Industry CPD

How engineering companies can avoid struggling with large amounts of project data

Modern construction projects produce an enormous amount of data, which can become a great risk for engineering companies and other AEC firms. This CPD module, sponsored by Newforma, examines various digital workflows which are suitable to tackle those challenges.

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1 hour of verifiable CPD

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Introduction

The construction industry is still one of the least digitised major industries in the world, with many processes still being handled manually or at best semi-automated.

When talking about the digitalisation of workflows, it is not uncommon for many Architecture, Engineering and Construction (AEC) professionals to cast it aside as something that either does not affect them or something that they will address in the future.

The dangers of underestimating the importance of developing solid, digital processes to handle large amounts of data or workflows are often not recognised as such. However, the more data that has to be handled in an unorganised, digital infrastructure, the more inefficient project teams will be. A staggering 35% of AEC professionals claim to be struggling with huge amounts of data they are handling on a day-to-day basis, according to a recent study by *Construction Manager* magazine.

It's no surprise then that hours are being wasted when engineers, architects, project managers or surveyors are looking for information within email inboxes or complex folder structures. It can also become increasingly difficult to stay on top of things when important project data resides within a variety of disconnected third-party sharing sources that are inaccessible or unknown to the rest of the company.

Besides a lack of efficiency, there is the potential for increased risk where no project-centric approach exists. This approach can be realised by centralising all data in one system, or by introducing a mechanism to unify and interrogate unorganised and unstructured data where it resides, often reflecting the reality of how fast-paced, creative projects unfold.

Engineering firms, architectural practices and construction companies are getting their project information management right. And it is easier than one might think

1) The right use of email

The history of email has always been about communication, analogous to that of a simple paper letter. With more than 4.5 billion email accounts active worldwide it has evolved into the most widely used communications medium on the internet.

Instant and direct communication between team members is of paramount importance on projects. Therefore, including emails in your overall project data set, ideally within a system that makes them accessible to the whole project team, is vital. Information held within emails is often critical in resolving questions and understanding why decisions were made both during and after the project has completed.

With higher bandwidth and better overall connectivity, more and more people have also defaulted to using email to transfer files. It is not uncommon for AEC professionals to send several emails a day containing 20 MB PDF, DWG or other files to contractors or even other team members, mostly because it's easy and simple.

The inherent problems with this workflow are limited file sizes than can be transferred via email and the fact that transactions via email are inaccessible to those not included on the distribution list. While email can be the go-to solution to share a file, it offers reduced visibility to the sender's business, who remain responsible for decisions made long after the project has concluded. Additionally, emails also lack the ability to notify the sender, if a file has been successfully downloaded by recipient.

As much as letters do not make good parcels, emails are not the optimal solution for exchanging files on a project.

2) File transfers

Now that email has been challenged as the preferred way for sharing files on a project, what are the tools most suited for this task?

When there are no in-house systems in place, many AEC professionals make use of mainstream tools that target a wide-range of consumers. The primary reasons for using such tools are typically convenience and familiarity.

While these tools have great appeal, they are operating outside of the overall digital project infrastructure. Just like email, these tools make it difficult for the wider team to have visibility on a transaction, for example if a person is sharing the most recent document. It is hard to find out which files were sent to whom and when or if and by

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whom they have been downloaded if there is little or no audit trail. Or if the only record is an email notification. With team members leaving a project or going on holiday, this can easily turn into a difficult situation to manage. Uploading information to a hosted service can also introduce concerns from clients over data security and sovereignty.

Within a high-risk environment such as the AEC industry, it is important to use Project Information Management (PIM) systems, which allow you to stay and work within your own data infrastructure. Not only to maintain proper project context, but also for being able to track information flow with a proper audit trail. In cases of potential litigation, this can be essential to avoid major monetary damage.

3) Searching for project information

Historically, to work in a structured world required neatly organised folders, drawers and filing cabinets. Order was an absolute necessity to find anything, typically by using a numbering system as the backbone of every search operation.

Many people still work this way today, even in the era of digitalisation. There are folder structures within folder structures within folder structures, mostly organised by name, type, date, etc. All designed to serve one purpose: finding information as quickly and easily as possible.

There are three major problems with this process. Firstly, it can take significant effort to agree and maintain a solid and logical structure, which then needs to be adhered to for all time to not cause issues. A potential risk when considering the high likelihood of human error in such a complex industry. Secondly, there's a high probability of delays when searching for files.

Thirdly, if not properly documented such a structure is only valuable to the people who originally created it. Others might file differently if they use their own logic to categorise information, causing co-workers to spend an unacceptable amount of time locating data.

The digital world equips professionals with better and more efficient tools for such tasks, making processes from analogue times obsolete.

Indexing is one of the most powerful ways of being able to locate information quickly and with a maximum of convenience. Modern internet search engines use exactly that principle to find millions of website pages and documents all around the world within the blink of an eye.

To fully utilise this principle, it is important to use a PIM solution that can index file content and not just its filename and attributes.

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4) PIM vs EDMS

Electronic Document Management Systems (EDMS) aim to centralise all project data in one single database, providing every member of the team with a project container to work within. However, there are significant disadvantages to an EDMS as these systems do not easily support the wide variety of file types required for the modern building design process. If the EDMS system cannot contain the information, it cannot be aware of it. As such it does not represent a complete picture of the project.

For engineers an EDMS might be a good solution for versioning certain types of documents, but by far not all of them. In fact, for all other files, the possibility to make them searchable and being able find them quickly and easily is far more important.

The introduction of an EDMS system can also disrupt the way project teams have worked so far, forcing everyone to adapt to a new digital work environment and requiring migration of project data which can take months. The implementation of such an invasive system must be carefully considered, and the cost of the change

management involved can often exceed the cost of the EDMS system itself. A subsequent decision to move away from an EDMS system can also be time consuming and costly.

An alternative and more contemporary way of managing project data is to use a non-disruptive Project Information Management system.

This approach does not require data migration and focuses on referencing and indexing data wherever it resides. This 'light touch' has inherently low change management.

5) Success is having everyone on board

Whatever system is chosen to manage project information, its success is defined by user adoption. If the system is difficult to adapt to because it requires significant change to working processes over a short period of time, then it is likely to meet with resistance.

Particularly in the AEC industry, where people have worked with the same processes for years, it can be hard and overwhelming to adapt to new tools and

digital work environments.

Implementing a system that adapts to users' needs, and not vice versa, supports adoption at a pace that suits everyone. And engineers can put more focus on the actual design tasks, rather than the tools required to perform those tasks.

Conclusions

The data struggle is real. Higher complexity, easier to produce data, and the evolution of BIM have seen the amount of information produced by a single construction project grow by a factor of 65 since 2004.

With this continually growing volume of data comes an increased risk for those companies that have not introduced a strategy for project information management.

With the right digital system in place, you can focus on your core business confident in the knowledge that nothing is falling through the cracks.

In other words: the data struggle is real. But with the right workflows not really that threatening.

Questions

Answer all questions correctly and submit by 31 May 2019 to receive your CPD certificate

QUESTION 1:
Why should files not be sent via mainstream third-party tools?

❏ They are always very expensive

❏ There's a danger of getting a computer virus

❏ Because using them means a violation of GDPR

❏ Sending and receiving data outside of the main digital infrastructure can cause disruption, misinformation and delays within the project and team

QUESTION 2:
Which of the following is not a disadvantage of a manually created folder and filing structure?

❏ Human error while manually filing documents

❏ Different filing logic of different team members

❏ Manually created folder structures cannot be accessed without WiFi

❏ Delays while searching for files in a certain folder structure

QUESTION 3:
Which of the following statements about email is true?

❏ Information held within emails is often critical in resolving questions and understanding why decisions were made

❏ Everyone will be able to access information in email inboxes at all stages of the project

❏ There is full transparency into whether a recipient has downloaded a file within an email attachment or not

❏ Emails are a perfect way to send large files

QUESTION 4:
The average amount of information a single construction project produces in 2019 has risen by which factor since the year 2004?

❏ Factor of 2

❏ Factor of 41

❏ Factor of 23

❏ Factor of 65

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QUESTION 5:
What is a crucial factor for the successful adoption of new technology?

❏ Making sure your lawyer likes it

❏ Ensuring all team members are on board with the adoption

❏ That it also works on a Macintosh system

❏ That it's certified by the Institution of Structural Engineers

QUESTION 6:
Which of the following is not a major disadvantage of an EDMS solution?

❏ Disruption of established workflows project team members are used to

❏ An EDMS can only be used when working on-premises

❏ Its use comes with extensive data migration and a costly implementation phase

❏ Files that are not implemented into an EDMS are not part of the project

QUESTION 7:
What are the potential consequences of not using a centralized approach when handling project data:

❏ Inefficiency due to an inability to easily find and locate information

❏ Increased risk of costly delays and disputes

❏ Lower visibility and transparency for team members into current operations

❏ All of the above

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