

DATA AND DOCUMENT MANAGEMENT FOR THE CONSTRUCTION INDUSTRY

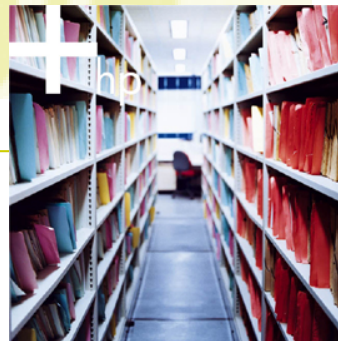
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There are a number of issues facing construction companies and their owners today in regards to handling information within their organization, particularly in hard-copy form.

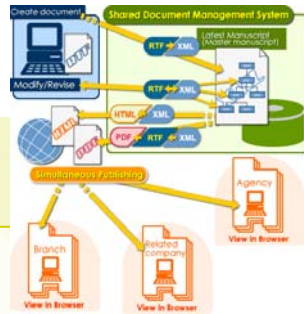
Studies show that

- 40% of an office workers time is spent handling paper
- At any given time 3-5% of documents are lost or mis-filed.
- The Gartner Group says it costs \$ 7.50 every time a piece of paper is touched.
- An average of seven copies are made of each original and different notes are made on each copy with no master copy.
- "It is estimated that up to 30% of the cost of construction are costs due to inefficiencies, mistakes, delays and poor communications." (The Economist, 1/15/00)

This whitepaper discusses specific data-handling challenges and how to maximize your companies productivity with a Document Imaging and Management System.



D A T A A N D D O C U M E N T
M A N A G E M E N T F O R T H E
C O N S T R U C T I O N I N D U S T R Y



Routing and Approval of Invoices and Job Document Management:

Having been in over one thousand construction companies over the last ten years, we have seen the average time to get an invoice approved to be about three weeks. Project managers have to either come into the office or receive a copy of the invoice through the mail or other service ...

Accounting and Process Management:

We have seen more and more companies that have to provide cost-plus and T&M backup for their jobs to owners. This is an extremely timely process, ranging from making duplicate copies once an invoice is received, through going through the bill and pulling all invoices that need to be billed ...

Why Imaging Now?:

Most companies want to be more paperless and know they could benefit from an imaging system, but delay the decision, costing them both time and money...

Times have changed

There are a number of issues facing construction companies and their owners today that make the business more challenging than ever. Responding to those changes is necessary. Some of the major issues we have seen confronting construction executives are:

- Owners want to build wealth in their business (either to pass on to their families or for resale.)
- Risk is a big factor in construction today – lawsuits, claims, jobs over estimates. A better way is needed to control and monitor these risks.
- Owners would like a long term reduction in costs, but want every initiative to contribute to the bottom line the first year. They want to get the “most bang for the buck”.
- Owners and their executives need to understand where they are on a job and be able to review all information needed for decisions. The world of email, instant messaging, and voice mail demands this.
- Owners want to give their Project Managers the best production tools to bring the job in on time and at or under estimates.
- Owners want to make the business process simpler, not more complex, but are hesitant to deal with some technology solutions they see as complex. They would like to reduce the paper flow and the constant search for documents.
- Some owners want to take more time off to enjoy the hard work they have done in their earlier years. However they want to stay in touch and be able to access information and documents as if they are in the office.
- Owners want to manage their operations for maximum profitability
- Owners would like a more defined process to achieve the desired results. They want to insure everything gets taken care of on time, documents are not lost or seen, and the staff is following the path directed by executives.
- Some executives are very concerned about regulatory compliance and want to insure their business meets this compliance.

To help resolve some of these issues and understanding of the problems that exist in a construction company is needed:

- Studies show that 40% of an office workers time is spent handling paper
- At any given time, 3-5% of a company's documents are lost or misfiled.
- The Gartner Group (a large information and technology consulting and research group), states that it costs \$ 7.50 every time a piece of paper is touched.
- An average of seven copies is made of each original and different notes are made on each copy with no master copy.
- “It is estimated that up to 30% of the cost of construction are due to inefficiencies, mistakes, delays and poor com-

munications.” (The Economist, December 15, 2000)

- “Leaders say the construction industry must reinvent itself in a world than now demands peak performance” (ENR December, 2000)
- No matter how much everyone hopes, one software system can not offer solutions for all applications. One vendor tried for seven years to integrate project management with their accounting. Another took three years for a partial solution. Most attempts at a total encompassing system are a pipedream that all want, but is rarely accomplished.
- More and more communications are with email and there must be a way to record and track email by job, person, date, time and subject.
- Invoices many times are lost on the way to payment. This increases tense relationships with vendors.
- Many executives want to spend more time with their families and not have long days and weekends to close the books, approve invoices, research information, or spend time dealing with paper.
- Companies changing from one accounting vendor to another have experienced long hours and many months for a transition that gives them marginal improvement. They are wary of technology solutions.

In our research and experience we have found owners and key executives understand the issues, but many times do not want to deal with the solution. They “hope” for an easy solution or they pass it on down for others to deal with. Owners and key executives have the long range vision for the company and have to lead the charge. Executives fear failure of new systems; however, those systems that are most successful are those that have executive involvement. The time on the front end to set the vision and direct the path for the right solution is paid back many times in a successful implementation.

The other issue we see in creating a successful technology installation that happens in weeks, not months or years, and comes in on budget is to use best-of-breed solutions. These solutions work across both size and type of construction companies. Implementing a system that is configurable and allows the company to still “have it their way” without custom modifications cost much less and takes significantly less time and effort. Payback needs to be quick and to make it quick, the system has to be installed and running in weeks. Many executives looking at imaging and workflow do not understand all the capabilities and benefits that can be derived. Unexpected benefits are cheered by those executives once implemented, because they are happy to get more than they thought they were getting. Using a “best of breed” solution, not one that has been tacked on by an accounting vendor to sell their software, provides advantages and offers significant function over these tacked on accounting systems. We have seen a number of companies buy the imaging feature of their accounting software only to find it does not work as they need it to, because it is very limited. They end up discarding or never implement it.

There are many benefits to be derived from the variety of applications of imaging and workflow for construction. “Best of breed” solutions have the features that offer the benefits, where the imaging feature with the accounting software only has one or two.

Routing and Approval of Invoices

While visiting over one thousand construction companies over the last ten years, we have observed the average time to get an invoice approved to be about three weeks. Project managers have to either come into the office or receive a copy of the invoice by mail or other service, possibly cost code the invoice, make sure it matches the PO and the delivery ticket, and approve and return it to accounting. In many companies an invoice may go through five approvals with various people cost coding, approving, passing it to another for a final approval based on dollars or division and then coming back to accounts payable. Those approvers are very busy managing their jobs and “paperwork” is one item they prefer not to do. If material has not been delivered on a job or the pricing is wrong, the approver will most often hold the invoice. A problem is created because accounting does not know the issues when they get calls from vendors. Many companies have decentralized receipt of invoices so the approver can receive them at their location, approve, and pass to accounting rather than a two-way process. The accounting department then loses control of when the invoices are approved and received for entry into the accounting system. Often invoices are lost or misfiled. Everyone that works on an invoice may make a copy before sending back. Many of those receiving invoices will make a copy and log the invoice before sending for approval, to make sure they are not lost. For cost-plus and T&M jobs additional copies are made. The result: long approval cycle, lost invoices, and a needless and expensive administrative time copying and following up on invoices.

With the electronic routing and approval of invoices with imaging and workflow, the entire process is shorter, less complex, and productivity greatly improved. For those companies that would like to centralize receipt of invoices, it is now possible. The invoices can be received, scanned and routed electronically that day to the approvers. Approvers can be notified of invoices either by a popup box or by an email. They can match the PO and Delivery Ticket if they have been scanned or brought in from their accounting system. While viewing the invoices, approvers can pull up related documents such as liens, lien waivers, contracts, insurance certificates and associated documents, **everything** the approver needs for invoice approval. The invoice can be coded with valid cost codes pulled from the accounting system, and then once approved, can be automatically passed to the next approver either by position or dollar amount of the invoices. The approval process works the same way every time, making sure that the procedure set is followed. Typically invoices are approved in less than a week.

Invoices that go to the wrong person can be returned to accounting with one click. For those needing to be held for approval, notes, highlighting, arrows, and rubbers stamps can be applied to annotate why it has not been approved. Then when accounts payable hears from the vendor, they can instantly view these invoices and tell the vendor that the material is not on the job or the prices are wrong.

Another great feature of an imaging system is if there is a question on an invoice either for the vendor or someone else in the company, with the click of a button the invoice is passed to the email system and the recipient is pulled for the contacts and the invoice is emailed in seconds. Accountability is maintained, in that list of approvers by number of invoices can be displayed in a report, and no approver wants to have the most number of unapproved invoices. We have seen one imaging user that sends an email from “Big Brother”, with a list in sequence by approvers that have the most outstanding invoices. We have seen another put up the number of unapproved invoices on their intranet and when clicked on, the list of approvers in sequence of unapproved invoices is viewed. In these cases, invoices are frequently approved in days. Also when an invoice is in question as to receipt and approval, there is an audit trail to show every time an invoice was touched, by whom it was touched, and the time and date. People do what they are inspected to do, not what they are expected to do in most cases. It is not necessarily that they are doing a poor job, but they have many tasks to accomplish. Giving the ability to approve invoices anywhere there is a PC connection makes it easy, where all documents needed are accessible, and provides for better management of jobs.

Once approved invoices are returned to the accounting department, they are reviewed and either entered or passed to the accounting system once validated. As a byproduct of this entry, the invoice is filed in the imaging system in up to twenty ways. After the checks are printed, the check signer may review images of the invoices by check number and date. They can easily pull up all the

invoices for that check date and click on an invoice and review the backup in minutes. Companies also find value in being able to file the invoice by all the cost codes. Many times they want to review all invoices for a certain cost code for pricing information, descriptive information, or cost codes that are over estimate. In a manual system this is extremely labor intensive and almost impossible. It can be done in seconds on an imaging system. One thing overlooked by many imaging vendors is problems created by changes made in the accounting system that do not flow to the imaging system.

Most companies only spend an hour or so a day scanning invoices. The routing and coding takes less time than before, but the real savings come in **not** filing invoices and **not** spending time looking for invoices for a certain criteria. While accounts payable is in their accounting system, they can click a button and the associated invoice appears on the screen. Or a project manager might go to the imaging system and do a query based on all invoices for job # 34, cost code 3445-55, which were over \$ 1000 for the last thirty days. This happens in seconds. Invoices are reviewed and if necessary, action can be taken. This tool provides them to be more efficient at managing their job and have instant information.

We have seen configurable system installed, training accomplished, and the user up and running in two weeks! Our observation is that companies with the proper training and easy-to-use operational manuals implement easier and have fewer questions. The proper training for any system is of utmost important. No matter how good a system is, if the users are not using all the benefits or using it incorrectly, they are not getting the most 'bang for their buck'.

Cost-plus and T&M Billing

We have seen more and more companies required to provide owners cost-plus and T&M backup for their jobs. This is an extremely time consuming process, ranging from making duplicate copies once an invoice is received to pulling all invoices that need to be billed. Sometimes reports and timesheets or timecards have to be pulled. All these have to be copied, reconciled to the invoice, and then sent to the owner.

With full-function imaging systems, the invoices, timesheets, and reports can easily be selected by job and timeframe, invoices can be removed or added, and those that are finally selected are marked for the billing. A CD is created with the images of the invoices, timesheets, and reports, with an imaging viewer and the document indexes for the owner. The owner then can view all invoices for a certain cost code, for a certain dollar amount, **and** have the benefit of a paperless system. This creates additional value for the owners, giving them the incentive to do business in the future with the construction company.

Job Documents

Job documents are the most critical documents in a construction company and also the most difficult to deal with. With lawsuits, claims, and disputes "he who has the best documentation wins", so making sure the document is available is critical in today's environment. Frequently a document needs to be sent for review or approval, and needs to be tracked to make sure a document does not get lost or not seen.

Manually this is time-consuming and error-prone. One owner of a construction company told us when he started the business he knew where every document was and how it was filed, but now he had a difficult time finding any documents. Sometimes companies need to enter information from the job documents into a project management system, but still be able to retrieve these documents from the accounting, estimating, or other systems.

"Best of breed" imaging and workflow systems allow the companies to electronically file, route, and store job documents many ways for easily viewing both in the project management and in conjunction with other systems. These systems allow job documents scanned in a batch and then either routed to a person for indexing or to be indexed as a byproduct of entry into the project

management system. Typically documents are indexed by job #, date, and document type. Based on job #, other indexes, such as job name, address, project manager, superintendent, automatically can be filled in. If one of these parameters is changed on a job, others can be easily backfilled. There are certain key indexes that refer to all job documents, but there are specific indexes needed for certain document types. For example an insurance certificate needs carrier, limits, expiration date. A drawing needs drawing #, author, revision #, drawing date. A multi-tiered database is necessary to properly classify all documents.

A very important aspect of any system working with job documents is the ability to track to whom a document has been sent, if it was received, and where it was sent from there. A complete audit trail is needed for compliance as well as to make sure everyone sees the documents they need to see. When a document is opened, the recipient needs to know who else was sent the document and if they have read it.

One very important aspect today is the archiving of emails. Being able to archive emails by sender, date, subject, recipient and job # is mandatory. Many of these add-on systems do not address emails. Also being able to store any document type such as CAD drawings (with a viewer), spreadsheets, word processing documents, PDF files, photos, and print files. We have even seen one imaging user store their voice mails in the imaging system.

Being able to store all job documents in one place, being able to route, and being able to see who has seen the documents and **knowing that a document will never be lost** is a very important part of any imaging system.

OCR and Full-text Search

In the normal course of business, the best way to find most documents in an imaging system is by index fields such as job #, date, document type, and other ways. However for a lawsuit or claim, or even for a very large RFP, OCR and Full-text Search software allows you to OCR(Optical Character Recognition to “read” the scanned document) all those scanned documents, combine those in text format already, and then do a full-text index. This procedure indexes the documents on every word. This allows you to find all the pages in seconds that has the word “asbestos” or “asbestos and pipe” or in an RFP, words such as “required”, “penalty”, or “deadline”. This added feature for the “best of breed” systems allows you to find all the required documents, reduce your personnel time looking, reduce your legal costs, and it may even make a difference in the a claim or lawsuit. Robust systems even allow OCRing of landscape pages and looking up combination of words.

Human Resources

Imaging in human resources requires security, privacy and long term storage of important records. Most employee records are stored by employee #, social security number, name, document type, and date. Other indexes such as birth date and hire date can be used, but normally indexes that might be changed such as department are not used. There must be strict security by document type so sensitive documents such as drug tests or evaluations are only seen by those authorized. Other indexes can be included to allow lookup within subdocument types.

When people convert their manual HR records to imaging, they typically find misfiled documents, which is inherent of a manual system. With imaging they have several methods to find a document so if it were misfiled by one index, it could be found by others. With all the records available in seconds, when an employee calls or there is a request, the document can be pulled up, questions answered and the employee is back to work quickly. In addition superintendents can review past work history for applicants seeking to be rehired. Security is greatly enhanced and compliance is easy to attain.

O&M Manuals and OEM Manuals

Many contractors have to prepare multi-binder sets of all the manuals, specifications, and other documents related to the job. With

imaging, a library of both scanned documents and documents received in PDF or other formats can be maintained. In short order an electronic O&M manual can be prepared on CD with a viewer plus an index structure to guide the owner to the proper information. For homebuilders, the complete warranty manuals for a house or unit can be given to the owner on one CD.

Equipment Applications

Companies have and maintain equipment need many types of records. Maintenance personnel can benefit from having all records in one place and obtainable in seconds. OEM manuals, warranties, titles, work orders (both inside and outside), parts orders and other documents can be stored by equipment number, asset number, model number, serial number, description and type can and accessed in seconds. For those that own and maintain several pieces of equipment, OEM manuals from the manufacturer can be stored on CD or could be available over the web for instant access to know tire sizes, crankcase requirements, part numbers and other information needed for maintenance. One construction owner told us they had overhauled a motor grader that was under warranty, before they installed their imaging system and it could have avoided the entire cost.

Ticket Applications

For those with asphalt, concrete, and/or aggregate plants, storing of tickets is a real task with hundreds of tickets generated every day. Plants creating their own tickets can scan the tickets, read through OCR (Optical Character Recognition) the ticket # and back-fill from the plant computer the customer, tonnage, driver, truck number, date and time, and other information. A ticket can then be pulled instantly by customer or any criteria and emailed or faxed to show signatures. Tickets received from multiple vendors such as lumber, steel, asphalt, concrete or aggregate, can be scanned and indexed and have an easy way to access by ticket number.

Other Applications

These are some of the applications and uses we have seen for imaging in construction and related companies across the country. There are many more. For example one company sends out PO quotes via fax and when returned handwrites vendor #, date, amount and other information. Then the system reads the handwritten fields with OCR and files the documents. Most electricals have the ability to receive invoices electronically though EDI and with the "best of breed" systems, these documents can be automatically entered plus an image of the electronic document can be created so it can be routed. We have heard many users say "Imaging is more than they ever thought it would be" and the applications are only limited by the imagination of users with a system where they can create their own applications in minutes.

Why Imaging Now

Most companies want to be more paperless and know they could benefit from an imaging system, but delay the decision, costing them both time and money. Some of the common misconceptions are:

- *"I do not have time to install it, we will do it next year"* – We have seen mature, configurable imaging systems **installed and operational in a couple of weeks**. With these companies, the benefits are available immediately.
- *"We can't afford imaging now"* - The average payback in construction and related companies is about ten months! **You cannot afford to not do it!** The many costs associated with paper systems, cost of storing documents, courier and overnight fees, number of people needed all add up to a significant amount without imaging. And if the system is leased with a ten-month payback, you can actually have a positive cash inflow, even in the first year. One homebuilder told us he justified the system in six months. A \$ 20 million demolition contractor stated they justified the system in people savings alone with a 10-month payback. One company had a death and a person and these people were not replaced after imaging. Another had a downturn and when they regained their sales did not

need rehire back four people that were previously employed.

- *"It will change our processes"* – Most companies with manual paper flow need to change their processes. Imaging **will** allow that to happen.

With Citrix and Terminal Services [software that allows remote users (even on dialup lines) to view images quickly] project managers and superintendents can view images at the job site or at home. They can even be viewed from wireless devices or a tablet PC. When we are at meetings with controllers and CFOs that have imaging systems, they tell us they were able to approve invoices from their hotel room the night before!

Companies that embrace new technology will lead in the future. Rarely is technology like imaging available that has a payback in less than a year!

So how does imaging address the issues of most construction and related companies?

- Reducing paper flow and dependence on paper, becoming more efficient.
- Centralizing operations when practical for better control.
- Never losing a document and knowing who has viewed what document.
- Reducing the time for approval of invoices.
- Allowing project managers and others instant access to job documents to better manage their jobs.
- Reviewing documents anywhere, anytime with the proper security.
- Increasing profitability by being able to do more with less and grow without adding people.
- Knowing required procedures can be built into the imaging system and will be followed every time.
- Promoting compliance.
- Providing a long-term reduction in costs.
- Providing backup to all their documents off-site, something that cannot be done with paper.
- Provides instant access to documents, enabling your business to make better business decisions.