Construction EDI in Australia
Some Recent Developments and Current Aims

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ABSTRACT

The construction industry in Australia covers a very large number of organisations from small suppliers and contractors to major consultants and government authorities. These are spread over a large geographical area and the works which they undertake range from very small to billions of dollars. There is a wide variation in technical sophistication within the industry. A 1992 survey of the use of electronic exchange of data between sections of the industry showed considerable interest, limited understanding, and little attempt at implementation. The current economic downturn and the long term return on the first costs involved, limits enthusiasm. Difficulties with its adoption and steps to overcome these are proposed with a timetable to the year 2000. This will be achieved only with government commitment, a well defined industry plan, and close ties with the international EDIFACT body of the United Nations.

Key Words
electronic data interchange;implementation;Australia;project;aims

Introduction

The construction industry in Australia is one which takes great advantage of new techniques, and develops many of its own. This is most obvious in the field, where new and sophisticated equipment continues to improve the efficiency of projects. In its office activities the industry uses computers extensively to provide better and more timely information on design, construction, and management.

Each of these office systems tends to be used in isolation, with little correlation between them, and does not produce output which can be readily used by another firm or department involved in the project. In Australia this major shortcoming is now being realised and there is an embryo movement to develop systems where data can be transmitted and stored electronically in a common format. This needs to be done in line with international procedures which are being developed through the United Nations, but the fragmented nature of the industry makes this difficult to organise and implement.

The current status of the development towards electronic trading in construction as set out in the paper is based on survey and anecdotal information. The setting of future goals and their achievement will require considerable enthusiasm and dedication within the industry but the rewards of efficiency and competitiveness are substantial.

History

The Construction Industry Information and Computing group (CIIC) is a group of some 20 major national organisations representing government, professional associations, and industry, concerned with the development of computer aided techniques in construction. In 1992 it surveyed the national and international position on the development of EDI in construction through a Task Group of which the author is Chairman. This is known as EDICON after similarly named bodies overseas.

In 1992 the Task Group published a pamphlet setting out the EDI position with reference to the international and local scene. It outlined possible future action and the advantages to be gained. It also sought comment from the industry on this first draft. A revised, up-dated publication will be issued early in 1993.

All the respondents to the survey saw the main long term advantage to be the adoption of EDI in most phases of the construction process rather than the limited area of order/invoice. These include project management, drawing information, tender preparation, specifications, quality systems, bill of quantities and contractural documentation.

There is a growing awareness of the potential of EDI in construction but so far this has not translated itself into sufficient action to produce any real experience. There is activity in a number of separate areas including:

A working party in the steel industry on order/invoicing messaging

Computer Aided Design and Drafting is in common use and another Task Group within CIIC is playing a role at an international level in its development

A working party on software for estimating aimed at data transfer between proprietary packages

A group formed to evaluate the running of a pilot project on a total EDI basis

Postgraduate study of computerised cost control and risk analysis

The Construction Industry

Perhaps, because of its large land mass and small population, Australia has developed particular ways of handling its construction business. Many aspects are common to those used elsewhere in the world but some have an influence on the ease or difficulty with which EDI procedures can be established. It is convenient to break the industry down into a few classifications.

Domestic/Minor Industrial

Most of this work is carried out by small builders operating in one small area - typically a single city or town in one State. There may be 50,000 of these in the country each employing very few staff and dealing with a limited number of clients on the one hand and suppliers on the other. They tend to be unsophisticated in their approach.

Major Industrial/Major Buildings

This work is undertaken by relatively few companies perhaps only a few hundred. Some of them operate in all parts of the country but many of them have a particular State or city in which they are strongest. Their clients are significant sized companies and both parties aim to adopt the most efficient techniques. The construction companies have increasingly acted as managers and sub contracted much of the actual construction to smaller specialist firms and these in turn may let out part of the work and deal with the off-site suppliers. At the end of this chain many of those involved do not have state-of-art procedures.

Engineering Infrastructure

As with the previous group the number of companies and clients is small. The clients are almost all government departments in each State such as road, power and water authorities. Again there are the problems resulting from the sub-contracting of work and supplies to a major extent.

In both those last groups there are normally design consultants, quantity surveyors and a variety of other professional bodies involved in the work leading to a contract, and its administration. Such companies may have a large staff, be part of an international group, and operate throughout the country or in only one limited area.

Any project then, is likely to involve a client with a large group of consultants, contractors and suppliers with widely differing technical and commercial facilities and standards. There are, however, some significant projects where the total number of parties involved is small.

The current Position

The interest in, and development of, EDI methods is very variable across the industry. The following table shows on a scale of 0 to 10 (no interest/involvement to very high interest/commitment) the position in Australia. The figures are, in part, subjective and also based on the 1992 survey.

		Interest	Knowledge	Commitment	Use
Clients	- government	4	2	1	1
	- private	2	1	1	0
Consultants		2	2	1	0
Contractors	- major	3	3	2	1
	- minor	1	1	1	0
Suppliers	- large	6	4	4	3
	- small	2	1	1	0

On this basis it is the major suppliers who are leading. This is because other industries with which they work are themselves more advanced. It also reflects the relative simplicity of their transactions, the ease with which they can be implemented, and the savings to be made.

The Difficulties

The contracting part of the industry has always been a competitive one and in recent years this has spread to consulting and management services. Government departments are also under great pressure to reduce their own operating costs. Add to this the reduction in construction work generally, due to shortage of funds and the problem of debt servicing. These pressures give counteracting signals to the introduction of EDI.

At the end of the day any new idea must improve the profitability of the organisation. Even more importantly it must give a company an edge over its competitors. EDI is not something which can be practised unilaterally, it is a multi-way process. It is something which is good for the industry, good for the economy, good for the country. That is where the problem lies at present. It requires pioneers to spend considerable time and resources for (eventually) the common good.

A scenario can be made of a project which is deliberately set up to involve the minimum number of parties and to operate this on an isolated EDI basis. As a method of testing procedures this has considerable merit and has been proposed and investigated for at least one project in Australia. The group would consist of a developer with its own in-house design and specification facilities which also has a construction arm, and with a project requiring only a few major suppliers. This group could carry out work, within these limitations, on a very competitive basis. Even so this would not really spread the boundaries of operation so much, and, other than gaining experience, it is not what EDI is

really about. There is also a major danger of sub-groups "doing their own thing" and developing systems still unable to communicate with those outside the group.

There is little problem in understanding the amount of time and cost to be saved if it is in place. All facets of the industry struggle under mountains of paper which they pass up and down the line with repeated entry and exit re-writing, but there is a general lack of understanding of how this EDI idea works and how difficult (expensive) it is to install.

On the one hand then, there has never been a better time to introduce efficiencies into the industry but it comes when development funds are scarce and long term community goals are not seen as helping an individual's short term profitability.

The Rest of the World

Fortunately, we in Australia do not have to start from scratch. There is already an extensive network starting from the United Nations Organisation, which has helped to develop EDI procedures on a world-wide basis in many other industries. In construction the Western Europe group has made most progress although this is patchy, largely due to commitment and funding issues.

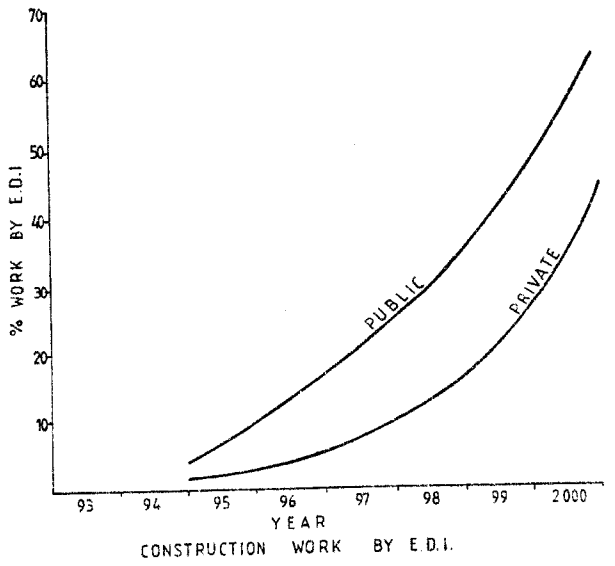
Nevertheless six "Messages" (the actual electronic data format for exchanging information) have been developed to "Status 1". They cover such matters as tenders, quantity valuation and payment. At this level of development the messages are officially "Drafts for Trial Use". This means that countries should be actively using them and commenting on their operation and the need for adjustments. As construction procedures vary around the world it is difficult to find a set of parameters which meets everyone's needs. What is clear is that if other nations do not rapidly become involved in the decision making they will be left with a fait accompli which is unlikely to fit neatly into their own procedures. At present Australia's links into the UN/EDIFACT system are tenuous, primarily due to funding limitations.

Programme for the Future

We need to have a positive but realistic set of targets. The following timetable is achievable, indeed to the optimists it should be shortened.

		Year 1994	1997	2000
% Practical Commitment to Use				
Government Departments		20	100	100
Consultants		10	60	80
Contractors	- major	10	100	100
	- minor	-	30	70
Suppliers	- major	20	100	100
	- minor	-	50	70
Project Usage				
Government - major				
% of all projects		20	50	80
% use on one project		20	50	80
Private - major				
% of all projects		10	20	70
% use on one project		20	50	70

From a position of zero use in 1993 these figures require a rapid acceptance of EDI if the suggested targets are to be achieved. The graph below combines the information in the table to show the amount of work estimated to be done by EDI and this makes the target look more achievable.



There is no suggestion that everything on every contract will be handled this way, and there must always be some work so far outside the norm as to require a different approach. Nor is it proposed that paper documentation will be totally eliminated on even the most appropriate project. The two lines show the anticipated use on work initiated by the public sector and the private sector. The difference between the two, reflects the author's view that government must take the lead in promoting and insisting on its use in the early stages. Otherwise, the industry will stay where it is, or worse still, drift into a multiplicity of arrangements between particular clients and contractors which are not compatible outside these selected groups. If government and major private clients insist on its adoption, then the rest of the construction chain will fall into line; otherwise they will be prevented from tendering because they lack the facilities and knowledge. No one in the middle of the chain can exercise this influence. The Golden Rule is "the man with the gold makes the rules".

There is a very good comparison to be made in Australia with the use of Quality Assurance procedures in the construction industry. This is now a widely accepted system which many have proved is a cost effective procedure. The push for its use however came mainly from government agencies insistence on its use by those who wished to work for them, or in some cases from consultants/contractors with experience of it overseas. The industry, if left to itself, would still be procrastinating.

How to Achieve this

Right now it is a matter of convincing the senior management in both government and private sectors of the desirability of the process through:

conferences like this

general information on overseas developments

internal government groups examining proposals

strengthening our ties with the UN agencies

local workshops and seminars

At the same time an education programme for the potential practitioners must be available. This requires:

strengthening the activities and expertise of existing working groups

active involvement in those overseas groups who are currently developing messages and procedures

technical workshop activities

Finally when the early implementation steps are taken it must be with:

the full support of government or client - including financial consideration

the understanding that early trials will require adjustment to previous non-EDI procedures and a settling in and de-bugging period will be needed

open dissemination of the results

Organisation

All these matters are currently under review by CIIC. There are some problems to be solved arising from different interests and state of development, but these can be readily overcome. What is needed is the strengthening of the committee by a firm commitment of government and industry to pursue these goals.

This cannot be done without finance. In addition to an individual organisation's in-house cost, the funding of an effective central educational and technical body will be significant in the early years. A small price to pay for substantial returns but to commit such funds and take the first step requires courage in these difficult times.

The benefits of EDI can be obtained working within one country.. The greater benefits however lie in its use internationally. Australia as both a major exporter and importer in our region of Asia stands to gain by its adoption.

Australians have a well earned reputation for initiative and innovative techniques. There is no doubt that they can make a significant contribution to this international development, which offers the opportunity to increase the industry's efficiency greatly. The early work has been done and it is vital that it continues.

Reference

CIIC (1992) *Electronic Data Interchange in the Construction Industry*. Institution of Engineers Australia.