was delivered. They need to be able to search for information without pulling their hair out. In short, they need excellent project information management.

About This Book

Project Information Management for Dummies, Deltek Special Edition, is all about getting a handle on the flood of information that is the lifeblood of a project. In these pages, the subject is tackled in bite-sized pieces, offering practical suggestions to allow you to be a better manager of the information sprawl. This book discusses the role that technology plays in creating data, and how technology can be used to help you take control.

A discussion of project information management, like you'll find here, will get you thinking about emails. It'll have you pondering the many kinds of documents you need to organize and file. It'll bring to mind design deliverables such as drawings, and the challenges of keeping them straight. And don't forget about the contracts that spell out who is supposed

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to do what. Read this book and you'll come away with techniques to help you to manage all of these kinds of information, from the office as well as from the road.

Foolish Assumptions

You felt compelled to pick up this book and open it, and based on that fact, we're making a few assumptions about you, the reader:

- You're part of an organization that's all about projects, whether construction, design, manufacturing, or something completely different.
- You're finding it increasingly challenging to keep tabs on the information your projects are generating.
- You'd really appreciate some insights into how you can deal with information more efficiently and effectively.

Icons Used in This Book

Check out the margins of this book and you'll see some icons. When you spot one, make note of the paragraph next to it, because there's some information you just might find useful.

Next to this icon is a helpful idea for enhancing your success as you roll out project information management tools.

Even if you aren't savoring every single word of this book, don't miss the important point shared in this paragraph.

You want things to go right — that's why you're reading this book. This paragraph is a reminder of what can go wrong if you're not careful.

Where to Go From Here

The traditional thing to do would be to turn the page. But it's really up to you, because we've organized this book in a way that's intended to offer you choices. If you'd prefer, check the chapter titles and read the one that piques your interest the most. Read the chapters in order, in reverse, even-numbered first, whatever suits your fancy and meets your needs. Enjoy!

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Chapter 1

Projects and Information

In This Chapter

- Recognizing the uniqueness of projects
- Adding on players and complexities

You wouldn't have picked up this book unless you're someone who works on projects. They could be construction projects, marketing campaigns, or consulting projects — the common denominator is that they're *projects*.

This chapter discusses why information is so central to the success of project-based work, and looks into the idiosyncrasies of project work that makes their information such a challenge to handle.

A Project Is Unique

By definition, a project is a one-off. Sure, it might be similar to something that happened before, but it's not the same thing as, say, manufacturing a car or a microwave, where you'd insist on precise repetition. A project is a unique thing, and your business processes are built around this fact.

The fact that each project is unique is one of the big reasons your business needs information management. Uniqueness requires your business to generate a great deal of information about the project, and it also creates the need to share that information. Being unique means that the project is not yet understood. It needs to be conceived, it needs to be developed, it needs to be delivered, and it often needs to be very well-documented. You might need to answer a great number of questions about the project. And as it progresses, there could be mistakes and misunderstandings.

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All of these things might be the case, or they might not. It depends upon scale. If you're an individual working on your own to plan a dinner that you'll be cooking yourself, you might need to record some information for your own purposes to help you plan, you might wish to record your decisions in case your memory fails, and you'll need some invitations. But do you need a system to do this? Do you need "techniques"? Are there contractual issues? Probably not. This is a small project, with few problems of any size.

It gets a whole lot more complicated when there are multiple parties, when there are contracts, and when there is complexity. How many people are involved in each stage of the project? How many will read a project brief and need to understand it? Are these people all internal and close to you? Can you gather them together for a meeting, or are many of them external, perhaps in different time zones?

The Project's Many Players

Yeah, things are getting complicated. You need to review the brief in draft, then meet to discuss your response, then review the response, then approve it, then record the approved version. You'll need to distribute it to people who have never even heard of it — people who might not even know you or trust you just yet! They'll need to have the brief explained, and you can bet they'll want to ask questions. You haven't even gotten to the point of discussing prices for the project.

And that's just the beginning of the information your project will generate. For that matter, everyone knows it's not just "a project," anyway. It's really more like a vast collection of services that, even in the early stages, will involve other companies, perhaps even tens or hundreds of other players.

Soon enough, you wind up with lots of versions of documents and complex design deliverables, and a whole flurry of emails. Your project may be governed by complex contracts. And projects often take place at some site away from the office. You've got a whole lot of information to manage, and a whole bunch of people who need access to it, in many places, at offices and on project sites, sometimes with internet connections, sometimes without. No wonder you need project information management!

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Chapter 2

Get a Handle on Your Organization's Emails

In This Chapter

- Going beyond the vault
- Getting users to warm up to email management
- Avoiding duplication of effort
- Speeding up the process
- Setting the ground rules

Everyone grows weary of email overload from time to time, but there's no way around it — email is still the most prolific communication channel used by modern, project-centric businesses.

Effective email management helps you balance the administrative burden your staff feels against the productivity gains they'll enjoy from improved searching capabilities. It's vital for promptly finding critical project information captured in emails. This chapter discusses why email management is important, how it can work, and why it's not always easy to get your staff to buy in.

Why a Vault Doesn't Cut It

It seems simple enough, and you don't even have to change working practices. Just provide your users with an email vault, and you've solved the problem of email management. Right? Not really.

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Vaults feature very limited categorization. For example, you're unable to search through all emails from an organization on a particular project. Vaults are decent solutions for infrequent e-discovery processes and mail server space management. They're a worthwhile investment, but should really be regarded as the last line of defense. When it comes to retrieving project information, they're simply not an effective, everyday tool.

Emails Aren't Just Conversation — They're Documents

Much of the information that used to be captured and transmitted using electronic or paper documents is now contained within the body of emails. That makes it necessary to treat emails as documents in their own right, and ensure that they form part of your organization's *document corpus*, the overall collection of important documents that your organization maintains.

Users searching the corpus must be able to find *all* information matching their search criteria, and that includes information found in emails. If you store your emails in a separate system, users will have to remember to search multiple repositories when looking for information.

How Can You Get Users to Adopt Email Management?

Today's work environment is incredibly fast-paced, which makes it challenging to get staff to take a little extra time to categorize their incoming and outgoing emails.

One solution is to build some compulsion into your email application, forcing users to file their emails. You'll need to employ the power of persuasion. You'll have more success if you take the time to clearly explain to your users the benefits of central filing. Show them how their working lives can be improved if they have ready access to all the emails related to a specific project that their teams receive and generate. You'll

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need to reinforce this message regularly, and senior project managers must remain focused on this important aspect of the project's quality procedures.

Attachments Get Extra Consideration

Although attachments are stored as part of an email message, they often must be extracted and declared as documents in their own right. These attachments may be key design deliverables that need additional tags and require additional processing.

One potential benefit of receiving documents by email is that you can often utilize some of the *metadata* (data about data) already provided in the email message to streamline the filing of the attachments. You can harvest document tags for Contacts and Organizations from the email's sender and recipients by matching to email addresses stored in your system. These tags can then be automatically applied to the attachments as well as the email during filing.

Avoid Duplication of Effort

In the past, communications were often routed very carefully, but with email, communications have been transformed into more of a broadcast, with many extra people being included on a message. This can have some benefits in terms of general awareness, but it also creates huge potential for duplication of effort when it comes to filing.

Setting up rules can reduce duplication, but the solution is ultimately a software problem. Each email message has a unique identity, and this information allows document management systems to identify and restrict the saving of duplicates into the corpus.

Speed Is Key

In an ideal world, the taxonomy applied to emails would have the same rigor as that used with any other document created

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or received into the business. After all, emails are documents, and they can cover any topic on the project. However, emails demand special treatment because of their immediacy and sheer volume.

Ignore this difference at your peril. If users are forced to carefully file each email they receive into the correct container, based on content, they'll soon drown in a sea of administration. With email, the simpler the filing structures, the better.

Communicate the Rules

A few simple rules will help improve your email management:

Give emails a meaningful subject line

This seems obvious, but just look at your inbox! Subjects should include useful and unique information about the subject of the email and to what it relates. More specific subject lines bring greater clarity for recipients, and also help users identify the correct message when reviewing search results.

Agree who files received emails

When emails have lots of recipients, it's helpful to set some rules establishing whose responsibility it is to file received emails. One simple option is to decide that the first recipient in the "TO" list files the email ("CC" or "BCC" recipients need not worry about filing).

Agree when emails should be filed

Users often use their inbox as a to-do list. This can be troublesome in a team environment where knowledge sharing is often important. Agree on a timeframe specifying when an email should be declared in the system. If your system can't support emails being both filed and still in your inbox, then get users to publish early and log outstanding tasks separately.

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Chapter 3

Managing Those Documents

In This Chapter

- Keeping all documents in one place
- Doing the extra work
- Understanding the importance of taxonomy
- Spreading the taxonomy across the organization
- Making sure your system is auditable
- Omitting what isn't needed
- Moving to the new system

Chances are you've realized that the system you currently have in place for managing documents doesn't offer the control you require from a corporate governance perspective. Just as important, users simply can't find the information they need in a timely manner.

Moving your users away from their long-established processes of filing documents in yellow network folders (or not filing them at all) isn't a task to be undertaken lightly, though. It's time for a change, but don't embark on this journey until you have a clear picture of the end game and the resources required both internally and externally to make it happen.

This chapter spells out the benefits of managing all of your documents in one place, creating the right taxonomy, and spreading it across the organization. It discusses the need for auditability, and offers advice on migrating to the new system.

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A Repository for All Content

One of the biggest obstacles to efficient document management is having multiple repositories for different types of content. How can users be sure where they need to look if there are separate systems for accessing various kinds of corporate documents — such as marketing, HR, and finance — plus CRM documents and project documents?

With multiple systems, overlaps and puzzles are frequent. For example, is an invoice a project document or a finance document? This type of confusion causes frustration, which becomes a barrier to adoption. It can also result in duplication of documents across the systems, then a struggle to understand which is the "correct" version.

Good document management should provide users with access to all the company's documents from a single interface and always give them a single source of the truth!

No Such Thing as a Free Lunch

There's no escaping the fact that document management requires most users to do additional work during the filing process. As with email management, you'll need to spend some time explaining to users the benefits that the system will deliver, both to them and to the business as a whole.

Encouraging changes in behavior often requires both the stick and the carrot. Think carefully about how best to make change happen. Gentle nudges are often more effective than stern directives, which often cause negative reactions among users.

Move all key corporate reference documents into a new system as early as possible. This is an easy step and helps get users into the habit of using the system to find information. Meanwhile, change access to older filing systems to read only. This will allow users to access documents on legacy systems but will stop them from continuing to file on these systems.

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The Importance of Taxonomy

Taxonomy refers to your organization's system for classifying documents. Creating the correct document taxonomy is possibly the single most important step in building an effective document management system. This is a complex task, with many factors and variables to consider.

The structure should be simple to follow, and it must offer the necessary level of breakdown — break down into too many pieces and a folder might only contain a single document, but with too little breakdown, users may struggle to find documents. Your taxonomy must also allow the appropriate level of security, based on your range of users and your approach to security.

A change of mindset is required if you hope to make effective use of the multidimensional tagging facilities that modern systems offer. With traditional filing structures, you subdivide documents using only a single dimension, the folder. This limitation can create enormous repetition because folders must be repeated to accommodate breakdown by what are, in reality, independent dimensions — such as document type, project, and the authoring organization.

If your system supports hierarchical taxonomies, it's best to keep the number of folder levels to a minimum. Deep hierarchies are more time-consuming to navigate and can act as a barrier to adoption. And try to avoid regular use of "other" type containers in your taxonomy. "Other" ends up becoming a dumping ground for users who don't bother to look for the correct container.

After you've built your initial structure, test it out by filing some real documents and asking a cross section of users to try to locate them using taxonomy only.

Be prepared to add additional containers to your taxonomy as you start to see usage patterns and unforeseen needs, but add new containers carefully. Take time to challenge the automatic assumption that a new container is always required. You may be able to tag onto an existing container with a slight name change.

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Promote a Company Wide Taxonomy

If you have a multidivisional organization, it's worth pushing hard for a common taxonomy across the business. This means involving people from all divisions in the design of the taxonomy.

Be ready to take on the skeptics. You'll hear many reasons why Division A is completely different from Division B, and thus must have its own dedicated structure. Take time to drill into these apparent differences, because they're often just semantic. Be prepared for a negotiation, and keep your eye on the goal of a common structure. If a particular division has some unusual requirements, it's much better to add a few extra containers into a single, shared structure, rather than build separate structures for each division.

Having a common structure offers benefits across all divisions. It enables users to easily search for a certain type of information across the whole business. Imagine trying to find the last correspondence from a vendor if you have to look in the correspondence folder for each division of your business. A common structure also helps your staff become more flexible. Employees moving from one division to another, whether on a temporary or permanent basis, won't have to learn a new taxonomy.

Auditability Is Vital

It's easy to overlook the importance of having an auditable document management system. No one questions the need for the company's accounting system to have rock-solid auditability. Strange that some leaders don't expect the same rigor when it comes to documents, many of which have serious legal and contractual weight.

Auditability means it should never be possible for a user to physically delete a document from your system. The ramifications of such an act, whether accidental or deliberate, should be obvious — think missing contract, missing warranty, and the like. Don't bet the farm on backups, either. You're not

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likely to notice a missing document until it's too late and the backups have been overwritten.

You should always be able to remove documents from view, but they must be maintained physically and be easily reinstated until the business is ready for them to be permanently removed, based on sound disposition rules.

It's also important to consider which version of a document is available at any given point in time. Documents change over time and decisions are made based on their content. Understanding a historical decision might require accessing a document's content at that point. That's hard to do if you only have the current version available.

Lack of version control can have other serious side effects if your staff members attempt to use existing documents as templates for new ones. Who hasn't opened an existing document and hit Save after making a few changes, when you really meant to hit Save As to create a new document. If a user doesn't immediately realize what he or she has just done, then you've lost a document.

What Shouldn't Go In?

You're implementing document management, not file management. Don't fall into the trap of thinking every file created is a document, and therefore must go into the system. This kind of thinking will bloat your system with extraneous files.

In some cases, it's not even possible because many engineering applications require direct network access to files and utilize specific folder structures. Many document management systems are web-based and rely on internet protocols rather than traditional file system access.

Migrating Documents to Your New System

It's rarely practical to migrate all of your existing documents into a new system. You must accept the fact that you just

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can't go from a simple, one-dimensional structure to a multidimensional one without significant extra effort to add the missing metadata. Who has the time to do this?

A more realistic approach is to have a well-communicated strategy on migration. That lets users know when to go to legacy systems to find something and when to use the new system. Typically, the migration will be driven by project and based on simple rules.

Only migrate documents for projects that will continue to be active for a significant period, such as six months. If a project will conclude within this timeframe, leave all of that project's documents in the legacy system. This will require users to take different paths during the transition based on the project, but most users will be working on a limited group of projects and therefore should be comfortable with this approach. The alternative of filing in the new system based solely on a cutoff date will cause greater confusion in the long run, as users would have to access multiple systems for a single project.

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Chapter 4

The Complexities of Design Deliverables

In This Chapter

- Understanding design deliverables
- Managing design deliverables
- Creating the document register
- Assigning content to the register
- Reviewing the content
- Tracking how content is transmitted

Design deliverables are the primary mechanism for communicating design intent with organizations and people. If your organization is an engineering design firm, you'll be carrying out design, calculations, simulations, and the like, in order to reach an optimal solution to a particular design problem. The resulting design will be represented in such things as drawings, diagrams, schedules, and specifications. This documentation forms the design deliverables.

This chapter takes a deep dive into design deliverables and how they're managed. It discusses the document register and what you can learn from the way documents are identified. And it spells out how design deliverables management keeps tabs on how documents are gathered, reviewed, and transmitted.

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Characteristics of Design Deliverables

The documents that make up a set of design deliverables will have certain characteristics:

- They'll be revision-controlled, meaning that each time the document is modified and distributed to other firms or people, the revision letter or number will change. In this way, it's possible to uniquely reference a particular document at a particular revision.
- They'll be issue-controlled, meaning that when the documents are distributed to other firms or people, a transmittal record is made. The transmittal record will detail what was sent, to whom, and when. In this way, a full audit trail is maintained to avoid disputes and misunderstandings.

Why It's Important to Manage Design Deliverables

Under most contractual arrangements related to design work, the end product is delivered through the design deliverable drawings, diagrams, schedules, specifications, and so on. The agreement will set dates for this delivery, and failure to meet these dates will result in penalties under the contract.

It's very important, therefore, to accurately record when information is issued and received. That's how you prove that you've complied with deadlines. It's also vital to manage the production of these documents efficiently — there's a direct correlation between the resource planning requirement and the work needed to produce the documentation.

It takes a number of processes to properly manage design deliverables:

- **Create a document register.** This is a list of all the design deliverables for a project. In many cases, the full list can't be created at the outset, and more documents will be added as the project progresses.

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- **Monitor production or delivery.** This means keeping track of the documents in the register, and reporting on any missed deadlines.
- **Review the documents.** This is where you ensure they're complete and correct. If there are errors or omissions, request that revised versions be produced.
- **Transmit or issue documents to firms or people**. This creates the all-important, accurate record of who was sent what, and when.

The Document Register

A *document register* is a list of the controlled design deliverables for a project. This includes documents produced in-house as well as incoming controlled documents from other firms.

Examples of in-house documents for a design company would be drawings and diagrams. For a construction company, examples would be schedules, method statements, and health and safety risk assessments. Incoming controlled documents, on the other hand, would include information from the client/end user defining requirements as well as design information from other firms.

Each controlled document in the register should have a reference code or number that uniquely identifies the document on the project. That way there's no ambiguity about which document is being referenced. The documents will also have a revision letter or number to identify the version, and the documents will generally have a title.

The document register is a dynamic list that will evolve and grow throughout the project. Keeping it up to date can be a laborious task, but with the right tools that overhead can be minimized.

The document register is vital to the smooth production and control of a project's information. Its use can vary depending on whether you're a producer or consumer of design information, but either way the register provides the record of the

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current situation. Here are some things to know about the document register:

- It provides a record of document production intent, with deadlines and clear responsibility.
- The production schedule will dictate design schedule and resource requirements, and it's used to ensure that the dates are achievable.
- The register monitors receipt of design information from other firms. For a contractor or manufacturer, the timely receipt of information is absolutely critical if you're going to meet production deadlines.
- By monitoring and recording the approval status of the documents, it becomes clear what can be constructed or manufactured and what can't. Knowing this is crucial for avoiding costly errors.

The information in the register should be shared by all parties involved in the project to ensure consistency and avoid doubt.

Creating a document register

Creating a register from scratch can be time-consuming, which is why you need tools for automating and streamlining the process. Such tools can include:

- Using predefined schemes for the document code or number.
- Copying records from another project or from a template.
- Importing from a list housed in a spreadsheet or other file.

In order to get the most out of the document register, you should assign dates for the production and/or receipt of documents in accordance with the overall project delivery schedule. You should also assign responsibility for who is producing the information. For internal documents, this would be a member of the project team. For externally generated documents, this would be the firm that will be producing the documents (also known as *originating firm*).

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Setting deadlines and assigning responsibility

If you want your document register to be useful as a means of monitoring production and delivery, you'll want to be able to set an expected date for receipt or transmittal of documents, and assign responsibility either to an individual or firm. Once you enter this information into the register, you can produce reports on a regular basis and highlight any documents for which delivery is overdue.

Controlling content from design applications

Design is generally carried out in software applications such as Revit and AutoCAD. If you can link the drawing register directly with these applications, you'll be able to reduce errors and better control the workflow.

Assigning Content to the Register

After you've created the register, you'll use it to monitor the production or receipt of documents. An automated system will take care of this when files are uploaded. What normally happens is that the files are automatically assigned to the correct record in the register by matching the filename to the document reference. This is when the document revision gets entered, and if needed, the suitability code or status of the document.

The status or suitability code provides guidance on how the document should be used. The status can be as simple as Preliminary or For Construction, indicating whether or not a document is okay to use for construction.

As files are added to the document register, the system records the production dates. That way it's possible to report progress against the intended delivery dates.

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Track incoming documents

When documents are to be produced by external people or firms, they're added into the system in the same way that internally generated documents are added. And, in the same way, the received date is noted so that it's possible to monitor delivery against the required-by date.

You may choose to require that incoming documents be reviewed and commented on by a specific date. Often the length of time allowed for comment is defined by contractual agreements between the project team members. If that's the case, it's important to record the comment-required-by date in order to demonstrate compliance.

Keep track of those revisions

When a new revision of a document is produced or received, it is entered into the system and will supersede the previous revision of the same document. In some cases, a document (particularly a drawing) will go through many iterations and revisions before it's declared ready for construction or manufacture.

Given that, it's quite important to correctly record the supersession of documents as new versions become available. In a well-managed system, it'll be possible to view any revision of a given document throughout its lifecycle.

Time to Review the Content

When documents are first uploaded, it won't yet be clear whether or not they're suitable for use. It often requires a review to determine what status should be applied. There are a number of ways to handle this, one of which is to record a separate approval or review status against each document.

In automated systems, the stages in the review process are often referred to as a workflow or route. These routes can have multiple stages that allow different sets of people to review the documents either concurrently or sequentially. They'll also often allow for online commenting and markup to be added to the documents. The routes or workflows will include deadlines for commenting.

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After comments have been received, the approval status of the documents will be updated to reflect the comments. Needless to say, it's vital to keep track of this status accurately in the document register. That's the key to ensuring that documents are reviewed in a timely manner, and aren't used for construction or manufacture until they're successfully passed through the review process.

Controlling How Content Is Transmitted

Design deliverables are the way information is exchanged between firms working together on a construction or manufacturing project. The word *deliverable* is critical — the details of delivery are often governed by contractual arrangements and deadlines. That makes it extremely important to have accurate records of which documents have been distributed and when.

That's where *document transmittals* come into play. Sometimes referred to as *document issues*, they're the way that distribution of controlled documents gets recorded. They're designed to provide an accurate record of what was sent to whom, and when. The transmittal should record the following at a minimum:

- Document number or reference
- Document revision
- Reason for issue
- List of recipients
- Date of issue

Keeping track of transmittals

The most important reason to have a formal transmittal system is to demonstrate compliance with the design and production schedule. Because such things are typically spelled out in contracts, a system must be able to record and report on intended and actual dates. At the very least, it should be possible to produce a report listing which documents

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have been issued and to whom, as well as which documents haven't yet been issued, and who's supposed to issue them.

Why is this document being transmitted?

It's also important to show the reason why a document is being issued. You absolutely must provide clarity and prevent confusion, because the consequences can be a whole lot worse than a simple oops. There have been cases when construction works have been carried out based on drawings that were intended only for comment or information.

Pick a transmittal method

An efficient system should give you the capability to select different transmittal methods. The method you choose will depend on the nature of the documentation and also on project-wide agreements. Methods include:

- **Hard copy**: This time-honored way to transmit documents is still important for the actual construction process. As yet, there's no good substitute for paper on a building site.
- **By email attachment**: This is a popular way to go, but limitation on email size and email server storage can complicate things and make it necessary for documents to be split into small chunks.
- **Electronic media**: CD, DVD, and memory stick are useful options for transmitting very large amounts of information, especially when bandwidths are limited. Sending tens of gigabytes of data through the mail is still faster in many places than transmitting over the internet.
- **Upload to extranet or shared environment**: If those involved in a project have decided to adopt a shared environment, documents can be uploaded to it. It is still vital, however, to keep an accurate record of that upload.
- **By download**: Allowing the recipients to download the documents directly overcomes size restraints of email, and allows creation of a record that the documents have been downloaded.

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Chapter 5

What's All This about BIM?

In This Chapter

- Defining the acronym
- Realizing the benefits of BIM
- Dealing with BIM's challenges
- Benefiting from real collaboration

During the last few years, there's been a great deal of talk about BIM. You might be asking, what's that? Good question, and there's no simple answer, because there are a number of words you might be referring to when you use the acronym *BIM*.

This chapter sets forth a definition of BIM, explains how it benefits pretty much everybody involved, and discusses what tools and technologies are needed to allow for the true collaboration BIM promises.

What Do Those Letters Stand For, Anyway?

Before diving too deeply into a conversation about BIM, it's important to define what exactly we're talking about. One place to find an answer is the *National BIM Standard — United States*, which defines BIM as follows:

> BIM is a term which represents three separate but linked functions:
>
> **Building Information Modeling**: Is a business process for generating and leveraging building data to design,

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construct, and operate the building during its lifecycle. BIM allows all stakeholders to have access to the same information at the same time through interoperability between technology platforms.

Building Information Model: Is the digital representation of physical and functional characteristics of a facility. As such it serves as a shared knowledge resource for information about a facility, forming a reliable basis for decisions during its life cycle from inception onwards.

Building Information Management: Is the organization and control of the business process by utilizing the information in the digital prototype to effect the sharing of information over the entire lifecycle of an asset. The benefits include centralized and visual communication, early exploration of options, sustainability, efficient design, integration of disciplines, site control, as built documentation, and so on — effectively developing an asset lifecycle process and model from conception to final retirement.

That certainly clears it up, right? For a related but somewhat different perspective, here's a more succinct definition from the *UK PAS 1192 – Part 2*:

> Building Information Modelling: Process of designing, constructing or operating a building or infrastructure asset using electronic object-oriented information."

That's certainly a bit easier to digest. But it's important to point out something neither of these definitions say: BIM is about 3D modeling. It's a common misconception that by designing a building in 3D using software such as Autodesk Revit or Bentley MicroStation, you're doing BIM. That's just not true — BIM is about much more.

In many ways the adoption of BIM is a journey from traditional two-dimensional drafting through to full building information modeling. This progression is represented in Figure 5-1.

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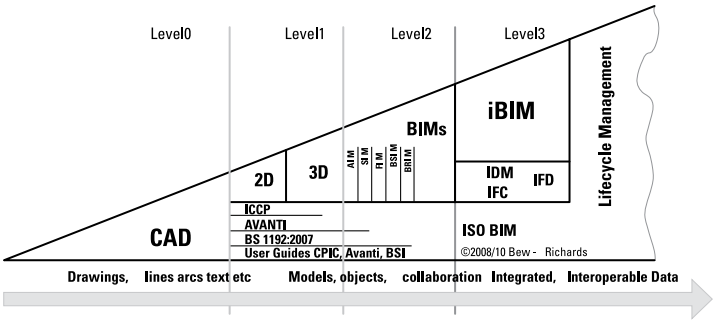

UK Government Construction Client Group (GCCG).

Figure 5-1: The UK BIM maturity model

The UK maturity model has a couple of alternative names: the iBIM model (the name of its highest level) and the BIM Wedge (due to its famous shape). It was developed by Mark Bew and Mervyn Richards in 2008. There are many versions of the base model, with subtle but meaningful differences. The one shown in Figure 5-1 appeared in the UK Government Construction Client Group (GCCG) report in 2011.

Move from left to right and the first thing you see is the replacement of 2D CAD with 3D modeling. Then comes the inclusion of additional information into the model, such as time-based programming information (also known as 4D), as well as cost/quantity surveying information (also known as 5D). The idea is that this information will remain accessible through the full lifecycle of the building, from inception to demolition.

We also see a move from design and construction being carried out in distinct silos, with documents being transmitted between parties, to a collaborative working environment where all team members have access to a central repository of information. That leads eventually to a situation in which everyone on the whole project team has access to a central model, which contains or references all the pertinent information needed to design, construct, operate, maintain, and eventually demolish the building or asset.

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If you take all this into account, a good way of thinking about what BIM is that it is the process of creating a digital representation of the physical, functional, and other data required to build and operate a building or other asset. This representation will be accessible to, and developed by, all the stakeholders, through collaborative processes, during the lifecycle of the asset from inception through to demolition.

How BIM Benefits the Design and Construction Process

BIM has lots of benefits to offer, with savings in all aspects of the process. As BIM adoption increases and moves from level 1 through to 3, there are more and more benefits, and bigger benefits, too.

Benefits for designers:

- The reuse of standard components in the model can lead to time savings.
- Object-based design significantly reduces the risk of drafting errors.
- When all designers are working in BIM, there will be different models for the architectural, structural, HVAC, and electrical elements. These models can be compared and coordinated together (that's a process known as *federation*). Any clashes between models are easily identified, and that prevents costly errors.

Benefits for contractors:

- Design errors are reduced or eliminated, which means no costly rectification.
- The use of models can more accurately identify material quantities and costs.
- The use of models means that buildability issues are more readily identified and overcome.
- Models can contain scheduling data and even simulate the construction sequence. That makes it a whole lot easier to predict and overcome difficult access problems and sequencing issues.

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Benefits for clients and end users:

- Fewer errors and defects means lower overall costs.
- There's greater certainty earlier in the process about what the completed building will be like.
- Operational costs are reduced because the design, construction, maintenance, and operation information is available throughout the life of the building.

The Challenges of BIM

How big of an industry change does the adoption of BIM represent? It's at least as significant, and perhaps a good bit more so, than when work moved from drawing boards to CAD. There are multiple reasons.

- Designers must learn to use the modeling software (as well as 2D CAD for the time being).
- Working practices need to change so that models can be shared and federated, not just at design stage but throughout the life of the project.
- Contractors need new skills to be able to consume the model information and utilize it fully.
- Clients and end users need to adopt different working practices to benefit from the information in the model.
- IT infrastructure needs to improve to provide the tools needed to share and collaborate effectively.

Moving from Cooperation to Collaboration

If you're really going to take full advantage of the many benefits of BIM, you really have to get the whole project team onboard. Collaboration is the foundation for effective use of BIM, and there's a need for better tools and IT infrastructure to support this improved way of working.

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The most fundamental requirement is for a central repository for information, in particular documents, so that all team members can access the latest information. Of course, there are inherent risks involved in sharing information that's not yet ready for widespread dissemination. That means it must be possible to configure the shared environment in a way that restricts access to some people while allowing access to others.

Beyond this basic shared information repository, effective collaboration relies on tools that help control document visibility, tools that notify users of new or changed content, and tools that allow interaction between users.

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Chapter 6

Contracts Need to Be Managed, Too

In This Chapter

- Understanding contract management
- Managing contracts for professional services
- Tracking contracts for contractors
- Listing contract management items

Most projects are governed by a contract or a number of contracts that spell out the different responsibilities of the project team members. Like everything else discussed on the pages of this book, these contracts and the documents that help prove compliance are information that must be managed.

This chapter explains why contract management is vital, discusses the differences between contract management for professional services and for contractors, and offers detailed examples of many of the most common contract management items.

Basics of Contract Management

The contracts that govern any given project are generally sourced from a suite of interrelated documents that define processes for the interchange of information, review and comment deadlines, and control of change. They also define processes for financial control, particularly the valuation of works carried out and the certification of payments.

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Contract management is the process or processes of managing these interfaces, keeping accurate records, and maintaining properly documented records of information, change, and financial certification.

Back in the day, contract management processes were carried out by sending standard forms to the involved parties, then capturing the responses. They were on paper, stacks of paper, that had to be shuttled about from party to party and stored in very safe places.

Today's contract management systems are highly configurable to reproduce the formal documentation of the past, but they also allow immediate notification through email or extranet access, as well as immediate online response. The automation of these processes reduces the amount of work needed to administer the system.

Contract Management for Professional Services

In the construction industry, the role of contract administrator or contract supervisor is vital in ensuring the smooth operation of the project. The firm that takes on this role is responsible for overseeing the contractual communications between the client, the designers, and the main contractor. This is a role that traditionally has been undertaken by the architect for building contracts, but more recently it's been taken on by specialist project management firms.

The contractual communications overseen by the contract administrator include:

- **Change orders or variation orders:** These are instructions to vary the work to be carried out from the information that is spelled out in the contract documents. These changes often have an impact on the contract cost and, in some cases, the schedule.
- **Interim and final valuations:** These determinations are normally carried out monthly. The valuation ascertains the value of the work carried out so far.

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- **Practical completion certificate:** This is issued to signify that the contractor has completed the works to an acceptable standard. This, in turn, often triggers the release of retained amounts.

Contract Management for Contractors

There are all kinds of contractual obligations that contractors must fulfill. Among them, they're required to formally inform the contract administrator when they require additional information, and they must make formal notice when circumstances may affect the contract price or schedule. For that reason, it's very important for contractors to have detailed records of everything that might affect the contract.

The many kinds of contractor communications include:

- **Requests for information:** These are communications requiring clarification or provision of information that might be unclear or missing from the contractual documentation. In many cases the reply to an RFI will generate a change request.
- **Change request:** This is a formal request for a change to the contract. It might be the result of the reply to an RFI, or it might be a response to unexpected conditions encountered on site.
- **Site instruction:** This instructs a subcontractor to carry out certain work or obtain certain materials. This instruction may or may not result in the need for additional payment, but it's vital that the instruction is formally recorded.

Types of Contract Management Items

Truth be told, there are too many different types of contract management items to list them all, but it's worth considering a few of them here. Many firms will have their own processes,

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or interpretations of the standard contractual processes, so flexibility in the design of the items is important.

Request for information (RFI)

The RFI is a fundamental type for most contracts. It's a formal request for additional information that may or may not have a cost implication. Often the requests are time-critical.

Imagine, for example, that the architect has detailed a particular type of door furniture, but hasn't specified all of the criteria necessary to precisely identify the item to be purchased. Perhaps there's a date by which the door furniture must be ordered in order to keep the construction process on schedule. The contractor needs more information, and will raise an RFI seeking that information, setting a deadline date for the response. A failure to meet the deadline might result in a claim for additional costs resulting from schedule delays or acceleration.

The architect or another designer might instigate an RFI to get information from other designers, the client, or the project manager. The process is the same and the consequences for being late in supplying the information can also be significant.

Variation instruction

One hopes that it's possible to enter the construction phase of a project with information that's complete and correct. Unfortunately, this isn't always the case, and there may be changes or clarifications throughout the construction process. It's very important that these changes be fully documented, and the cost and schedule implications recorded. In the best cases, the client and contractor are in agreement on these details.

Most form of contracts have processes for dealing with this change. A good contract management system will allow for variations to the contract, and will capture the associated costs and schedule changes.

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Other instructions

When a main contractor gives information to subcontractors, that information is usually accompanied by an instruction. This is a formal record of the fact that information has been passed, and it lets the subcontractor know what to do with the information.

If it's important enough to create an instruction, it's important to hold a record of this instruction. Why? Because it'll form part of the evaluation of final account valuations for the work that the subcontractor conducts.

Compensation events

Most forms of contract also allow the contractor to notify the client, or the client's project manager, of events that may have an impact on the contract value or the schedule. The cause might be anything from unusually inclement weather to the discovery of expected things in the ground!

Following the initial notification, a process will establish the legitimacy of the event and ascertain the cost and schedule implications.

Valuation certificate

Here's an important one. Most contracts require a process to carry out the official valuation of work. Quantity surveyors representing both the contractor and the client conduct this valuation, which will generally include the value of work carried out as well as the value of materials onsite (and sometimes offsite materials, too).

After a value has been agreed upon, the project manager will issue an interim valuation certificate. If all of the work is complete, it'll be a final valuation certificate.

Upon the issuance of this certificate, the contractor can raise an invoice for the work. The client will pay the invoice in accordance with the terms of the contract.

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Completion certificate

Most contracts require a formal signoff signifying that the work has been completed, either in its entirety or in sections. The official record of this signoff is the issuance of a full or partial completion certificate, delivered from the project manager to the contractor.

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Chapter 7

Mobile Working

In This Chapter

- Taking project information management on the road
- Understanding the power of mobile work
- Firing up your team
- Enabling the technology
- Putting forms online
- Supporting mobile devices

Mobile devices have become an increasingly prominent part of modern home lives in recent years, and they're playing an ever-more-important role in work lives, too. Expectations have risen regarding what's possible with mobile technology in relation to work, and how mobile devices can improve the working environment.

This chapter explores how mobile tools can interface with project information management practices, highlighting what's possible, what the challenges are, and how best to get your team to successfully adopt mobile working systems.

Making PIM Happen Just About Anywhere

With regard to project information management, there are simple, fast, and powerful solutions that complement a wide range of onsite activities. Mobile systems these days are an extension of the PIM toolkit, enabling the streamlining of onsite data capture processes. Mobile systems have the additional benefit of enabling captured information to either

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be published directly back into the PIM document store, and facilitate secondary activities such as approvals and notifications. All of this PIM activity can occur while the user is onsite or out of the office.

Consumers and those in the corporate space are using pretty much the same mobile technology. The mobile working toolkit that today's technology is able to deliver really empowers site-based workers to remain connected and engaged with the office while they undertake their day-to-day site tasks.

By using mobile working technology, your organization will save time, benefit from increased accuracy, and reduce the risk of data loss. Technology can provide a robust audit trail for site-captured information, and can also be extended into managing other corporate functions and activities.

Another part of this transformation of consumer technology into the corporate space involves the supportability of the apps. The technology must be quick to setup, easy to manage, and robust not only in how it handles security and data resilience, but also in how it scales to the larger business-critical user community.

Mobile systems should streamline the collection and storage of information, mirroring existing traditional paper processes so that the user can undertake the same activity in a more efficient way. These simple and powerful solutions can be easily adopted by a business, operating in both online and offline environments, dramatically reducing the requirement for secondary information handling.

The Promise of Mobile Working

Working onsite, by definition, means getting things done away from your corporate office. But it's more than just being out of your office. You might also be away from the kinds of office technologies that you take for granted in the office, including phone and network links, or WiFi. At some sites, you might not even have great access to mobile data.

Not only does this make performing day-to-day duties more difficult — it also raises challenges related to timely access to

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information. That potential disconnect affects those at the site as well as those in the office trying to monitor site progress.

Adopting technology means accepting that you may not have a full-time direct link into office systems, and thus need to work in a different manner. The good news is that you don't have to rely on paper-based systems, but you'll be adopting devices and systems that have been designed with mobile challenges in mind.

In this new way, onsite workers can again access vital project information. The office worker, meanwhile, can monitor site progress while avoiding the historical administrative burdens of paperwork and phone chasing.

One of the key benefits of mobile working is the greater efficiency it yields. By providing more timely access to information, workers are able to make key decisions and prevent holdups, regardless of where they're located at the moment. It stands to reason that if you have access to the right information at the right time, you'll be more effective.

Empower Your Teams for Mobile Working

How can you engage your business in the transformation from paper to mobile? It's quite helpful to have a few people acting as champions for mobile working. They'll serve as knowledgeable and empowered points of contact for support during the rollout of your mobile working strategy.

Here are some key thoughts:

- Your team needs to understand and embrace the benefits that mobile working can bring. The more they understand how mobile systems fit with your business practices, the more easily they'll see the benefits.
- A mobile working solution is best supported by those within your organization, for the best overall control of your management systems.
- You and your team must understand the benefit that you'll get when you align the solution you're using with

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the way that the quality system documents your business processes. With this kind of integration, it's possible to build compliancy checking into your standard management system.

- Get your internal process and management system transferred to mobile working.
- A transformation into mobile working should start with a review of your current business processes. This will help you understand the requirements when adopting and tailoring elements of the mobile solution.
- During the course of transferring to mobile working, take advantage of the opportunity to adjust your system to fit the mobile solution.

A Tablet Online, or a Mobile Working Tool?

You can use project information management tools on your tablet through a web browser, which will give you access to live project information from the same system you would access in your corporate headquarters. It's a great tool if an internet connection is available.

Of course, not all sites have an always-on link to office systems. That means there needs to be a different tool to allow continued work and offline access to information. That tool, then, should synchronize automatically with the main office system.

Deltek's PIM Mobile Working is an example of this. It is designed to take advantage of the wealth of smartphone and tablet devices available, supporting offsite and offline working with the benefit of a much simpler interface for users to update and access information.

Making Forms Go Mobile

The right mobile application lets you take your simple paper forms — such as permits and safety forms — and convert

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them into a more effective, easy-to-use mobile-based process that can then be published into your PIM document store. It allows your documents to be stored in one place, easily located with comprehensive search tools.

You can build forms that are sent directly to the database, and you can have the resulting published document emailed to a specific user role, providing instant notification that a form has been submitted. You can also require that a form be marked for approval before it can be published into the main system.

Additional features allow you to take your more complex forms and turn them into a mobile-ready form that will publish to your DMS and be readily available when needed. These forms, like the simple ones, can also be developed for approval, to notify, or to go straight to the main database.

All of this mobile magic works because the document is published as soon as it is received by the server. No need to worry about bits of paper floating around. Your mobile users don't need to come to the office to hand over their forms, and those bits of paper won't get lost in the back of a van or in boxes when a site closes. Because the forms are in the system, those in the office will have immediate access to dot all the i's and cross all the t's.

Supporting Mobile Devices

Think of the devices used by your mobile users in the same way you do the computers sitting in the office. Those mobile users may need some help from time to time. There are many support structures for office-based workers, and that same support system needs to exist for those working in a mobile manner. Here are some things to consider.

- **Mobile device management:** IT departments for larger implementations may consider mobile device management tools (sometimes called MDM) as a means for remotely supporting a fleet of users. This gives the ability to control a device remotely, assisting a user who may be having problems. MDM also offers the possibility to restrict usage of a device, such as preventing access to social media.

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- **Types of devices:** A wide range of devices are available. There's no single option that's suitable for everyone, so try a selection of devices to evaluate before committing. Many of your users will already have experience with smartphones, and may have a natural affinity with a particular type.
- **Device size:** Smaller devices may fit in pockets and be less susceptible to breakage. Devices with larger screens, on the other hand, may be easier to use, especially by those with big thumbs. But larger devices will require a bigger battery to power the screen.
- **WiFi/3G/4G:** Generally, devices should only be considered if they support 3G/4G mobile networks, which also requires a SIM card and data connection/contract. Technically, it's possible to operate PIM Mobile Working over WiFi only, but only if you can tolerate the potential limitations of spending long periods of time offline.
- **Downtime and broken devices:** All hardware breaks from time to time, so it's essential to have a plan. Can a replacement be configured and delivered to the user in a timely manner? You can sometimes prevent hardware failure by sourcing rugged devices, or storing them in rugged cases.

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Chapter 8

Ten Thoughts on Technology

In This Chapter

- Embracing the promise of technology
- Clearing your plate of unnecessary effort
- Deciding on your new system's vital features
- Choosing the right partner for your solution

Are your information challenges all caused by technology alone? That conclusion would be oversimplifying things, but it's true that management challenges have been multiplied by the advent of collaboration, social media, email, and other forms of electronic communication. Here are some random thoughts about technology and how it can become your best friend.

The End Is Not Near

As much as your world has been disrupted by technology, the impact of technology will only keep on growing. Even email, the most archaic of the electronic communications media. It may feel like the bane of your existence, but experts believe its use will keep on increasing. The only way to improve and evolve is to invest in new technological solutions and to adopt new techniques.

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Old Approaches Are Fading

Historically, many businesses have adopted a paper-only approach for managing much of their project information, or perhaps they've implemented standalone solutions that need to be sewn together with vast amounts of manual effort. These are approaches that are becoming increasingly difficult to sustain. Surely now the only solution that makes sense is an integrated system that is ready-built and continuing to evolve to suit the needs of your project-oriented business.

Tight Margins Are No Excuse

The business of delivering projects traditionally is tight on margins and is threatened by the lack of repetition-based economies. With this in mind, how do you justify permitting the disruption in current processes, or the cost of investing in cutting-edge software? The irony is, that very lack of repetition-based work is one of the reasons that your project information is your lifeblood. A better system will ultimately pay for itself in increased productivity and reduced errors.

It'll Never Be Any Easier Than It Is Now

Projects are getting more complicated, larger, and more ambitious. The demand for well-organized, integrated practices will only increase. As opportunities for growth present themselves, shouldn't you invest now while the delivery is only this complex, you are only this busy, and the pressure for compliance is only this high? As the proverbial wisdom points out, a stitch in time saves nine. To that, add one more bit of wisdom: there's no time like the present.

Duplication of Effort Is a No-No

So you've decided to dive into a better system for project information management. Of course, you'll want to select a system that is simple to use and has the features that you

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require. But make sure the features are integrated so that you don't need to duplicate data entry, and so that learning one part gives you skills to help you with other parts.

Eliminating Effort Is a Yes-Yes

Progress is all about eliminating the need to think about and do certain things, so your mind can be free to think about and do even more important things. That's what your project information management system ought to do for you. There are so many places that are ripe for automation. Think about the document register, for example. You definitely need to keep track of the documents that your project-focused efforts are generating. You need to keep different document types straight, and know which version is the latest. What if your system had predefined schemes for codes and numbers? What if your system automatically kept others in the loop when files are updated or approvals are needed? What if you felt confident that those and other vital but sometimes mundane tasks would take care of themselves? What would you do with the bandwidth that has just been freed in your brain?

Get Out of Town

You never imagined you'd be carrying a computer around in your pocket, but there you are with your smartphone. When you're developing your project information management solution, be imaginative about the possibilities of working away from your desk, because what seems pie-in-the-sky now will likely be a basic expectation before long. Look for a solution that has powerful mobile capabilities now, and that has a track record of keeping up with those changes that seem unimaginable.

You'll Want Some Help

You don't have to do this on your own. There's no need to invent a better mousetrap, because someone else has already been working on it. When it comes to seeking out help with your project information management, select a provider that is focused on your market and understands your challenges.

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You need an expert that speaks your language and keeps up-to-date with the changes in legislation, technology, and techniques that impact your industry.

Not Too Much, Not Too Little

Consider the approach championed by Deltek, an enterprise software and information solutions provider that speaks the language of the project-focused world. Deltek provides solutions which overlay your processes to just the right extent. This means striking a balance between the all-singing, all-dancing solution whose complexity models every condition, versus a solution that is too simple to be useful. The best solution must attract users without the need for excessive training. And it must allow you to involve external parties without putting the burden on you to support them.

Good-Looking for the Long Term

One more thing about the right project information management solution: It must be attractive to look at and enjoyable to use. And it needs to stay that way. The solution must promise to evolve as technology changes, and be a long-term platform to support your activities.

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Calm the chaos of project-related information

A project is a one-off event, a unique initiative that has its own very specific details. Those details — from email communications to contracts to design deliverables — are information, without which the project can't succeed. How can you collect, organize, disseminate, and track all of that information efficiently and effectively?

- ***Clean up the document mess* — bring order to the many versions of documents, contracts, and design deliverables**
- ***Corral the communications* — properly manage emails, because they're documents, too**
- ***Benefit from BIM* — use building information management to benefit design and construction**
- ***Work as a team* — develop collaborative capabilities so all partners can access the info they need**
- ***Take it on the road* — give your team mobile tools for managing information while away from the office**

Open the book and find:

- **How to make the best use of email**
- **The value of carefully defined taxonomy**
- **The right way to create and fill a document register**
- **Why contract management helps you get paid**
- **How a smartphone can become a secret PIM weapon**

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