Laws controlling contracts: the importance of Web-based Information Management Systems for engineering education and industry

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ABSTRACT: In previous articles, one of the authors outlined a number of cost engineering and property management issues to be integrated into engineering and technology education. The management of construction contracts is a serious administrative operation both for general contractors and clients. The importance of the law is greater when clients commit more funds to new construction projects that should be kept within budget and design, respect legislation and simultaneously decrease financial risk. A number of progress reports for linear and building projects were gathered and analysed, to identify the current practices and the public laws controlling contracts in construction in the period 2006-2010. In this paper, the authors list the law resources for controlling contacts and the importance of Web-based Information Management Systems (WbIMS) for engineering and technology education, industry, and better construction management.

INTRODUCTION

In previous articles, A.R.N. Molson outlined a number of cost engineering management, project financing and property management issues that could be further integrated into engineering and technology education, and improve management practices. The integration of industry and engineering and technology education for sustainable development was based on a case study of the *Greek Construction Industry* and its *Property Market* [1-4].

The management of construction contracts is a serious administrative operation, both for general contractors and clients, and this paper outlines the option of Web-based information systems, an implementation relying solely on Web technology as the infrastructure for the proposed tool - *Law controlling projects.* The term, controlling, refers to managing the case study or the construction project.

The term, law, refers to Greek National Legislation, the European Union's Directives and to International Law guides and legal principles. The implementation of a Legal project management and process system, with an emphasis on the resources of *laws* and specifications, is vital for a large construction firm that has a law department similar in size to law offices.

Ward states that:

> *…laws in a legal sense, a mixture of items, some being what is termed common laws and others with a legislative background,* [are] *all quite important, because these have extensive influence over many human activities* [5].

Molson affirms that:

> *The importance of laws in a legal sense is greater when clients commit more funds to new construction projects that should be kept within the budget constraints and design, respect legislation and simultaneously decrease financial risks. The user's problem is that of handling and controlling legal information; and the usage of knowledge management systems in the subject of laws controlling projects has been an interesting issue for module leaders and experts in this field.*

In this paper, the authors list Web links to the *laws for controlling* construction *contracts* in Greece, and examine the importance of Web-based information management systems (WbIMS) for engineering and technology education. The main goal is to enrich engineers' knowledge and expertise, as well as contributing to better construction and sustainable

management in the industry. A sample of basic Web site links for legal information is listed in Table 1 (based on a case study of small and medium size projects) [6].

Table 1: Sample of Web sites for GR@Legal Information.

http://www.et.gr	http://www.nomotelia.gr	http://www.domiki.gr
http://www.ypes.gr	http://www.lawsociety.org.uk	http://diavgeia.gov.gr
http://lawdb.intrasoftnet.com/	http://www.tee.gr	http://www.acci.gr
http://www.dsanet.gr	http://www.tiresias.gr	http://www.dsalib.gr
http://www.synigoros.gr	http://www.dpa.gr	http://www.epant.gr
http://www.odp.gr	http://www.simap.eu	http://www.europa.eu
http://www.ministryofjustice.gr	http://www.minagric.gr	http://www.inlaw.gr
http://www.lawyersvoice.gr	http://www.tee.gr & eetem.gr	http://www.kedke.gr
http://www.ggde.gr	http://thiseas.ypes.gr/thiseas	http://www.ypan.gr
http://www.dsa.gr	http://www.pomitedy.gr	http://www.ypoian.gr

The total number of operational Web sites for retrieving legal information is more than 200 in Greece [7].

THE INDUSTRIAL SURVEY REVIEW

An industrial survey review shows that the *Conditions of contracts* require the submission of project control reports at the construction phase, based on National and European Union Legislation [4].

Based on this study, a number of progress reports for linear and building projects were gathered and analysed in order to identify the current practices and public laws, i.e. laws controlling contracts, in the construction period 2005-2010.

The sample comprises 82 cases submitted for approval at the Construction Stage of Contractor's Contracting Obligations (Table 2) (including 54 cases listed in Reference [4]).

Table 2: Sample of 82 submitted project progress reports by geographical distribution (2006-08).

Geographical Area	Submitted Budgets Applications: Project Progress Control		Construction of Linear Projects [a],[b],[e] Ind. Plant & Building Construction [c],[d]	
A/A of Province (Regions Year 2010)	Construction Project Reports (89.02%) @ 73 cases	Design & Build Project Reports (10.98%) @ 9 cases	Water, Wasted & Drain Systems [a] (70.73%) Geo-thermal Heating Systems [b] (2.44%) Building [c] (12.20%) Waste Treatment Plant [d] (8.54%)	Roads [e] (6.10%)
Attica, incl. Piraeus	6	3	1a, 5c	3e
South Aegean	5	1	5a, 1d	-
Central Macedonia	17	2	14a, 4c, 1d	-
Crete	11	1	11a, 1d	-
North Aeagean	11	0	9a	2e
West Macedonia	5	0	3a, 2b	-
Sterea Ellada	4	0	3a, 1d	-
East Macedonia & Trace	1	0	1a	-
Peloponnisos	7	0	7a	-
Thessalia	5	2	3a,1c, 3d	-
West Helladas	1	0	1a	-

Due to size constraints, only the basic data analysis of reports is given as follows:

- Many engineers with management, supervisory and quantity surveying duties found that information overload is significant (89.02%) with many instruction papers produced in a short period of time (100.00%). Few engineers (10.98%) involved in the design and built project reports reported the need for a detailed project filing system.
- Many engineers agreed (95.12%) that the Coding of Construction Law (CodCL) for public works No. 3669/2008 improved the Implementation Process and Management of Laws in Construction, but few disagreed due to the incomplete volume of laws excluded. The Coding System is very important.
- The historical progress of Construction Industry Laws (CILs) is a good tool for Visual Window or Web - WWW.
- From the basic analysis of project report introduction sections (82 case studies), it was found that the subject reports (95.12%) were based on three major Web sites: http://www.ggde.gr (Figure 1), http://www.et.gr and

www.tee.gr; in conjunction with previous project documentation and libraries. The instruction papers are also used as references in all cases (82).

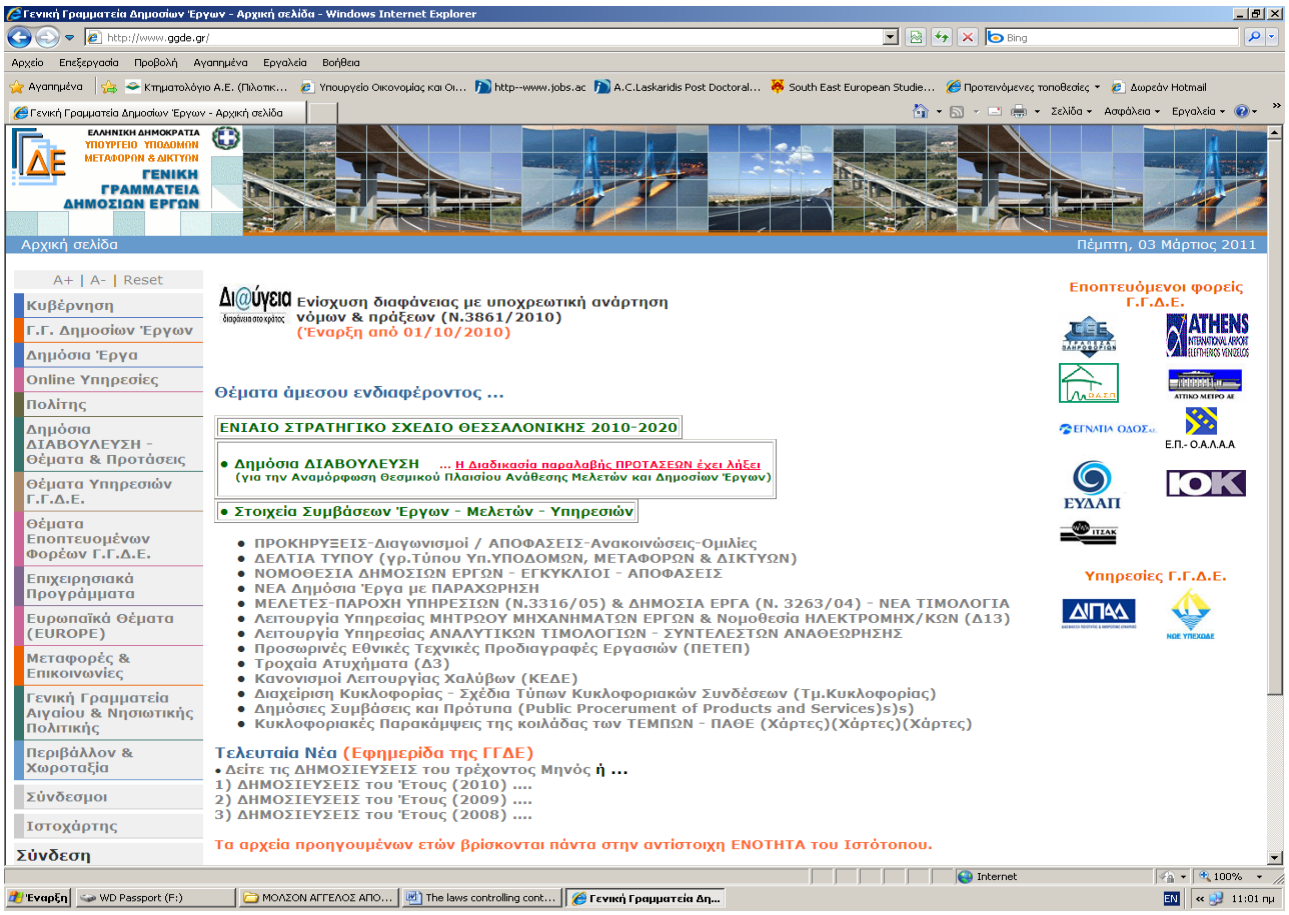

Figure 1: Web site most popular in use is: http://www.ggde.gr.

WEB-BASED INFORMATION MANAGEMENT SYSTEMS

As information technologies and applications become ubiquitous, demanding and diverse, persistent information technology problems have become even more urgent. Information overload, a result of the ease of information creation and rendering via the Internet, the WWW, as well as organisational data sources, has become more evident in people's lives. This phenomenon is nowhere more evident than in government, specifically in criminal justice information systems [8].

Wikipedia is the most famous wiki. Wikipedia.org is a Web-based, free-content encyclopaedia. This site is based on a wiki platform, open for anyone to add content or edit existing content. With over nine million articles in more than 250 languages and over 2.2 million articles in English alone, Wikipedia is several times larger than the Encyclopaedia Britannica.

One key step that Wikipedia took was to eliminate any requirement for registration to add or edit content. Anyone can anonymously edit wiki pages in Wikipedia. Wikis are attractive as a knowledge management tool because they make it very easy to contribute content and easy-to-find content. Most wikis offer an easy to use *What You See Is What You Get* page editor that resembles a simple word-processing programme. Since the wiki content is in the form of a Web page, most search engines can easily index and search the contents of the wiki.

Wikis can simplify the production of content by reducing the number of programmes needed and the steps to produce the content. Although they are not appropriate for all types of content, they are an excellent tool to add to a knowledge management programme [9].

PROPOSED FRAMEWORK STRUCTURE

The new wiki tool could be used in engineering education and training or by a law firm or a law division of a main contractor or an institution. In the case of an institution, there would be a need to identify the best way to use *@Laws controlling projects* (this new tool). The tool is based on a cas e study: i.e. Greece; and, as well, Wikipedia in a Multilanguage Visual Environment (MVE).

What are the sources of information in the system?

Describe the problems at the Construction Stage: Contract conditions, project design approval, council for approval of modifications, project control reports evaluation, etc.

Information context in the proposal system can be input from articles, codes, published government gazettes, instruction papers, court decisions and agencies' laws. Information in the system also may be gathered from other Web sites, such as public resources on the Internet, non-public investigatory databases, other law agencies, and commercial databases (see Table 1). A basic model of the proposed A.R.N. Molson framework structure is given in Figure 2.

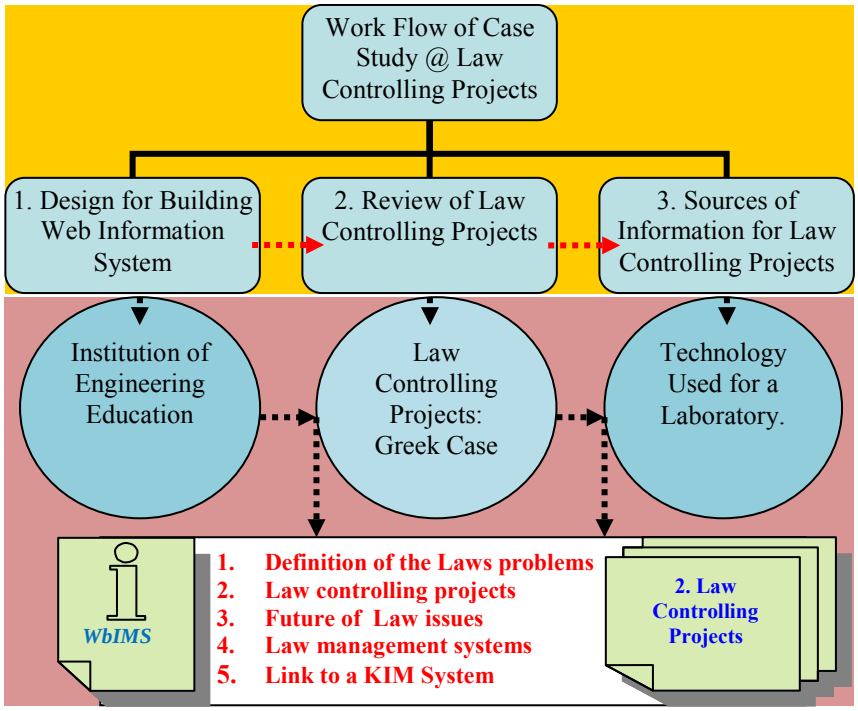

Figure 2: A.R.N. Molson's proposed framework structure.

Two principal infrastructures, the World Wide Web and CORBA (Common Object Request Broker Architecture), can be used to build the proposal system. Web technology is appropriate in two distinct and important ways [10]:

- *First: the ubiquitous nature of Web browsers, such as Netscape Navigator, makes it a natural user interface. Web browsers satisfy one of the primary requirements for application deployment in that they allow users of any of the popular computing platforms to participate in the work without any additional hardware. A multitude of users, many of whom are not computer sophisticates are already familiar with these easy-to-use browser interfaces* [10].
- *Second: Web Technology provides a solid communications infrastructure for building WfMSs ForWebWork. It is the only communications infrastructure, while OrbWork plays a supporting role to CORBA* [10].

CONCLUSIONS

The management of construction contracts is a serious administrative operation, both for general contractors and clients. The importance of laws in a legal sense is greater when clients commit more funds to new construction projects, which should be kept within constraints of budget and design, respect legislation and decrease financial risk [4].

In this paper, the authors list World Wide Web (i.e. WWW) sites (resources) for *@Law controlling contracts* in the Greek Construction Industry (GCI), analysing industrial survey outcomes, with an emphasis on public works and the importance of Web Technology, WbIMS, for engineering education and for industry. Therefore, this allows the control of the cost of law resources within a general contractor organisation's cost accounting system. The options for WWW-based Information Management Systems (WbIMS), as the infrastructure for the proposed tool has been introduced, with the Proposal Framework Structure providing for further development. This has to be tested and it can provide an IT support teaching/training tool to make modules more successful and enjoyable for students.

REFERENCES

1. Molson, A.R.N., Integrating technological education and industry through research into the developed cost forecasting and control strategies in the Greek construction industry. *Proc. 5th Global Congress on Engng. Educ.*, New York, USA, 223-226 (2006).

2. Molson, A.R.N., Expanding the integration of technological education and industry through research into developed cost forecasting and control strategies for contractors with the incorporation of econometric models. *World Transactions on Engng. and Technol. Educ*., 6, **1**, 139-142 (2007).
3. Molson, A.R.N., Expanding the integration of engineering and technology education and financial institutions with the incorporation of location cost modelling in construction cost estimations. *Proc. 1st World Conf. on Technol. and Engng. Educ.*, Kraków, Poland, 14-17 (2010).
4. Molson, A.R.N., Innovation in engineering and technological education: a judgmental application for an activity or a group of activities based on cost of model/location cost factoring, *2nd WIETE Annual Conf. on Engng. and Technol. Educ.,* Pattaya, Thailand, 58-63 (2011).
5. Ward, B.R., The laws controlling engineers. *World Transactions on Engng. and Technol. Educ.*, 4, **2**, 165-169 (2005).
6. Molson, A.R.N., Lecture: Introduction to Legislative Framework of the Awards for Public Works, Conditions of Contract CEM 003 MSc Management in Construction TEI Piraeus. 1-13 (2010), http://mmc.teipir.gr/forum/ (in Greek).
7. Molson, A.R.N., Lecture: Conditions of Contract IT Lab, Conditions of Contract CEM 003 MSc Management in Construction TEI Piraeus. 1-18 (2010), http://mmc.teipir.gr/forum/ (in Greek).
8. Chen, H., Hauck, R.V., Atabakhsh, H., Gupta, H., Boarman, C., Schroeder, J. and Ridgeway, L., COPLINK: Information and Knowledge Management for Law Enforcement, University of Arizona. Photonics East Conference, SPIE, Technologies for Law Enforcement. Boston (2000), http://ai.bpa.arizona.edu
9. Cornelius, D., Wikis and Document Management Systems at Law Firms. 1-5 (2008), 1 February 2011, http://dougcornelius.com/files/Wikis_and_Document_Management_Systems.pdf, Versions of this paper appeared as Which Route? *KM Legal,* 2, **4** (2008) http://www.kmlegalmag.com/coverfeature & EI Case study: Wiki versus DMS at Goodwin Procter *Inside Knowledge,* 11, **8** (2008), http://www.ikmagazine.com/.
10. Miller, J.A., Palaniswami, D., Sheth, A.P., Kochut, K.J. and Singh, H., WebWork METEORs Web based Work Management System, Large Scale Distributed Information Systems Lab LSDIS. Department of Computer Science, University of Georgia, Athens, GA, USA, 1-36 (1997).