

RISK AND RECOMMENDATIONS OF E-CONTRACTING TECHNIQUE IN A CONSTRUCTION PROJECT

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Abstract - E-contract is an avail to drafting and negotiating prosperous contracts for consumer and contractor and cognate inns. It is designed to avail humans in formulating and implementing business contracts regulations inside e-contract. Advances in telecommunications and computer technologies in recent years have made laptop networks a crucial part of the financial infrastructure. Increasingly corporations are facilitating transactions over internet.

Key Words: E-commerce, E-contract, Prototype, Acceptance, Information Technology

1. INTRODUCTION

The fundamental structure of the society runs on the concept of supply and demand, consolation and delectation of lifestyles. Understanding of someone for certain rights or to incur sure responsibilities, while apperceived via law, is called a contract. A settlement is an acquiescent enforceable by using regulation which gives personal rights and imposes private obligations; which the regulation bulwarks and enforces towards the events to an acquiescent. Traditionally, the contracts was paper based, but with the introduction of internet, corporations are departing from the notion of conventional based contracts and are going on line. This shift from paper based contracts to on-line contracts has led to the emergence of new species of agreement i.e. "digital contracts

2. PROPOSED METHODOLOGY

- To study the concept of Traditional contract.
- To study the concept of Electronic contracts.
- Identify the legal and security risks
- Formulate practical recommendations that may be implemented by industry to minimize or eliminate the relevant legal and security risks.
- Preparing a proto type WEBSITE

3. TECHNICAL INFORMATION

One of the very important factors in the growth of e-Commerce is e-Contract and its legal validity. Faithfulness and sincerity is the first and fundamental principle of commercial law .E-Contract forms a very thin line between trusts and being deceived as trust is something which cannot be partial. Today's world is the 'e-world' or 'the virtual world' powered by e-speed, digital innovation and borderless expanse, where money replaces time. The obligations they had undertaken or the consequences of failing to carry out the terms of the agreement.

3.1 CONSIDERATIONS

Many companies experience difficulty keeping contract information up to date. It's kept in different locations and is time consuming to find. Construction staff can find the use of technology challenging. Whatever system you have in place, staff need to understand it and use it. Establishing consistent company administration protocols across all contracts is an ambition of most successful construction sector companies.

HSQE compliance is an important aspect of running projects and expensive to administer. Spreadsheets are not an effective way to manage work where there is more than one contributor to the sheet. You are always uncertain if the information is up to date. There is no audit trail as to when a row was last updated. Cost control is an important aspect of running successful contracts

4. LEGAL AND SECURITY –RECCOMENDATIONS

4.1 Time of Contract Formation

4.1.1 Risk

Where a construction contract has been formed by an exchange of electronic communications, there are legal uncertainties that make it difficult to determine the precise point in time that the contract has been formed. The reason it may be important to determine the time of contract formation is that once an offer to enter into a contract has been accepted it becomes irrevocable. Accordingly, up until the point in time that the offer has been accepted (being the time that the contract is formed).

4.2.1 Risk Example

Company A wished to enter into a contract with Company B. On Friday 8 June A sent an email to B offering to enter into a contract with B upon the terms attached to the email. B sent a return email to A accepting the terms of A's offer, which was sent by B at 9.00am on Tuesday 12 June.

Due to bottlenecks in communication lines, B's email did not reach A's internet service provider until 4.30pm on Tuesday 12 June. B's email was not downloaded to A's employee's computer until 8.30am on Wednesday 13 June. A's employee did not actually read the email until 10.30am on Wednesday 13 June.

On Tuesday 12 June, A's board of directors met and decided they no longer wished to enter into a contract with B. A sent a facsimile to B withdrawing its offer to enter into the contract which B received at 5.00pm on Tuesday 12 June. Is A's withdrawal of offer effective? There are several possible answers:

1. If the postal acceptance rule applies B's acceptance would be effective and the contract formed at 9.00am on Tuesday 12 June. A's withdrawal of offer is not valid.

2. If acceptance is not effective until it is communicated to A, the position depends upon when 'communication' occurs:

I. If communication occurs when the message was received by A's ISP – the contract was formed at 4.30pm on Tuesday 12 June. A's withdrawal of offer is not valid.

II. If communication occurs when the message is downloaded to A's employee's computer or when A's employee reads the message, A's withdrawal of offer is valid as A may revoke its offer at any time prior to the communication of acceptance.

4.2.2 Recommendation:

It is recommended that the simplest way to avoid the legal uncertainties surrounding the time of electronic contract formation is to include clear provisions in the contractual offer that specify how acceptance is to be communicated and when an acceptance of the offer will be deemed to be effective.

In addition to ensuring that appropriate timing provisions are included in a construction contract, from an evidentiary perspective it is important to ensure that the date and the time that electronic communications take place are accurately recorded. One technical mechanism that may be adopted for secure time recording is digital time stamping.

4.3 Place of Contract Formation

4.3.1 Risk Example

Company A has its principal place of business in Queensland. A wishes to enter into subcontract with Company B, whose principal place of business is located in New South Wales. A sends an email to B offering to enter into a subcontract with B upon the terms attached to the email. B then sends a return email accepting the terms of the offer.

If acceptance of the offer is effective at the time the acceptance is sent by B, the contract is formed in New South Wales. Alternatively, if acceptance of the offer is effective at the time that it is communicated to A, the contract is formed in Queensland.

4.3.2 Resolution

Most of significant electronic construction contracts will contain clauses where the parties agree to submit to the jurisdiction of the courts of a particular place (either a State of Australia or a particular country), and to the applicable law that will govern the contract. Where the governing law and jurisdiction is clearly specified and has a 18 logical connection with the contract, it is highly unlikely that a court would disturb the agreement that has been reached by the parties on this issue.

Although it may be difficult to determine the actual place where an electronic construction contract has been formed, this problem will have minimal legal relevance where appropriate jurisdiction and governing law clauses are included in the construction contracts.

4.4 Electronic Notices

4.4.1 Risk

Construction contracts invariably contain contractual provisions that govern the delivery of notices under the contract. Due to the legal uncertainties that surround the validity of electronic notices, it is imperative for construction contracts to include appropriately drafted provisions that clearly identify the parties' intentions in relation to electronic communications.

Regardless of whether or not the parties to a construction contract wish to be bound by electronic communications, the only way to clarify this issue is to incorporate clear provisions within the contract.

4.4.2 Recommendation

To avoid the legal uncertainties about the status of electronic notices, construction contracts must contain clear provisions setting out the parties' agreement as to how valid notices may be given under the contract. It is recommended that when drafting notice provisions, regard should be had to the following matters:

The contracting parties must first decide whether they wish to be bound by any electronic notices. If they do not wish to be bound, then the contract should clearly exclude electronic communications as a valid form of notice delivery. This is particularly the case if the parties otherwise use electronic communications for day to day correspondence.

4.5 Compatibility of Technology

4.5.1 Risk

If the parties use incompatible technology to process electronic records, there may be difficulty ensuring that each party's view of the records is consistent with the

other party's view. For example, where the parties use different versions of the same collaboration system to carry out a construction project, it is possible that some of the software components available in the latest version of the system may not be available in the previous version. Accordingly, the integrity of the electronic record is not assured.

There is an additional risk that the performance of collaboration systems designed for computers running a 32-bit version of Windows OS may become slow when they are run using a 64-bit version of Windows OS. In this case, there may be possible project completion delays from the parties that use a slower operating system to run the collaboration system.

4.5.2 Recommendation

The following recommendations are made to avoid questions as to the integrity of electronic records arising as a result of a lack of compatibility of software and operating systems:

- A collaboration system designed to run on computers with 32-bit processors should only be used on computers with 32-bit processors (even if it can run on computers with 64-bit processors).
- All collaborating parties should use the same version of the collaboration system. If the collaboration system has backward compatibility with some of the applications in the operating system, then it is recommended that all the parties use the same operating system to make the best use of those features of the operating system.

4.6 Disputes Between The Service Provider And The Contracting Parties

4.6.1 Risk

Disputes may arise between the contracting parties and the provider of the collaboration system (who may be a third party or one of the contracting parties) regarding the use of the system. For example, the level of service provided may not be of the standard represented by the service provider or expected by the users of the system. In the event a dispute arises, further disagreements may occur, for example regarding the use of the project collaboration system or the use of the contracting party's branding and data for promotional purposes by the service provider.

4.6.2 Risk Example

Company A is the head contractor for a large construction project. The project is administered using an online collaboration system provided by Company B. A has several subcontractors involved in the project who also need to use the online collaboration system. The agreement between A and B provides for the use of the system by other parties involved in the construction project. However, due to the number of subcontractors, the system is not able to handle the load of a large number of users simultaneously accessing the system.

4.6.3 Recommendation

It is recommended that to minimize disputes arising due to uncertainty about the rights and obligations of the service provider and the users of the system, the service provider should enter a contract with all of the proposed users of the project collaboration system. The types of provisions that should be part of the agreements include the following

The levels of service to be provided should be specified including specifications as to security, backup systems, and integrity of data, audit trails, access controls, technical specifications, system availability, software upgrades, customer support and end-user training. The users of the system should be granted a license to use the system in relation to the project. Any right of the service provider to use the project participant's branding and data should be specified.

4.7 Disputes Between The Contracting Parties

4.7.1 Risk

Parties may breach the confidentiality of documents. Breaches of confidentiality may be more widespread because of the ease of copying and distributing electronic documents. Intellectual property infringements may also be more likely as a result of the electronic sharing of plans and drawings.

4.7.2 Resolution

It is recommended that the contractual arrangements between project participants should contain provisions in relation to the electronic administration of the project. The contract should include, provisions regarding the ownership of the database, obligations of confidentiality and commercial advantage. A clause deeming electronic records kept by the project collaboration system to be admissible as evidence and prima facie accurate. Provisions relating to the ownership of intellectual property in project drawings and designs

4.8 Confidentiality

4.8.1 Risk

Confidentiality refers to electronic records being able to be accessed, used, copied or disclosed by the people who are authorized to access, use, copy or disclose them and when there is a legitimate necessity to access, use, copy or disclose the contractual information.

There is a significant risk involved in leaking the user credentials when the contracting parties establish contracts or transfer contractual documents using a web-based email service without using appropriate encryption technology to encrypt the email messages. In this case, it could be possible for unauthorized personnel to view the user credentials such as a user name and password. They must only be able to be accessed by or disclosed to authorized personnel.

4.8.2 Risk Example

Company A transmits a highly confidential document relating to a construction project to Company B by email. During the transmission, the email is intercepted by a malicious third party who makes public the contents of the document to the commercial detriment of both A and B.

4.8.3 Resolution

It is recommended that the agreements between the project participants and the agreements between the project participants and the service provider of a collaboration system should include provisions imposing on the parties a specific duty of confidentiality. The duty of confidentiality should extend to the security of user names and passwords. The document confidentiality security property for the documents in the system ensures that only authorized users may access documents. Many documents that are stored and created within a collaboration system may contain sensitive information that should not be shared with unauthorized users. On their roles to access data within the collaboration system. The use of authentication mechanisms such as restricted access to the systems using the Internet protocol (IP) addresses and user name and password mechanisms can also assist in achieving the confidentiality of the documents.

4.9 Proof of Time

4.9.1 Risk

There is a risk that computer systems might not record time accurately. The administration of a computer system's clock is at the discretion of the system administrator. A person may intentionally speed up or slow down the system clock. It is also possible for computer system clocks to be inaccurate and there is no guarantee that different computer clocks are synchronized to each other.

4.9.2 Risk Example

Company A is required to give a written notice by 5 pm on a certain day. The contract provides that the time of giving the notice is the time it is received by the recipient. A sends the relevant notice to B by email at 4.55pm on the specified day.

B alleges that the notice was not received until 5.05pm and is therefore not valid. When sending the e-mail, A requested a notification of receipt of the email. The notification of receipt was received on A's computer at 4.59pm. The time of receipt was calculated according to the clock on A's computer. B has produced a copy of the email received which shows the time of receipt as 5.05pm (such time being calculated according the clock on B's computer). It will be for the court to decide whether to rely on the time recorded by A or B's computer clock.

4.9.3 Resolution

It is recommended that companies synchronize their respective system clocks over a network that can be directly traceable to the Universal Time Code (UTC) before entering into communications where accurate time

recording is required. Where the time of creation or communication of an electronic record may need to be proved with a high degree of certainty it is recommended that digital time stamps be used.

A digital time stamp establishes the existence of an electronic record at a particular point of time. Time stamps are created by a time stamping authority (TSA) on records to prove that the record has not been modified since it has been created. The TSA computes the hash code of the electronic record using a standard hash function such as SHA-1 and then attaches the current time, date and identification of the owner to the hash code and signs this compound data.

The resulting digital signature is the time stamp. If the parties use digital signatures to timestamp an electronic record then the validity of the record can be proved even if a party's private key is compromised after the record has been signed. The time stamping authority may be either part of the business organization using the time stamp or a separate trusted third party whose only role is to issue time stamps.

4.10 Authentication of Contracting Parties

4.10.1 Risk

Authentication is the process of verifying the identity of a user of a computer system. For example it is necessary to establish the identity of the contracting party or of the person who created or communicated an electronic record. User authentication relies on one or more of the following factors, something the user knows, such as a password or a personal identification number (PIN). This assumes that only the owner of the account knows the password or PIN needed to access the account. Something the user has, such as a smart card or token. This assumes that only the owner of the account has the necessary smart card or token needed to unlock the account. Something the user is or does, such as fingerprints or the voice, retina or iris characteristics of the user or the user's hand-written signature (biometrics).

5. PROTOTYPE-WEBSITE

After identifying the risks and their recommendations a prototype website is developed with a name of "ADK Consultants"

5.1 The ADK Benefit

- All contract information is stored in one location. It can be easily found and viewed by everyone who needs to refer to it. This improves communication, reduces mistakes and saves time.
- ADK is easy to use. Implementation is managed by us so that you get the benefits of the system as quickly as possible. Training time is kept to a minimum by defining what different users actually have to do and then providing them with appropriate training for those tasks.
- Your standard processes can be set within ADK which means that it is easier to train staff to do things 'The Company' way. Consistency across all of your contracts

provides many efficiency savings in training, administration and quality control.

- ADK allows clearly defined processes to be set for many different work types. The ability to record information using mobile technology reduces the time taken for compliance staff to manage and report on any aspect of contract delivery.

- ADK's processes control time sheets, order Placements, sub-contract orders and other associated costs providing reports which show the actual level of spend at the point that the commitment is made.

- ADK has a specific module called Easy-Smart-Forms which allows you to recreate all your standard forms and provide access for your staff to complete them using our website. Form filling is easier and reports are generated automatically from the information recorded. This significantly saves time and money.

- Everyone uses spreadsheets as they record progress, compliance and financial information. This information quickly becomes out of date and inaccurate.

- ADK provides a structured solution to replace spreadsheets with records that can be easily updated from your office or site, using mobile devices and desktops.

- ADK reduces the amount of time required to administrate all types of construction work.

5.2 Cloud Solution to Contract Management

All the information for each contract is securely stored in the cloud. ADK removes the need for numerous folders on your server (or on-line storage), and replaces them with relevant contract functions your staff will use. These include:

- Ability to fill in and monitor timesheets
- Replacing your paper forms with Easy-Smart-Forms
- Complete purchasing management including: sub-contract, purchase and hire orders and requisitions
- Job tasking and staff allocation
- Real-time job costing reports
- Drawing and document registers
- Requests for information



Fig -1: Cloud solution to contract management

5.3 Accurate Information Delivered In Real-Time

Informed decision-making is a key aspect of running successful contracts. ADK provides accurate real-time information to all members of the contracts management team, allowing them to understand progress and performance more easily. This leads to better decisions being made and better quality control.

- It's quick and easy to do

Plus you can easily add new features because our toolkit allows you to think of forms in a new way. All the forms you will ever use, available on your phone or tablet device.

- Collaboration included as standard

Every function in the Contracts module has been designed to improve the flow of information and enhance communication between your staff, regardless of whether they are based in the office or on site.



Fig -2: Network diagram of worksheet sharing

- Powerful reporting

With all the contract information recorded in real-time you can expect SRJ to provide powerful and insightful reports.

- Job cost report

Automatically capture the values and costs of each contract as changes occur in real-time. Have this information at your fingertips whenever you need it.

- Register reports

Register reports allow you to configure what information you see within the key areas of your business process. Such as enquiries for new work, jobs secured, invoicing and contract spend.

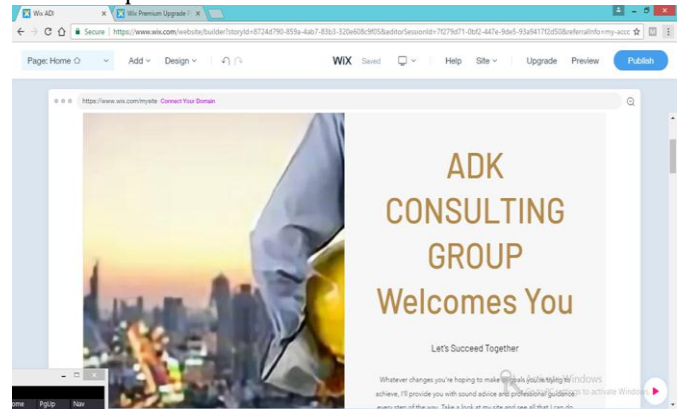


Fig -3 Prototype view 1 of website

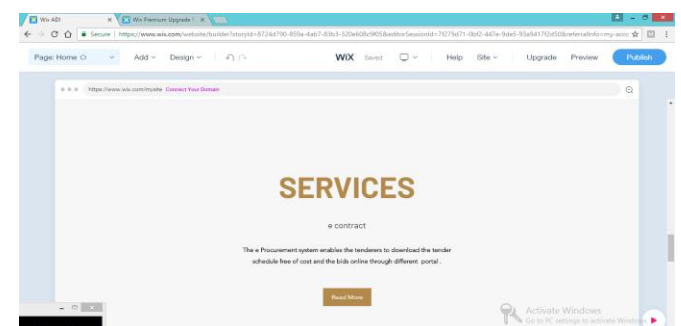


Fig -2 Prototype view 1 of website

9. CONCLUSIONS

The use of Information and Communication (ICT) Technology inside the production enterprise can cause great efficiencies within the management of projects and is drastically used as a means of coping with and recording production initiatives. This report has recognized the felony and security dangers which could rise up when production contracts are shaped, administered and recorded inside an electronic environment and has encouraged steps that events may take to solve or limit those dangers.

The conclusion obtain is the electronic switch of information from computers to computer

Table- 1 : Identified Risk Ad Recommendations

IDENTIFIED RISKS	RECOMMENDATIONS
It may be difficult to establish the precise point in time that an electronic construction contract has been formed	The only way to avoid the legal uncertainties surrounding the time of electronic contract formation is to incorporate clear provisions in the contract that state how acceptance is to be communicated and when acceptance of the offer will be deemed to be effective
It may be difficult to establish the place where an electronic construction contract has been formed.	A construction contract should include clear provisions where the parties submit to the jurisdiction of the courts of a particular place and agree to the applicable law to govern the contract.
The authority of an individual to enter into a construction contract on behalf of another person or entity may be uncertain.	Regardless of whether a construction contract is formed by paper or electronic communications, the parties must still carry out their usual due diligence investigations to ensure that the individuals who are entering into the contract on behalf of another person or organization, possess the actual or apparent authority to enter into the contract.
Electronic communications may	As a consequence of the legal uncertainties surrounding the

not satisfy statutory requirements for guarantees to be in writing and signed	validity of electronic signatures, to avoid the risk that a guarantee may be unenforceable all guarantees should continue to be entered into in paper form and be physically signed using handwritten signatures
Depending on the terms of a construction contract	Contracting parties must expressly address electronic communications in their contract documents. The provisions must be clear as to which communications under the contract may and may not take place in electronic form.
A construction project may be disrupted if the collaboration system used for administration of the project is unavailable for any length of time.	Where ICT is used to carry out e-contracting the parties should follow the best practice standards recommended by ITIL. The service provider should enter into a contract with all of the proposed users of the ICT which make clear the rights and obligations of the service provider
If parties to a construction project use incompatible technology there may be difficulty ensuring consistency between the electronic records available to each party	The contract between the project participants should contain specific provisions relating to the electronic administration of the project. Designers should take practical steps to protect their copyright in drawings including incorporation of a copyright statement, the designer's name and logo and a watermark on all drawings
The rights and obligations of the service provider of ICT used to administer a construction project may be uncertain.	The contract between the parties should specifically deal with the ownership of copyright in the project drawings and should specify that these copyright provisions continue to apply regardless of the extent of any collaboration between the parties in the development of the drawings.
The electronic	Electronic records that may be of

administration of a construction project may lead to disputes between the parties, for example the ease of copying	importance in the event of a dispute relating to the construction project should be created and maintained as part of the business record of the contracting party. Electronic records created by an administration system used for the administration of the project will be likely to be admissible as business records.
The intellectual property in project drawings may be more easily infringed in an electronic environment due to the ease with which copies of the drawings can be made and shared.	The agreement between the contracting parties should include a provision deeming electronic records maintained by the agreed administration system to be admissible as evidence and prima facie accurate.
If project drawings are amended extensively by online collaboration, the ownership of the copyright in the drawings may no longer rest with the original designer.	Parties must implement procedures to ensure that they can demonstrate the authenticity, integrity and reliability of a digitized copy of a paper record. These procedures include ensuring the accuracy of the scanner, recording details of the person responsible for scanning the record and time stamping of the digitized record.
Electronic records may be inadmissible as evidence in the event of a dispute if they are considered to be hearsay	When an electronic record is printed, parties should not delete the electronic record but should retain it in case it is needed as evidence in the event of a dispute
A digitized copy of a paper record may be inadmissible if the party relying on it cannot satisfy the court that it is an accurate copy of the electronic record.	If an electronic record is likely to be of evidential importance then the electronic record should be signed using digital signature technology
A paper copy of an electronic record	Where the electronic record is of very high evidential importance

may be inadmissible if the party seeking to rely on it as evidence cannot satisfy the court that the paper record is an accurate copy of the electronic record,	the record should also be time stamped so that the integrity of the record can be assured even if the digital signature becomes invalid
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