

# Electronic Project Administration in the Construction

## Industry

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## Abstract

**Purpose** – The purpose of this research project is to identify the legal and security issues, risks and barriers to the uptake of communication and document management technologies by the construction industry. Previous research suggests that the construction industry, especially in Australia, has been reluctant to adopt technology on a broad scale due to a range of legal uncertainties. The purpose of this paper is to explain the relevant legal issues and risks and to suggest possible solutions for legally compliant electronic project administration in the construction industry.

**Methodology/approach** – This paper is based on research undertaken for the Australian Cooperative Research Centre (CRC) for Construction Innovation Research Project 2005-025-A *Electronic Contract Administration – Legal and Security Issues*. The outcomes from the research to date include a literature review and several case studies. The research project will ultimately produce a set of recommendations for secure and legally compliant electronic project administration.

**Findings** - It is apparent that if the uncertainties associated with electronic project administration remain unresolved, then the practical consequences for parties using electronic project administration tools may be serious. On a more general level, these

uncertainties will contribute to a reduced willingness by the construction industry to take advantage of modern communication technologies.

**Originality/value** – This research contributes to the need for greater clarity and knowledge of the legal issues and risks of electronic project administration in the construction industry.

**Paper type** - Research Paper

**Key Words** – electronic contract administration – variations and notices – document retention - legal risks

## Introduction

This paper outlines the results of research conducted for the Australian Cooperative Research Centre (CRC) for Construction Innovation Research Project 2005-025-A *Electronic Contract Administration – Legal and Security Issues*. The purpose of this paper is to present a review of the literature on the legal and security issues that may arise from electronic contract administration in the construction industry.

Information and communication technology is increasingly used as an effective means of managing and administering construction projects. The type of technology that may be used ranges from standard email communications through to sophisticated online collaboration platforms. The use of ICT technologies has the potential to facilitate considerable efficiencies in the administration of construction projects by facilitating the giving of notices, variations to contracts and communications between project participants, but there has not yet been an extensive examination of the legal and security issues that arise from the use of ICT within the construction industry. Uncertainty about the legal efficacy and security of ICT in project administration has the potential to inhibit the use of these technologies.

This paper reviews the existing literature on electronic project administration in the construction industry in order to identify the legal and security issues that arise.

A range of legal and security issues have been identified in connection with the administration of construction projects within an electronic environment. The key issues that emerge from the literature are:

- whether electronic communications can have the effect of varying the contract between the parties;
- whether notices under a construction contract can be given electronically;
- whether electronic communications meet evidentiary requirements so that they will be admissible in court in the event of a dispute between the parties; and
- whether electronic communications and records can be managed in a way that not only satisfies legal document retention and archiving requirements, but also in a manner that facilitates the efficient discovery of documents in the event of litigation.

Increasingly, online collaboration platforms are being adopted in the construction industry as a means of administering construction projects. Accordingly, this paper specifically targets the issues that arise from electronic project administration in the context of online collaboration platforms.

## **Can electronic communications have the effect of varying the contract between the parties?**

Usually a construction contract will require any variations to the contract to be in writing and may require the writing to be signed. The question that arises is whether

an agreement to vary a construction contract constituted wholly by electronic communications will constitute an agreement that is in 'writing', and if relevant, 'signed' in accordance with the construction contract?

The analysis of whether or not an agreement evidenced only in electronic form can be said to be in 'writing' and 'signed' will vary according to the relevant legislation and judicial decisions in the jurisdiction governing the construction contract.

Courts in Australia (*McGuren v Simpson* [2004] NSW 35), England (*Hall v Cognos Ltd* (Industrial Tribunal Case No. 1803325/97), the United States (*Dow Chemical Company v G.E.*, 2005 US Dist. LEXIS 40866 (E.D. Mich. 2005)) and Singapore (*SM Integrated Transware Pty Ltd v Schenker Singapore (PTE) Ltd* [2005] 2 SLR 651) have readily accepted that electronic communications, such as emails, which are available in printed form satisfy a requirement for a document to be 'in writing'. It is unclear, however, whether a document that is available only in electronic form will be granted the same status by a court. Resolution of this question is important to the uptake of electronic collaboration tools, which are premised on keeping all communications between parties electronically.

Whether a purely electronic document constitutes 'writing' may depend upon the meaning of 'writing' adopted in the relevant jurisdiction. 'Writing' is generally defined to include any mode of representing or reproducing words in a *visible* form. Competing arguments have emerged in the literature. Commentators in Australia and Canada have argued that electronic documents fulfil the requirement of writing if they are capable of retrieval and representation in a visible form (Christensen, Duncan & Low 2002, p44; Beale & Griffiths 2002, pp471-2). In the United Kingdom Edwards and Waelde (1997, p139) argue that electronic communications stored on a recipient's computer will not be capable meeting such a definition as the electronic impulses representing their contents are not visible.

Very little judicial consideration of this issue has occurred, mainly due to the fact that electronic communications produced as evidence have been produced in printed form. However, dicta in judicial decisions such as the United States case of *Bazak International Corp v Tarrant Apparel Group*, 2005 US Dist. LEXIS 14674 (S.D.N.Y. 2005) point to the likelihood that courts will accept that emails and other forms of electronic communications are writing, because they are either represented in a visual form or are retained in a tangible form capable of being read (at pp383-384).

Given the uncertainty on these issues, it will be vital for contracting parties to expressly address the legal status of electronic communications in their contract documents. However, as discussed further below, careful consideration must be given to any such provisions as there may be particular types of communications under the contract, including but not limited to contractual variations, which the parties may still prefer to take place in paper form (Briggs & Brumpton 2001, p30).

## **Can notices under a construction contract be given electronically?**

Construction contracts typically contain obligations on parties to communicate with one another by way of formal notices given under the contract (Hassan, Shelbourn & Carter 2004, p2). Where the contract requires notices to be given in writing and signed the same considerations as discussed above in relation to contractual variations will apply.

It has been suggested that if the parties specifically allow for electronic notices in their contract, then it is likely that the courts will interpret this strictly and hold the parties to their intention (Mallesons 2003). For example, in the Canadian decision in *Kanitz v Rogers Cable Inc* (2002) 21 BLR (3d) 104, a court held that the plaintiffs were obliged to continually inspect the defendant's website for updates to a user

agreement, as the user agreement made specific provision for this to occur (Malleons 2003).

If a construction contract does not contain a specific provision for notices to be sent electronically, it is unclear whether in the absence of an express legislative provision, an electronic notice will be found to be valid. If a party is purporting to rely on electronic transaction legislation, such as legislation based upon the UNICITRAL Model Law for Electronic Commerce 1996, an additional issue will be whether the party receiving the notice has consented to service of the notice by electronic means.

In light of the importance of contractual notices (and depending on the circumstances of the parties and the security of their communication systems), it has been suggested that as a general rule email should not be used for the delivery of contractual notices, as opposed to day-to-day correspondence (Malleons 2003). If the parties wish to contractually avail themselves of effective electronic communications for some, but not all contractual notices, any notices that are intended to remain paper based should be clearly excluded by appropriate contractual provisions (Briggs & Brumpton 2001, p30).

To avoid the legal uncertainties about the status of electronic notices, construction contracts should contain clear provisions setting out the parties' agreement as to how valid notices may be given under the contract.

## **Evidentiary considerations**

### ***General evidentiary issues***

The rules as to the admissibility of electronic records as evidence vary and in some jurisdictions are quite complicated. In common law jurisdictions (those based on the United Kingdom legal system including Australia and Canada) the key issues are

whether or not the electronic record will be considered to be hearsay and whether the electronic record produced in court will be considered to be authentic. The hearsay rule applies when the electronic record contains a statement made by a person and the record is sought to be admitted as proof of the truth of the statement. Authenticity means that the document is what it purports to be.

In civil jurisdictions the hearsay rule does not apply. As a result, any electronic record or communication will be admissible in court (Hassan, Shelbourne & Carter 2004, p2). The key issue in civil jurisdictions will be establishing the authenticity of the electronic record.

### ***Hearsay rule***

The hearsay rule will apply where the electronic record contains a statement made by a person. In that case the record will not be admissible unless it comes within one of the exceptions to the hearsay rule. Accordingly the hearsay rule may impact on the admissibility of emails and project records which are used significantly in the construction industry and will be relied upon extensively in construction litigation (Cassimassima & Caplicki 2003, p16). Email and project records are likely to be admissible as business records which are usually exempt from the hearsay rule. Where documents are used in evidence to prove the terms of a contract, or that a notice has been given under a contract, the hearsay rule does not apply. Accordingly, such documents will be admissible even in common law jurisdictions.

### ***Authenticity***

Authenticity may impact on whether or not an electronic record is admissible, or if it is admissible, the weight that should be attached to it. While an electronic record may be admissible as evidence, it may be given less weight by the court than its non-electronic equivalent. The court may not necessarily believe or act on the evidence

(National Archives of Australia 2004). The weight that will be given to electronic evidence will be dependant upon the security and management of the electronic storage system (DPWS 2000, p26). The key issue is whether or not the integrity of the record can be established i.e. whether the document produced in court is the same as the original document.

Doubts can arise as to the integrity of electronic records because they may be easily altered and such alterations may not be detectable. The reliability of electronic data may be impacted by viruses, data corruption, hackers and computer malfunctions (Laryea 1999). Thompson (2004, p133) argues that an email that is insecure in the sense that it is not authenticated and not encrypted, is likely to have little or no probative value.

Consideration should also be given as to whether the integrity of the meta-data associated with an electronic record is guaranteed. Meta-data may include information such as the origin and date of creation of the electronic record. The meta-data may reveal critical information without which the evidentiary value of the electronic record is reduced (Williams, 2005).

### ***Other evidentiary issues***

Apart from the admissibility and reliability of electronic records, other evidentiary issues identified by the literature are:

- How can the source of an electronic document be established? Authentication of the origin of a document is particularly an issue in relation to email where it is necessary to prove that the email was actually sent by the purported author (Mallesons 2003).
- How may the time of dispatch and receipt of an electronic communication be proved? Computer clocks may be inaccurate or may be manually altered and



accordingly, there is no guarantee that the recorded date of a document's creation or communication is accurate (DPWS 2000, p44).

## **Document retention and archiving requirements**

Obligations to retain and archive electronic records are found in various legislative requirements. In addition, in most cases organisations should keep electronic records for the limitation period (usually at least 6 years in the case of contract claims in Australia and the United Kingdom) to defend or bring proceedings in relation to breach of contract or possible tort claims arising from the construction project. The literature reveals that the key technological issues regarding the retention of electronic records are:

**Durability of storage media.** A potential problem in storing records electronically is that the storage medium may break down over time. The most common medium for archiving electronic records is the CD ROM format which is considered more resistant to degradation than magnetic tapes and disks (NOIE 2002, p52). Environmental factors such as light, humidity and magnetic fields may also affect the durability of the storage medium (NOIE 2002, p52).

**Readability of records.** As technology changes it may be impossible to access documents stored on an outdated storage device. For example, back up storage tapes previously used larger spooling devices and older tape backups are not readable without specialised equipment (White, 2001, p46). Accordingly, good maintenance procedures are required to ensure that both the hardware and software by which electronic records are stored do not become superseded.

Generally, parties will not have satisfied their obligation to preserve records if the mechanism on which it is stored has broken down or if the record is saved in a format that is no longer able to be read by contemporary computer systems.

## **Discovery**

### ***Obligation to make discovery of electronic records***

Discovery is a process that occurs in common law jurisdictions after commencement of a claim and prior to the trial. The aim of discovery is to provide parties to litigation with access, prior to trial, to all relevant documentary evidence in each other's possession (White 2001, p47). Each party produces a list of documents in its possession verified by affidavit and must produce the documents for the other party's inspection unless they can claim privilege (White 2001, p47). Construction projects generate large numbers of project records that are relevant to litigation and which must be produced for discovery.

### ***Retrievability and identifiability***

The discovery process in relation to electronic records may be complex and expensive in light of the quantity and variety of electronic records that may be discoverable (White 2001, p46). Electronic records may be stored on a variety of devices including the author's computer hard drive, the file server and router and the recipient's hard drive as well as on any back up media, lap tops, home computers, personal digital assistants and removable storage devices such as CD ROMs (Naismith 2003, p188). Some copies of electronic records may be created by computers without the knowledge of the operator and these documents may not be recoverable without significant technical expertise. There is an obligation to discover all copies of documents, therefore, all of these multiple versions of electronic records will be discoverable (White 2001, p46). As a result, compliance with electronic discovery obligations can be expensive and time consuming. It is therefore essential that a party's system for management of electronic records enables documents to be easily identified and retrieved. It is also advisable that where there is an electronic

records management system in place, employees should be trained to use that system rather than relying on alternatives such as personal email or file directories.

### ***Recovery of deleted documents***

If electronic records have been deleted in the usual course they may not be discoverable. However, where deleted documents are retrievable because the data itself has not yet been deleted from the computer or is still available on back up storage media, then those documents are discoverable (Naismith 2003, p188; Givens 2004/2004, p2).

If a company routinely deletes its email back up tapes and the tapes are destroyed prior to the company becoming aware of potential litigation, then those documents will be unavailable. If an electronic record is not obtainable from back up media then the existence of the electronic document should be noted in the list of documents as a record once but no longer in the company's possession (Gorry 1997, p62).

White (2001, p49) argues that organisations in litigation prone industries should have established procedures to delete electronically stored documents from back up media. The purpose of such a policy is to reduce the burden of discovery rather than to destroy possibly incriminating evidence. As discussed below, organisations should beware of falling foul of their obligations to preserve evidence. However it is unlikely that records destroyed in accordance with a valid disposal authority would be considered to be destroyed with the intention of spoiling a litigant's case (National Archives of Australia 2004).

### ***Duty to preserve evidence***

In addition to the obligation to make discovery, parties have a duty to preserve information that they know is relevant to ongoing or potential litigation (Naismith 2003, p186). Electronic records can be inadvertently destroyed by normal practices

such as routine maintenance. As soon as litigation has commenced parties have a duty not to destroy relevant evidence (White 2001, p48). The duty may also extend to preserving documents even though litigation has not yet commenced.

To comply with the duty to preserve evidence, parties have a duty to preserve back up media, make mirror images of hard drives and implement other steps to ensure that discoverable and relevant documents are preserved (Walters & Wright 2005). Failure to preserve information relevant to litigation may result in prejudicial orders against a party in relation to costs or factual matters, or in the party being guilty of the tort of spoliation of evidence. Spoliation is the destruction or significant alteration of evidence, or the failure to preserve property for another's use as evidence, in pending or future litigation (Ballon 1998, p9).

An electronic records management system must include procedures to be followed in the event that litigation is anticipated (Naismith 2003, p187). Such procedures would include the suspension of disposal practices and may also include saving a back-up at the commencement of litigation.

## **Online collaboration platforms**

The construction industry has begun to adopt online collaboration platforms as a means of administering construction contracts. An online collaboration platform is an electronic network linking different organisations for the purpose of exchanging information electronically. Documents are stored on an electronic database that contains all the information relevant to the particular project. The database can be accessed by any project participant at any time and from any place. Different organisations or individuals may have different levels of access to different documents within the database (Briggs & Brumpton 2001, p29). The database is generally maintained by an external service provider who will have a contractual

arrangement with at least one of the participants in the project (Kamara & Pan 2004, p57).

The use of online collaboration platforms in construction projects can result in significant benefits to industry (Tuma and Ward 2000). Hassan, Shelbourne & Carter (2004, p1) argue that the “[e]ffective use of collaborative systems is vital in the construction industry because of the large number of project participants, often being geographically dispersed.”

The literature reveals a number of issues in connection with the use of online collaboration platforms in the construction industry.

### ***Disruptions to service***

Disruptions may occur if the service provider is unable to maintain the service due to either technical difficulties or the cessation of the service provider’s business. The agreement with the service provider should contain provisions regarding times when the system may be unavailable to users and the notification that is required to be given to users in the event of unscheduled down time. The agreement should also be clear as to what will happen if the project extranet crashes (Wilkinson 2005, p115).

Project participants should consider whether their interruption to business insurance policy covers them for liability in the event that they suffer loss as a result of the collaboration platform being unavailable (Berning & Diveley-Coyne 2000).

The agreement between the service provider and the customer should include provisions that apply in the event the service provider becomes insolvent. These may include a right to transfer the contract to an alternative service provider (Wilkinson 2005, p117).

## ***Contractual arrangements***

### **Agreement between the service provider and customer**

The agreement between the service provider and the customer should contain provisions including (Wilkinson 2005, p111):

- The grant of a licence to the customer to access and use the collaboration service in relation to the project.
- The parameters governing the use of project data by the service provider and the project participants.
- The terms of the end-user licence agreements that will be entered into between the service provider and the other project participants.
- Ownership of copyright in the collaboration platform technology.
- The service provider's use of the customer's branding and data.
- Indemnification of the service provider against unauthorised use of the collaboration platform.
- Confidentiality, including the security of user names and passwords.
- The termination of the project including storage of data when the project is complete.
- Any limitations upon the service provider's liabilities.
- The levels of service to be provided by the service provider including specifications as to security, backup systems, integrity of data, audit trails, access controls, technical specifications, system availability, software upgrades, customer support and end-user training.

### **End user licence agreement**

Ideally, the agreements entered into between the service provider and the various project participants should be identical and there is a strong argument that such an

agreement should be annexed to contracts appointing any consultants who will use the collaboration platform (Wilkinson 2005, p111). The end user licence agreements should include provisions similar to those contained in the agreement between the service provider and the customer (Wilkinson 2005, p116).

### **Agreement between project participants**

The contract between the head contractor and any sub-contractors who will use the collaboration platform should also contain specific provisions to take into account the electronic management of the construction project.

Where a shared database is used for the storage of documents such as plans, there will be a greater possibility for there to be intellectual property infringements. As a consequence, the contract should deal with issues of design copyright, database ownership, confidentiality and commercial advantage (Briggs and Brumpton 2001, pp30-1).

The contract should also include a provision that electronic records that comply with specified archiving and authentication procedures are deemed to be admissible as evidence and prima facie accurate (Reed 2001, p91).

### ***Project protocols***

The service provider should establish a project protocol document setting out the rules of operation for project participants working on the collaboration platform (Wilkinson 2005, pp114-15). The project protocol document sets out common protocols describing how users publish retrieve and manage information.

### ***The ownership of documents and intellectual property***

Architects and designers may be concerned that their intellectual property rights in drawings are more likely to be infringed where they are submitted in their original

electronic format and stored on the collaboration platform. Practical means of protecting copyright in drawings are to (Wilkinson 2005, p121):

- Include a disclaimer and statement of permitted use of all drawings;
- Include the architect's name and logo and copyright statement on all drawings; and
- Watermark the drawings with the architect's name or logo.

Contracts should also include explicit confidentiality and copyright licensing provisions. Contracts with designers usually provide that the designer retains copyright in the design and grants a licence to the client and other project participants to use the design in relation to the project (Wilkinson 2005, p121). Even if the contract does not contain such a licence, there would be an implied licence to use the plans for the purposes of the project (*Gruzman Pty Ltd v Percy Marks Pty Ltd* (1989) 16 IPR 87). The use of a collaboration platform would not normally change the legal position with regard to the ownership of designs. Wilkinson (2005, p121) notes, however, that it is possible that if designs are amended extensively by online collaboration it may be that the authorship of the design can no longer be said to rest with the original designer. Contracts should include provisions to deal with this possibility.

## ***Archiving***

Upon completion of the construction project the database may continue as an online facility which continues to be able to be updated. In this case the software would also continue to be updated so that the customer need not be concerned with the continued readability and availability of the data (Wilkinson 2005, p122). Alternatively, the data can be stored in an off-line archive. In this case it may also be possible to produce a copy of the project for project participants on CD ROM or DVD (Wilkinson 2005, p122). The parties should agree contractually before the project



begins, how the project data will be archived and what data will remain available to each project participant (Berning & Diveley-Coyne 2000).

### ***Evidentiary considerations and audit trails***

The evidentiary considerations that arise will vary depending upon the evidentiary requirements in the relevant jurisdiction. Particular issues in relation to collaboration platforms are:

- The service provider should ensure that a rigorous audit trail is kept logging the time of creation of a document, by whom it was created, when it is sent and received and when and by whom changes to the document are made (Wilkinson 2005, p119).
- The collaboration platform must ensure that the integrity of the electronic records can be proven so that a court can be satisfied that an electronic record produced in court is unaltered from the original document. Compliance with recognised codes of practice and standards dealing with electronic record keeping would assist in satisfying the court that the integrity of the electronic records has been maintained (Wilkinson 2005, p110).
- Where a collaboration platform is used, the cost and time involved in the document discovery process in the event of a dispute can be significantly reduced (Wilkinson 2005, p119). This is because a complete record of the construction project is maintained by the collaboration platform rather than documents being stored in various formats (paper and electronic) and in various locations. This advantage will be lost if participants in the project also use alternative means of communication and document storage such as private email and paper documents.

## ***Security***

One of the most serious concerns that the construction industry has in relation to the use of collaboration platforms is the security of confidential information that is made available via the platform (Berning & Diveley-Coyne 2000). To alleviate concerns about the security of data, web collaboration platforms should be designed so that parties have limited access to data, depending on their role within the project (Berning and Diveley-Coyne 2000).

The rights to view and alter data should be controlled by an access control system that involves the identification, authentication and authorisation of the user. The type of access control system used will depend on the level of security required. Alternatively an application may use Extensible Access Control Markup Language (XACML). Where organisations use browser-based access to portals that aggregate resources such as web pages, applications and services, the server must determine whether the client is authorised to use a particular resource.

A further issue arises in keeping the data secure from unauthorised access whether by a party to the project or an outsider. A security policy determines who will have access to different types of data and whether or not they have a right to alter the data. The method by which the security policy is implemented is referred to as a security model (Gollmann 1999).

It is recommended that in the context of electronic contracting, one or more security models be used which ensure both the integrity of data and confidentiality between different projects with which an organisation is involved.

## ***Ensuring the use of collaboration platforms***

While it is apparent that there are several advantages to industry in the use of collaboration platforms in construction contract administration, there is a strong

resistance from industry participants to adopt these new technologies in their full capacity, and to change how work has traditionally been done in the industry (Becerik 2004, p1).

If participants use alternative communication and storage methods then the discovery benefits that flow from the use of a collaboration platform will be lost. Accordingly, it is essential that project participants adopt clear policies in relation to the types of communications and documents for which the collaboration platform should be used and that staff members are encouraged to use the collaboration platform in accordance with those policies.

It may be possible to include a provision in agreements between the head contractor and subcontractors requiring that the collaboration platform be used for all communications between the parties (Wilkinson 2005, p111). However, as noted above, any contractual notice provisions would need to be carefully drafted to ensure that they accurately reflect the parties' intentions on the use and validity of electronic communications.

## **Conclusion**

While the use of ICT in the management of construction projects can lead to considerable efficiencies and cost savings, the literature has revealed a range of legal and security issues that arise in connection with the administration of construction projects within an electronic environment. It is essential that the evidentiary value of electronic records be maintained and that a document management system be used that facilitates the retention and retrievability of electronic records to satisfy legal and discovery requirements. Contractual documents should address the use of electronic communications and other ICT project management tools so that uncertainty does not arise as a result of their use.

It is apparent that if the uncertainties associated with electronic contracting remain unresolved, then the practical consequences for contracting parties may be serious. On a more general level, these uncertainties will contribute to a reduced willingness by business to take advantage of modern communication technologies. As succinctly stated by Boss and Kaufman Winn (1997, p1470):

The increased costs of dealing with these new legal uncertainties may offset any reduction in costs achieved through the use of new technologies and, as a result, may slow needlessly the rate at which businesses are willing to implement new technologies.

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