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Process approach in modelling Croatian construction contract management practice

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SUMMARY

Contract management is an essential part of project management as well as construction management. International contract management practice has a great influence on Croatian construction contract management practice (CCCMP). The influence is manifested in the terms of globalization and integration processes, in the implementation of new financing models, in the ascending market demands, as well as in the increase of projects' complexity. The shortage of national assets and a constant need for the Government's borrowing from international financial institutions, resulted with the presence of international contract management and legal systems (Common Law) in the Republic of Croatia, which are inconsistent with the domestic ones (Civil Law). Such an influence urges for a remodelling and reshaping of the national contract practice. For instance, public projects financed by the international finance funds, due to the lack of quality and eligible domestic contract practice, often result in the direct application of FIDIC Form of Contract. The aim of this paper is to present the construction contract management as a form of a complex organizational process composed of several generic sub-processes, possibility of implementing data tracking and control system (DTCS) and its specificities in the CCCMP, with the emphasis on Progress Billings and Payments sub-process.

***Key words**: contract management, project management, construction management, FIDIC, contract practice.*

1. INTRODUCTION

For the last couple of years, under the influence of globalization and integration processes, Croatian construction industry undergoes intense changes. The implementation of new financing models, ascending market demands and the increase of projects' complexity are only a part of many influential elements. The shortage of national assets and a constant need for the Government's borrowing from international financial institutions in executing large public projects resulted with the presence of international contract management and legal systems in the Republic of Croatia. Emergence of such "new" contract management practice and legal systems based on Common law, strongly affected the domestic Civil law based contract management practice.

With public projects financed by the international funds, the existence of quality and eligible contracting practice is one of the key conditions for credit arrangements approval. In the lack of adequate contracting practice investors often turn to direct application of forms of contract prescribed by the International Association of Construction Engineers (Fédération Internationale Des Ingénieurs-Conseils – FIDIC). FIDIC Form of Contract [1] was first issued in 1957, and is based on Common law. The introduction of other legal system's forms of contract, such as the ones from Common law, causes great deal of conflict between the provisions of two different legal systems. Causes of conflict between the national construction contracting practice and FIDIC Form of Contract can be either linguistic or they can arise due to different conceptual interpretations originating from

the diversity of these legal systems. Conflicts can also arise as a consequence of underdevelopment or, more often, as a result of the lack of national contractual provisions conforming to those of the FIDIC. In any case, one of the major problems is the existence of the same legal provisions within legal systems with a different legal effect. In the case of public projects, it is necessary to fully understand and be familiar with the legacy of contractual provisions and to work proactively on the construction contract documentation and actively manage it.

The presence of FIDIC Form of Contract affects the national contracting practice forcing its remodelling. Conflicts that occur from the differences in the legal systems result in a number of circumstances in the construction contract management, which are in practice usually determined by the consultants and contractors [2]. Upon the termination of each project, the experience and knowledge that could be transferred on and that could help formulate the "Best Practice" disappears causing the contract documentation management system to stagnate [2, 3].

In public projects, taxpayers of public procurement are the main factor in the formation of market prices and relations. Achievements of public works are not evaluated, which results in a lack of interest of the taxpayers for modelling a desirable contracting practice and the development of autonomous regulations. Under the development of autonomous regulations, the authors are reviewing the making of general contract conditions for conducting construction works which will be supported by general and specific technical requirements. The underdeveloped technical legislation and the late emergence of professional organizations that have significantly contributed to the development of national legislation can be linked with the socialist practice from the pre-1990's period [2, 3]. The Croatian Chamber of Architects and Engineers (CCAE) was a young organization whose task was to actively provide answers to numerous market demands. It was established in 1998 [4], and in 2009 separated into the Croatian Chamber of Architects (CCA) and the Croatian Chamber of Civil Engineers (CCCE).

In this paper, the reasons for stagnation and non-development of national autonomous regulations will be shown through a presentation of the complex organizational process of construction contract management composed of its generic and extensive sub-processes. The possibility of implementing data tracking and control system (DTCS) and its specificities in the Croatian construction contract management practice (CCCMP), with the emphasis on Progress Billings and Payments sub-process will be shown as well.

2. CONTRACT MANAGEMENT

The term Contract Management can be explained in detail from the literature provided by the Project Management Institute (PMI) and the National Contract Management Association (NCMA). PMI in their "Guide to the Project Management Body of Knowledge" offers a division of the overall project management into knowledge areas and the related processes [5]. Project management knowledge areas and the related processes, given by PMI, are presented in Figure 1.

In accordance with the presented idea, NCMA issued the "Guide to the Contract Management Body of Knowledge" [6] which takes the structure of PMI processes and further develops the concept of Contract documentation management. Project Management presents a broader framework for a generally accepted knowledge and professional practice, where Contract Management is one of the many Project Management areas [7].

Figure 1 shows the PMI knowledge areas according to which the Contract Administration belongs to the domain of Project Procurement Management. On the other hand, Garrett and Rendon [8, 9] describe Contract Management area as "a comprehensive contract management process", while the Contract Administration is defined as "the process of securing the execution of contractual obligations of each party in accordance with the requirements of the contract". Gilbreath [10] recognizes the area of Contract Administration as a key element of the process of Contract Management, and defines it as "direct contract documentation management from the time the contract was awarded to the moment when it is formally concluded". He states that the Construction Contract Management is a systematic collection of plans, activities and approaches necessary for the fulfillment of the commercial side of the contracts.

Subsequently, Project Procurement Management is described [5] by the following six processes from the aspect of the Client as a signatory: Procurement Planning, Solicitation Planning, Solicitation, Source Selection, Contract Administration and Contract Closeout; and six processes from the aspect of the Contractor: Presales Activity, Bid/No bid Decision Making, Bid or Proposal Preparation, Contract Negotiation and Formation, Contract Administration and Contract Closeout [3, 8]. Key process areas of Contract Management are presented in Table 1.

Generally, it can be concluded that the stages of Contract Management life cycle, regardless of the legal system in question, output two types of documentation - bidding and contracting. Bidding documents consists of calls for tenders and bids, whilst the contract documents are constituted of the Contract and documents resulting from the implementation of the Contract. The typical contract structure used in public works consists of a contractual agreement, the special and general conditions of the contract, bid, attachments, contract bill and plans.

By definition [1, 2, 5, 6] which states that the process is "a set of related activities, with the

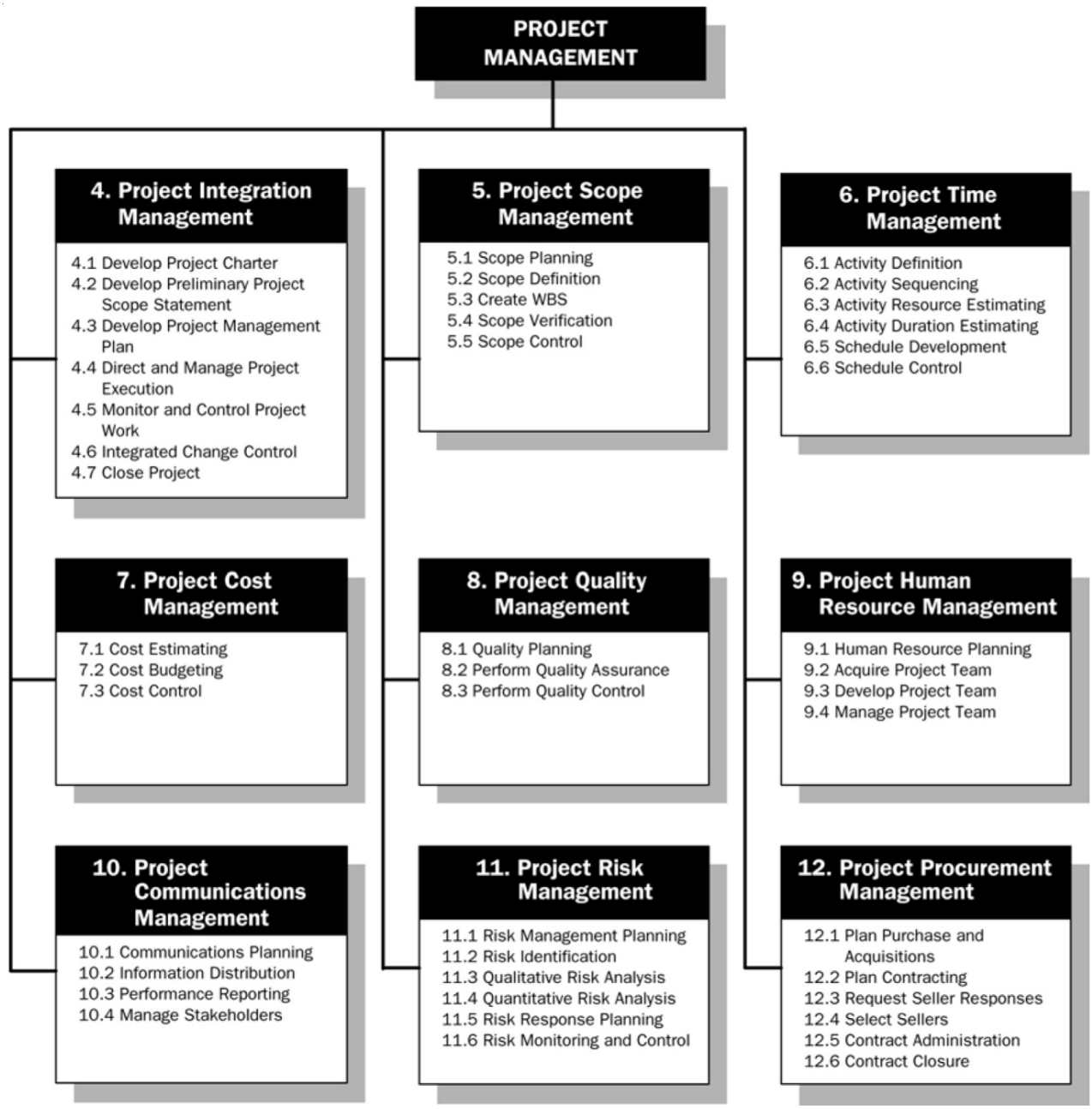

Fig. 1 Project Management knowledge areas [5]

Table 1. Contract Management key process areas [8]

Maturity Levels	*Contract Management Key Process Areas*						
	Buyer	*Procurement Planning*	*Solicitation Planning*	*Solicitation*	*Source Selection*	*Contract Administration*	*Contract Closeout*
	Seller	*Presales Activity*	*Bid/no-bid Decision*	*Bid/Proposal Preparation*	*Negotiation/ Formation*		

consumption of certain resources, converting the input parameters to output", we can define construction contract management as a process. Processes are in practice rarely found in its purified form, more often they are within the complex hierarchical systems.

Subsequently, the construction contract management will be presented as a series of closely linked and overlapped processes. For the purpose of presenting the formal construction contract management process, "IDEF0" method, which proved to be appropriate [11] for presenting complex processes, will be used.

3. CONSTRUCTION CONTRACT MANAGEMENT – PROCESS APPROACH

Construction contract is a strictly formal, negotiated, bilaterally obligated, financially binding contract acceptable in written form only. The most important parts of the Contract are considered to be the subject of the contract, construction period and total price. The subject is strictly defined, while the cost and completion date may be determined on the basis of legal provisions or the contract itself. Due to a number of complex legal issues that arise during construction, the construction contract is a complex agreement that gains important economic significance with high amounts of investment. The purpose is to make construction contract management a factor in protecting the public interest and a benefit to the national economy.

The overall construction character includes a very broad legal representation. The provisions of the Spatial Planning and Construction Regulation [12] relate to the protection of public interest, while the Civil Obligations Act (COA) [13] regulates the relations between the parties of the contract. COA also applies to foreign persons (physical and legal) when it comes to the rules of private international law that obligation relations suggest to.

Sources of law in Croatian construction contracting practices are based on Romano-Germanic legal system which is represented by contracts (if in compliance with mandatory regulations), customs, regulations and COA judicial and arbitral practice, or indirectly legal science. The legal source of the construction contract is the Civil Obligations Act (COA). General provisions (relating to compensation, unilateral termination of the will of the Employer, the Contractor's liability, breach of contract due to the deviation from the provisions of the contract) and the provisions of the service are applicable. The sources of law in the Anglo-Saxon system of jurisprudence are precedents, equity, legislation, international conventions, treaties and customs.

In the general concept of the construction contract management process (Figure 2), processes arising from the formation stage of the Contract are considered as input, while the output represents the realization of the provisions of the Contract. The process is actively affected by contracting parties (Client and Contractor), as well as by control processes that are encouraged partly by environment, partly by Client and Contractor. All the sub-processes of Contract documentation management represent a complex organizational process.

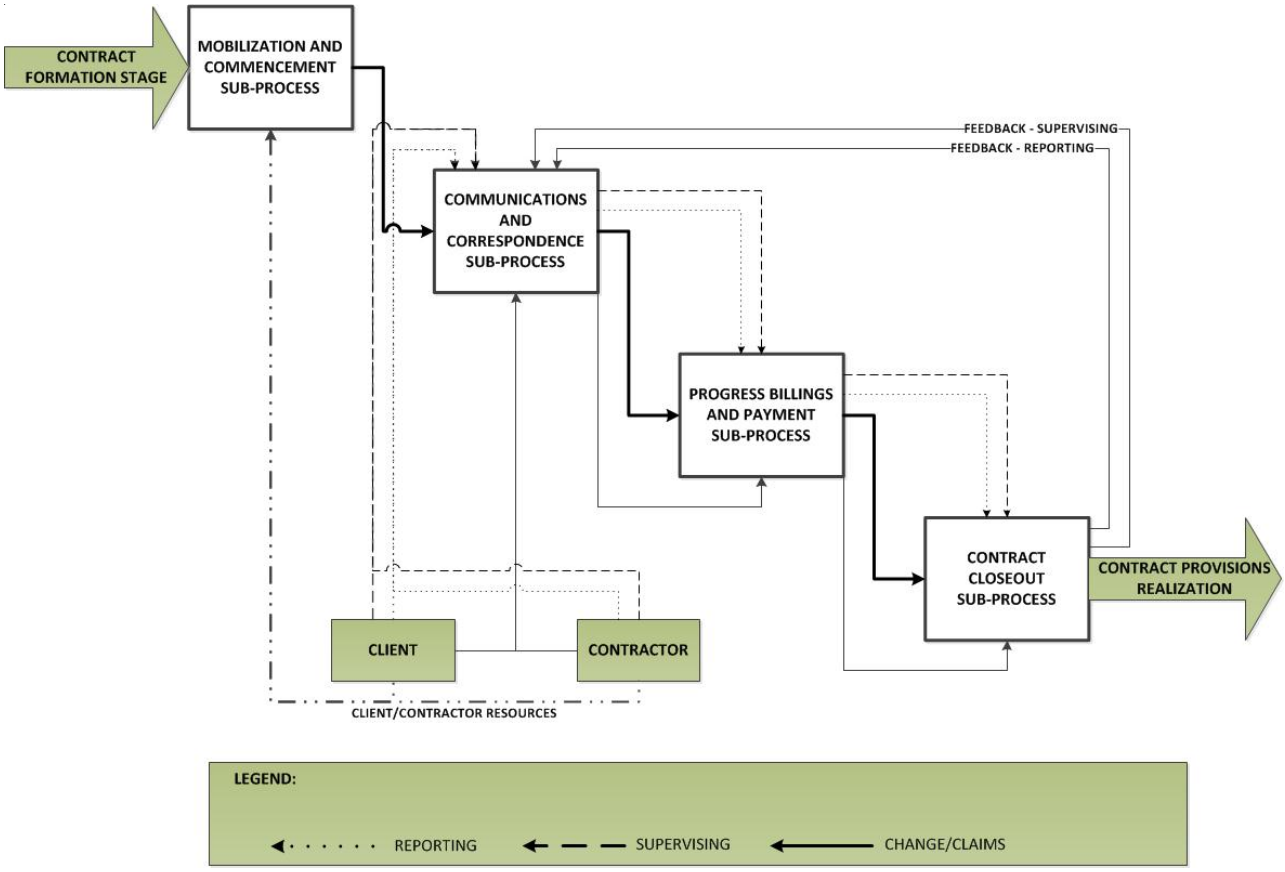

Fig. 2 Construction contract management process structure

Construction contract management consists of a series of sub-processes that are not organized in a linear sequence. We distinguish two types of sub-processes, generic and extensive ones. Sub-processes which are permanent and appear in any construction contract management process (shown in Figure 2) are called generic sub-processes. These sub-processes can be divided into: Mobilization and Commencement, Communications and Correspondence, Progress Billings and Payments, and Contract Closeout.

In addition to constant generic sub-processes, within construction contract management process extensive sub-processes are also present. They are likely to appear, but are unpredictable in terms of volume and frequency of appearance and, therefore, have extensive character. These sub-processes are induced by conscious action of the contracting parties which affect them and/or represent the reaction to changes that occur during the process by producing direct and indirect feedback. Extensive sub-processes are: Change Management, Claims Management, Contract Reporting and Contract Auditing.

Contract documentation management is inextricably linked to information technology, therefore controlling and monitoring the flow of information based on information technologies becomes its important element. For more than fifteen years, "E-Tools" have been developed to support the contract management and administration on which data tracking and control system (DTCS) is based. DTCS provides a platform through which all the project documentation can be generated, monitored, reviewed and reported from a single central database. The system offers the ability to communicate with subcontractors and suppliers at any place and at any time, as well as rapid organization of multiple bids, contracts and change orders. One part of the system related to the paper topic is certainly a possibility of making project calculations and cost control in one place. Data tracking and control system is a concept of high level efficiency and low cost requirements. Its implementation requires education and training period, standardized equipment and a certain level of experience of all participants in the project, which is the main reason why it still has not been widely used in the Croatian construction contract management practice.

4. CROATIAN CONSTRUCTION CONTRACT MANAGEMENT SPECIFICITIES IN SUB-PROCESS PROGRESS BILLINGS AND PAYMENTS

Progress Billings and Payments sub-process is the part of the Contract Management to which the most attention is given. There are three basic concepts of pricing methods:

* Payment based on actual costs,
* Payment based on time spent, and
* Payment based on performed work.

In general, the concepts are functionally associated with the intention of monitoring the dynamics and trends of the works done by the Employer. This further indicates on the calculation method of construction works and the technique of calculation [2].

The manner in which the price is contracted often depends on the decision of who bears the risk of the changes in quantity and variety of unforeseen circumstances that may arise during the performance of works, and on which the final cost of works depends [14]. The fact that it is usually difficult to accurately pre-determine the amount of work to be done is the main problem in determining the price of construction. Therefore, depending on who bears the risk for these unknown quantities, pricing methods are being formed. This means that the way the price has been contracted determines the division of responsibilities between the contract parties.

There are three basic ways of pricing:

* Unit prices - quantities are measured and they have an effect on the final price. The contractor takes responsibility for the continuity of unit prices, but not for the total amount of quantities.
* Lump-sum - one price for all the construction work. The contractor assumes the risk that entails' exclusive price for all works.
* Cost reimbursable - The contractor is compensated for all costs and is given a percentage of his makings.

Variations on the above pricing methods, as well as on the level of the obligation are as follows:

* Non-binding calculations,
* Calculations without the express warranty,
* Calculations with the express warranty,
* Unit prices,
* Lump-sum prices,
* Prices according to the actual cost together with fee,
* Prices according to price lists,
* Joint contract prices,
* Prices for the "turnkey" contract,
* Prices for "project management",
* Target price.

4.1. Unit price

The system of unit price contracting incorporates the distribution of risk between the client and the contractor presenting thus a very balanced way of price contracting. The risk division lies in the fact that the contractor takes the risk for the price of individual units, while the client takes the risk for the total number of derived units, i.e. the quantities. Precisely because of this balance, contracting of unit prices is the most common way of price fixing in the construction industry. Such a method of contracting is especially

suitable for larger investment projects - larger amount and longer duration of the works in which the extent of work is measured.

Unit prices are usually contracted in case in which the final amount of work required for the construction of a building cannot be predicted with certainty, which is the most common case of construction works. For each such type it is required for the bidder (contractor) to determine his unit price. Unit price is given individually for all those works that can be specified individually, which should be performed in a facility. These works and supplies are presented and sorted by each unit which can be calculated separately (e.g. excavation per cubic meter, foundations on the width and depth, individual price for each type of door, window, installation of all types of doors, windows etc).

A document that contains the display of certain types of works and deliveries, and is broadcasted in the format, in which prices are included, is called Bill of Quantities (BOQ). In a BOQ, all kinds of work to be done are described in detailed, and the bidder is expected to set a price for each work listed. Bills also contain the final sum of the estimated total amount of work to be done. However, these amounts, yet unknown at the time of bidding, are only estimates. Unit prices are, therefore, agreed to when the final amount of work required for the construction of an object can not be predicted with certainty, or when the contractor is not required to take the risk for the accuracy of that amount. These contracts are known as "measured contracts" since the real amounts derived are measured as work progresses and are calculated periodically. Periodical calculations of the performed work are calculated by multiplying the quantity of performed works and deliveries to the agreed unit prices, and the final cost of the entire structure is known only after the works are carried out in entirety.

The difference between the estimated quantities and actual quantities of delivery and works executed may occur as a result of various circumstances that are not yet known at the time of contracting. Unit pricing allows the client to have a rough estimate of works and prices of these works per unit of measurement at the time of contracting. It also allows him to compare those prices with the prices of other tenderers. The prices offered by the contractor can not be changed and the contractor bears the risk for the appropriateness of the specified unit prices. There are no obstacles, however, that such contracts, depending on various factors that influence their possible revision, provides the audit of the prices. The danger for clients with this pricing method is that bidders can provide lower prices for those works which are expected to be fewer, and higher prices for those are expected to be more. Similarly, the initial work can be charged more expensive to ensure a greater amount of money in the beginning of construction works. COA prescribes the application of contractual instruments such as a sliding scale, index clauses, and currency clause which is very popular in Croatian contracting practices.

4.2. Lump-sum

The term lump-sum is widely used in commercial terminology as the label for pre-agreed fixed fee. Croatian regulation of COA avoids the use of this term. Instead, the terms "total contract price" or "price determined in the total amount" are used. Lump-sum is the price at which the contractor has determined in advance the total cost for all the work to be done and in which quantities are not measured. If the price is fixed in such a way, the contractor can not ask for an increase in price due to higher amount of quantities, since the increase or decrease of the amount has no effect on the agreed cost.

When contracting lump-sum prices, it is essential for the parties to agree on the works that are immutable. Generally speaking, the lump-sum refers to the price in cases where the contracted quantities are not measured for payment. This means that the work not covered by lump-sum must be paid separately. All the additional work must also be paid separately. It is possible, however, that the lump-sum refers not only to price, but to the scope of work which depends on the formulation of the contract.

Premature termination of the contract may led to special difficulties in lump-sum prices. The Contractor is entitled to compensation for all the work performed, and if no specification of individual sections and their prices is given, the value of the work can be disputed. The situation is simpler if the lump-sum price is contracted after determining unit prices for certain type of work, and if these prices served as the basis for determining the lump-sum price.

If there is any doubt whether some of the work is included in the lump-sum price or not, the provisions of the agreement and intention of the parties will be taken into account. In some cases the principles of honesty and integrity can be applied by which it is evaluated whether a work is so beyond the agreed scope and nature that the contractor could not deal with. If none of the above stated indicators would provide the basis for the decision. Given the potential ambiguity in the contract regarding the lump-sum price and job description, the parties should define and specify those works and the scope of work implied with the utmost care.

4.3. Cost reimbursable

Cost reimbursable is a way of contracting the price where the contractor will reimburse all his costs, and a certain percentage of his makings will be added to the amount. This pricing method is usually applied when contractors do not know the exact price at the time of

contracting, or in the case of emergency or experimental works. It is also appropriate when the scope of the work and the circumstances under which the work will be done are not known at the time of bidding. The final price is known at the end of the project and is computed by multiplying the total amount of quantities by the agreed unit prices.

In such a calculation method the contractor shall be entitled to reimbursement of all actual costs resulting from the job performance, and even to a certain fee which will cover his profit and overhead costs. With this pricing method it is not necessary to agree on price revision clauses, since the client will pay the actual costs that will reflect the possible price increases. Such method of cost contracting shifts the entrepreneurial risk from the contractor to the client.

These contracts are frequently exposed to disagreements between the contractor and the client, both in terms of the construction works scope, and in terms of labor and machinery use. It is, therefore, necessary to agree in advance on the documentation that will prove the basis for the calculation and payment. At the time of contracting, clients do not have any advance review of the amount or the price of the project. All this leads to much more complex process of cost control and administration of the entire construction process, which greatly increases the price of the entire project. From the client's standpoint this pricing method is under great risk and control measures should be provided to prevent and reduce the possibility of contract abuse.

4.4. Payment methods

COA provides two pricing models for construction based on payment for the performed work: unit price from which follows payment based on the Unit price method, and Lump-sum method. A third model also appears in practice - payment based on actual costs and can be identified with the Cost reimbursable pricing method. These three models do not exclude other pricing models, so it is arguable that in Croatian contracting practice they are determined by agreement between the Client and the Contractor. If the unit prices are contracted, for each calculation, the work will be evaluated depending on the measured quantity amount for each unit. If the agreed price is lump-sum, the amount of payment will be lump-sum price that remains constant, unless being subject to changes in accordance with the contract.

Method of payment compliance and method of the advance payment is defined by the contract. Procedures of monthly progress billings and payment sub-process are carried out through the end of the project. Supervising Engineer has a central role in the Progress Billings and Payments sub-process in Croatian construction contract management practice. In practice, the measurement of the actual net quantity of each work section is made in accordance with the bill or with the provisions from technical specifications, standards etc. It is interesting that in the FIDIC Form of Contract, on which the measurement is based, the documentation is made by the Supervising Engineer. The Contractor's obligation then is to review and conciliate with the documentation. In Croatian construction contract management practice the Contractor documents the work in document called Bills of Measurements and the Supervising Engineer reviews it either approving or disapproving the performed work.

The Supervising Engineer generally solves the calculation issue through monthly situations, with its minimal amounts limited by contract (usually not less than *1%* of contractual amount). He controls the documentation and approves the work performed, the amounts to be added or deducted based on variations of price due to changes in the cost or quantity, or other circumstances (correction due to changes in legislation). The Supervising Engineer calculates the advanced and retention amounts, approves additional and unexpected works, additions and deductions that are due under the resolutions' claims. The amount calculated in all previous situations will eventually be deducted. The Progress Billings and Payments sub-process is sensitive and suffers from inadequate project preparation and imprecise contractual strategy definitions in the Contract planning, part of Contract formation phases [2, 3].

5. CONCLUSIONS

The introduction of new funding models, the growing market demands and market documentation, as well as the increasing complexity and scope of the projects, are just some of the elements that have affected the construction contracting practice in the Republic of Croatia. The construction of large public projects financed by international financial institutions has lead to the presence of the international contracting practices and legal systems. The execution of such projects calls for the presence of a quality contracting practice as one of the main conditions for the granting of credit arrangements. The organizational complexity of the process is presented in this paper, with a special attention being given to the Progress Billings and Payments sub-process.

In the absence of adequate national contracting practice, FIDIC Form of Contract is widely used. The presence of contract forms based on the legal system (Common Law) that do not correspond to the national ones (Civil Law) cause many problems and conflicts. Perhaps one of the most significant problem is that upon the cessation of every public project, the project team is dissolved and the acquired experience and knowledge, which could be passed on and be an active element in formulating the "Best Practice", disappears.

Such an attitude towards the projects and acquired knowledge directly affects the stagnation of contract management practice.

Although the advance of the process is not discussed in the paper, it is evident that the very action against the dissipation of the knowledge may lead to the development of an autonomous regulation. Due to the increased international investment activities, a general trend of separating the contracting practice from the national legislation will be even more pronounced in future.

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PROCESNI PRISTUP PRI MODELIRANJU UPRAVLJANJA HRVATSKE GRAĐEVINSKE UGOVORNE PRAKSE

SAŽETAK

Upravljanje ugovornom dokumentacijom predstavlja osnovu upravljanja projektima kao i organizaciju građenja. Međunarodna praksa upravljanja ugovornom dokumentacijom ima veliki utjecaj na upravljanje hrvatskom građevinskom ugovornom praksom. Utjecaj se očituje u globalizacijskim i integracijskim procesima, uvođenju novih modela financiranja, rastućim zahtjevima tržišta, kao i u povećanju složenosti projekata. Nedostatak nacionalnih sredstava i kontinuirana potreba državne uprave za zaduživanjem kod međunarodnih financijskih institucija rezultirali su prisutnošću međunarodne ugovorne prakse i pravnih sustava u Republici Hrvatskoj koji su nedosljedni domaćim. Navedeni utjecaj potiče na preoblikovanje nacionalne ugovorne prakse. Na primjer, kod javnih projekata financiranih od strane međunarodnih financijskih fondova, zbog nepostojanja kvalitetne poželjne ugovorne prakse, čest je rezultat direktna primjena FIDIC ugovornih formi. Cilj ovog rada je prikazati upravljanje građevinskom ugovornom dokumentacijom u obliku složenog organizacijskog procesa koji se sastoji od nekoliko generičkih potprocesa, mogućnost implementacije elektronskih sustava praćenja i kontrole kao i specifičnosti upravljanja hrvatskom građevinskom ugovornom praksom s naglaskom na potproces obračuna i plaćanja.

***Ključne riječi**: upravljanje ugovorima, upravljanje projektima, organizacija građenja, FIDIC, ugovorna praksa.*