

TC  
MIMAR SINAN UNIVERSITY  
INSTITUTE OF SCIENCE & TECHNOLOGY

**MODELLING AN INTRANET BASED MANAGEMENT  
INFORMATION SYSTEM BASED ON ACCOUNTING  
INFORMATION**

MASTER THESIS PRESENTED

BY

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## KABUL VE ONAY SAYFASI

Okulumuz öğrencilerinden Bahadır Şerbetçi tarafından hazırlanan **MODELLING AN INTRANET BASED MANAGEMENT INFORMATION SYSTEM BASED ON ACCOUNTING INFORMATION** adlı bu çalışma jürimizce Master tezi olarak kabul edilmiştir.

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## ÖZET

20.yüzyıl dünya ekonomi tarihi çok köklü deęişimlere sahne olmuştur . Dünya ekonomisinin küreselleşmesi, bilgi teknolojilerinin gelişimi, İnternet'in doğuşu ve küresel iletişim ağlarının yaygınlaşması iş dünyasının kurallarını ve doğasını deęiştirmiş, şirketler yeni çağın kural ve şartlarına göre kendilerini yeniden yapılandırmak zorunda kalmışlardır.

İnşaat sektörü'nde bu deęişime ayak uydurmak zorundadır. Yeni pazar şartları inşaat firmalarına getirdiđi zorluklar yanında birçok yeni imkanlar ve şanslar da sunmaktadır.

İnşaat sektörünün küreselleşmesi her gün biraz daha artan bir hızla devam etmektedir. İnşaat firmalarının geleceđi küresel düşünme ve hareket etme yeteneklerine bađlıdır.

Bugünün global inşaat firmaları dünyanın dört bir köşesinde onbinlerce kişi istihdam etmekte ve deęişik zaman dilimlerinde 24 saat faaliyet göstermektedirler.

E-mail, İnternet, İntranet ,video konferans gibi yeni telekomunikasyon teknolojileri inşaat şirketlerinin global ölçekte organize olurken yerel olarak çalışabilmesine ve deęişik zaman dilimlerinde ve coğrafi bölgelerde çalışan proje ekiplerinin koordinasyonuna imkan vermektedir.

Şantiyelerin finansal performanslarının toplamı şirketin toplam performansını oluşturur. Bu yüzden şantiyelerin merkez yönetimi tarafından efektif ve etkin denetimi şirketlerin karlılığı ve sürekliliđi açısından çok büyük önem taşımaktadır.

İnşaat sektörünün küreselleşmesi inşaat faaliyetinin aslında yerel bir faaliyet olduđu gerçeđini deęiştirmemektedir. İşgücü ve malzeme sağlayan firmalar yereldir. İşverenlerde genellikle yereldirler. İnşaat projelerinin başarısı büyük ölçüde yerel şartların iyi bilinmesine ve şantiyede iyi bir yönetime bađlıdır.

İnşaat firmalarının stratejik işletme birimleri olarak deđerlendirebilecek inşaat projeleri şantiyede yerleşik Proje Müdürleri tarafından yönetilirler. Şantiyelerin karlılığını etkileyebilecek bir çok günlük karar şantiyelerde Proje Müdürleri tarafından alınır.

Bu dađınık yapı işin doğasından kaynaklanmakta ve beraberinde ciddi yönetim sorunları getirmektedir.

Merkez ofiste oturan üst düzey yöneticilerin şantiyelerin finansal performansını ölçmek için ellerindeki tek güncel kaynak şantiyelerden gelen ilerleme raporlarıdır.

Fakat mühendis kökenli proje müdürleri genellikle şantiyelerin karlılığından çok işlerin fiziksel ilerlemesine, kalitesine ve süresinde tamamlanmasına odaklanmaktadırlar. Şantiyelerden gelen maliyet kontrol ve karlılık raporlarını projelerin gerçek finansal durumunu yansıtmaktan uzaktırlar.

Mali dönem sonunda üst düzey yöneticiler şantiyelerden gelen karlılık raporları ile Muhasebe Departmanından gelen finansal raporları karşılaştırdıklarında büyük sürprizlerle karşılaşabilirler.

Maliyet kontrol raporlarında proje süresince yüksek karla rapor edilen projelerin işin sonunda sıfır karla tamamlandığının anlaşılması çok şaşırtıcı bir sonuç değildir. (Bkz. Case Study kısım:4)

Büyük inşaat şirketlerinde finansal kontrol ve nakit kontrolü stratejik önem taşır. Şirket ansızın ciddi nakit sıkıntılarıyla karşılaşabilir. Malzeme sağlayıcılarının ve taşeronların faturaları ödenemez duruma gelir. Şantiyelere malzeme sevkiyatı aksamaya başlar. Taşeronlar ödemelerini alamadıkları için işi durdururlar. İş ilerlemesi durma noktasına geldiğinde işveren inşaat sözleşmesinden kaynaklanan hakkını kullanarak müteahit firmanın banka mektubunu hiçbir uyarıda bulunmadan nakite çevirebilir. Bu durum büyük ölçekli bir projede yaşandığında o inşaat şirketinin iflasına yol açabilecek ciddi sorunlar oluşturabilir.

Geçtiğimiz yıllarda yaşanan büyük inşaat ve enerji şirketlerinin hızlı iflasları bu duruma örnektir. Daha sonra bu şirketlerin çöküş sebeplerini araştırmak amacıyla birçok çalışma yapılmış ancak yapılan çalışmalara rağmen çöküşün mali sebeplerini tespit etmek dahi mümkün olmamıştır. (Enron, Morrison Knudsen etc.)

Bu çalışmanın amacı üst düzey şirket yöneticilerinin dünyanın değişik coğrafi bölgelerine dağılmış olan şantiyelerinin günlük hatta anlık finansal durumlarını takip etmelerini sağlayabilecek Muhasebe bilgisine dayalı bir Yönetim Bilgi Akış Sistemi modelini ortaya koymaktır

Muhasebe bilgisi tüm işletmelerde en hassas veri girişinin olduğu en güvenilir bilgi kaynağıdır. Muhasebe planı mühendisler tarafından proje aktivitelerine göre sınıflandırıldığında çok değerli ve güvenilir bir bilgi kaynağı oluşturur.

Önerilen model klasik maliyet kontrolü prensiplerine dayalı ve proje yönetim kademelerine her iş kaleminin gerçek maliyetlerinin tespiti, proje bütçesi ile gerçekleşen maliyetler arasındaki farkların belirlenmesi, ve iş sonuna kadar hangi maliyetlerin gerçekleşeceğini tespitine imkan vermektedir.

Bu metodoloji Proje yönetimi ekibine bütçe dışı maliyetlerin gerçekleştiği iş kalemlerinde zamanında önlem alma imkanı verirken , üst düzey yönetime de şirketin toplam performansını değerlendirme ve aksayan noktalara müdahale etme imkanı vermektedir.

Çalışmada inşaat şirketlerinin dağınık yapısından kaynaklanan iletişim sorunlarını gidermek ve şirket içi bilgi akışını hızlandırarak güçlendirmek amacı ile İnternet altyapısını kullanan Intranet modeli geliştirilmiştir. Intranet modeli tüm şantiyeleri merkez ofise bağlarken şirket dışı kişilerin şirket ağına girmesini engelleyerek özel ticari bilgilere dışardan erişimi engeller.

Muhasebe kayıtlarına giren her işlem merkez ofis tarafından görülür ve işlenir. Maliyet kontrol raporları ve finansal tablolar otomatik olarak yenilenir. Şantiyelerden otomatik olarak derlenen güncel muhasebe bilgisi üst düzey yöneticilerinin her gün şirketin finansal olarak hangi konumda olduğunu bilmesini sağlayarak yönetim kararlarına taban oluşturur.

Merkez yönetiminin şantiyeler üzerindeki kontrolünün artması ara yönetim kademelerinin azalmasına ve şirketin daha efektif bir yapıya kavuşmasına imkan verir. Ayrıca bilgi girişinin sadece muhasebe üzerinden yapılması çift bilgi girişini ortadan kaldırarak indirekt personel giderlerinin azalmasını sağlar.

Her şirket personeli şirket içi bilgi ağı sayesinde kendilerine verilen yetki dahilinde tüm şirket projeleri hakkında bilgiye sahip olabilirler. Bu entegrasyon şirket içinde sinerji yaratarak şirket içi iletişimi ve koordinasyonu güçlendirir.

Muhasebe bilgisinin yönetim kararlarına taban oluşturabilmesi için gerçek zamanlı bir raporlama sistemini sağlayabilecek bir enformasyon teknolojisi altyapısında çalışması gerekmektedir.

Bu çalışmanın kapsamı,

- Enformasyon Sistem / Teknolojilerinin inşaat sektöründeki kullanım alanları ve faydalarını irdelemek
- İnşaat şirketlerinin finansal kontrolü amacıyla tüm maliyetlerini Muhasebe planı düzeyinde (şirket ve şantiye düzeyinde) sınıflandırmak
- İnşaat şirketlerinde karar mekanizmalarına yardımcı olacak eş zamanlı muhasebe bilgisine dayalı bir YBAS'nin prensiplerini belirlemek
- YBAS'nin kullanacağı teknolojik altyapıyı tanımlamaktır.

## ABSTRACT

The purpose of this study is to design an Intranet based Management Information System (MIS) based on accounting information for a construction company which provides strategic information for the top level managers.

Construction sites can be considered as the strategic business units of a Construction Company. The consolidation of the financial performances of the construction sites builds the total performance of the company. That's why an effective control of the construction sites is the most critical challenge for the top management.

The most common used instrument for the top managers to evaluate financial status of the construction sites are the cost control reports which are provided from the sites. But these reports are generally far from to reflect real financial status of the jobs. (please see case study Chapter 4)

This study is based on the fact that the most reliable information about the financial progress of the construction sites can be provided from the accounting reports. The financial reports (Balance Sheet, Income Statement, Cash flow, etc.) which are obtained from the Accounting records are the best vehicles for the BA (Business Administration) based top level managers and the stakeholders to measure the company's overall performance.

If accounting information is organized and classified according to project activities by the engineers it provides very valuable and correct financial information for the decision makers.

In this study Chart of Accounts (COA) is classified according to "Cost Accounting" principles to allow the Project Managers to evaluate actual costs, variance with the budget, and the variance of the actual costs to complete.

For the rapid transmission of accounting information an Intranet Model is established. Each transaction recorded states far from the Head office will be instantly received and progressed by the Head Office. Cost Reports and Financial Statements like Balance Sheets and Loss-Profit Tables will be updated automatically. The top managers knows where the company stands today.

The proposed Accounting based MIS Model prevents the double data entry and decreases the administrative costs by eliminating an extra personnel required for the data entry.

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# 1 INTRODUCTION

## 1.1 GENERAL

The powerful changes in the 20<sup>th</sup> century, rising of global economy, the emergence of the information economies, the growth of the Internet and other global communications has changed the nature of the business world and the conditions of the construction market.

These changes brought some challenges and difficulties for the construction companies, but besides all of these brought new opportunities and chances.

Globalization of the construction is extremely decreasing day by day. The future of the construction companies depends on their ability to think and operate globally.

The global construction companies of today are employing thousands of peoples, operating 24 hours in the different geographical locations of the world.

But besides the global aspect of construction business, in fact construction is a local work. Workforce is local as are the suppliers. Client is often local. The success can be achieved with well knowledge of local conditions and good management of the projects in site.

Construction projects which can be assumed as "*strategic business units*" of a construction company are managed by the Project managers. Many critical day to day decisions which can affect the Profitability of the projects are given by The Project Managers in site.

The consolidation of the financial performances of the projects builds the total performance of the company. That's why an effective control of the construction sites is the most critical challenge for the top management.

The problems arisen from the decentralized structure of the construction business can be managed by the new opportunities of the information systems and telecommunication technology.

The new telecommunication technologies allow the construction companies to organize globally while working locally: Information technologies such as e-mail, the Internet, Intranet and video conferencing to the desktop permit tight coordination of geographically dispersed workers across time zones and cultures.

## **1.2 PRESENTATION OF THE PROBLEM**

Only available information about the financial status of the sites for the top managers who are sitting in the Head Office is the progress reports delivered from the sites.

But usually Engineering based Project Managers focus on physical progress of the works more than the “Profitability” of the projects. Cost control reports and profit estimates created by the Project Managers are generally far from to reflect real financial status of the projects.

It’s not surprising that if a project which is reported in the Cost Control Reports with a high profit level during the construction period finalized with “zero profit”. (pls. see Case Study Chapter.4)

In the end of the fiscal year top managers get surprised when comparing the results of reports arrived from the sites and the Financial Reports created by the Accounting Department.

An admirable Construction Company with many big construction projects all around the world may suddenly face with serious cash problems. Company can’t pay the bills of his suppliers and subcontractors, materials are not delivered to site, subcontractors terminate the job, the works do not progress, the contractor can’t fulfill his obligations and finally the Client changes the bank guarantee of the company in to cash even without making a warning, depending on the conditions of Contract. This may be the end of the company.

Sometimes it’s even not possible to find the real reasons of the bankruptcy of the Construction Giants as the examples were seen in the last few decades.

## **1.3 AIM OF THE STUDY**

Aim of this study is to design an Intranet based Management Information System which allows the top managers to control and follow day to day financial performance of the geographically dispersed construction sites by using accounting information.

Accounting information is the most reliable information in every entity. If it’s organized and classified according to project activities by the engineers it provides very valuable and correct financial information for the decision makers.

This model proposes a cost control methodology based on the classical “Cost Accounting” principles which allow the Construction Management level to evaluate actual costs, variance with the budget, and the variance of the actual costs to complete. This methodology allows the Construction

Managers to show immediate attention to any operation in which expenses are excessive and of taking effective action against cost overruns. Relying of the objective accounting data in spite of subjective judgments will create a stronger communication across the company.

Aiming to establish real-time financial control of the construction sites from the Head office, eliminating the problems arisen from the decentralized structure and improving the communication all over the company an "**Intranet Model**" is proposed.

Intranet will make it possible to integrate each construction site to the Head office by using Internet infrastructure while restricting the people outside the firm to reach private financial information.

Each transaction recorded states far from the Head office will be instantly received and progressed by the Head Office. Cost Reports and Financial Statement like Balance Sheets and Loss-Profit Tables will be updated automatically.

The consolidation of the Accounting information delivered from the sites will make it possible for the top managers to know where the company stands today.

Each personnel of the company shall be able to view cost information about the other projects of the company within the limits of authorization given.

This integration will increase the communication and create a synergy inside the company.

In the absence of "real-time" accounting reports, top management is unable to effectively control the future financial health of the company.

Proposed design aims to Collect and process every transaction in a project based chart of accounts providing valuable information to the top managers in the head office and for the Project Managers in the site for decision making and effective financial control of the company.

#### **1.4 SCOPE OF THE STUDY**

The scope of this study is limited to design and classify cost information occurred from the project activities and grouping the collected information in much meaningful way to help the top managers for decision making.

The study is also searches for the most optimal telecommunication network model for the information flow across the company.

There may be more integrated and sophisticated Management Information Systems integrating every department and function of the company. There

are many specialized technology and software companies serve to construction companies in this manner. But ready made programs and outer help of these consultants generally is not enough to solve the problems of the company. The solution should be created by the company managers who deal with the unique problems arisen from the operations of the company.

Describing the information need of the top management of the construction companies, analyzing the nature of the construction costing , preparing the most suitable Chart of Accounts to classify the accounting information are the main objectives of this study.

The necessary software development and the technology search is another specialized subject of study in the area of information technologies.

## **2 THEORETICAL FRAMEWORK**

### **2.1 CHANGING NATURE OF THE CONSTRUCTION BUSINESS**

In the twentieth century big powerful worldwide changes have altered the environment of business. These changes also made big impacts in the construction industry.

#### **2.1.1 Globalization of the Construction Business**

*“We are living through transformation that will rearrange the politics and economics of the coming century. There will be no national products or technologies, no national corporations, no national industries. There will be no longer be national economies...All that will remain rooted within national borders are the people who comprise a nation. Each nation’s primary assets will be its citizens’ skills and insights.”*

*Robert Reich*

The biggest change in the 20<sup>th</sup> century was the emergence and strengthening of the “Global Economy”. Foreign trade in Giant economies like America, Japan and Germany accounts for a little over 25 percent of the goods and services produced in their own country. The success of the firms today and in the future depends on their ability to operate globally.

Globalization had a big impact in the construction industry. According to ENR (Engineering News and Records) records ten big construction companies each with average 14-15 billion USD yearly turnover operating mostly in the foreign countries.

Competition in the construction market is hugely increased. Big global construction companies have expanded their market place in the international area by using the new opportunities of the information technologies.

This reality threatens the domestic construction companies. Globalization heightens up competition and forces the construction companies to play in open, unprotected worldwide markets.

The largest 4 global companies announced in June 2000 a new venture and global partnership that will revolutionize the entire Architectural, Engineering and Construction (AEC) industry, by linking global and regional portals in an innovative business model.

The initial partners are AMEC, Bovis Lend Lease, Hochtief and Turner, and Skanska. These partners possess a wealth of global experience, with operations in Africa, Asia, Europe, North and South America and the Pacific spanning more than 60 countries. Combined, the partners manage billions of dollars in construction projects around the world each year and discussions are already underway with further important global and regional partners to join the venture.

Professor Martin Betts (Head of the School of Construction and Property Management at Salford University) takes attention of the construction industry to this fact about the global construction companies:

"Within a few years there will be only five or six large global construction companies capable of undertaking major projects around the world,"<sup>1</sup>

### **2.1.2 Information Technologies in Construction**

Computing power which has been doubling every 18 months, has improved the performance of microprocessors 25,000 times since their invention 25 years ago. The soaring power of computer technology has spawned powerful communication networks that organizations can use to access vast storehouses of information from around the world and to coordinate activities across space and time. These networks are transforming the shape and form of business enterprises and even our society.

The improvement of Internet and global network communications has created new types of business called "e-commerce" or "e-business". Because of global communication and management systems, customers now can shop in a worldwide marketplace, obtaining price and quality information reliably, 24 hours a day.

While the new information and communication technologies has changed the nature of business in the other industries, construction industry is seen by many backward in deploying technology, not least information technology.

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<sup>1</sup> **Web-article** : "INDUSTRY MUST MODERNISE TO STAY COMPETITIVE" Professor Martin Betts, web-site: <http://www.constructiontimes.co.uk/> (UK Archive)

Application of IT has been quite piecemeal and only very few contractors have a comprehensive and integrated information system for its core business.

However the use of information technologies in the construction industry are also increasing day by day. The most common use of IT/IS in the construction industry are project specific web-sites.

Today, the rapid development of project-specific Web sites gives project teams an effective means for reengineering traditional information delivery.

By allowing each member of the project team timely access to information, a PSWS creates a communication network that facilitates information pull. In turn, these systems should improve the effectiveness of project communications by increasing the accessibility of information and eliminating gatekeeping, distortion, and overload.

Several companies are currently marketing project-based Web sites, and others are bundling Internet connectivity with project-management software packages (see <http://www.evolv.com>, <http://www.bluelineonline.com>, <http://www.prolog.com>, and <http://www.primavera.com>). One of the oldest commercial systems is called e-Builder (<http://www.mpinteractive.com>), which was introduced in 1997 by MP Interactive, a U.S. construction management consultant. Because the Associated General Contractors of America have sponsored e-Builder, it is one of the best-known project-specific Web sites. Unlike individually developed Web sites, MP Interactive maintains e-Builder at a remote site. Subscribers pay a monthly subscription fee for its use, eliminating many of the development, maintenance, and administration costs associated with individual on-site systems.

In essence, the system acts as an on-line project-management system with modules for communication resources, file storage and upload, and technical support. The e-Builder system provides a means of documenting and controlling most of the project-management functions on a project, including submittals, requests for information (RFI), schedules, specifications, meeting minutes, and digital photographs. The Web site can also be used to track the performance of team members. For instance, the site can show who has responded to critical issues like RFI or who has read specific messages transmitted through the Web site. The Web site can also be configured to provide continually updated photographs of site progress through a site "Web cam." In this way, all members of the project team can access project particulars from remote locations through the Internet. Fig.1 provides a graphic description of e-Builder's organizational structure

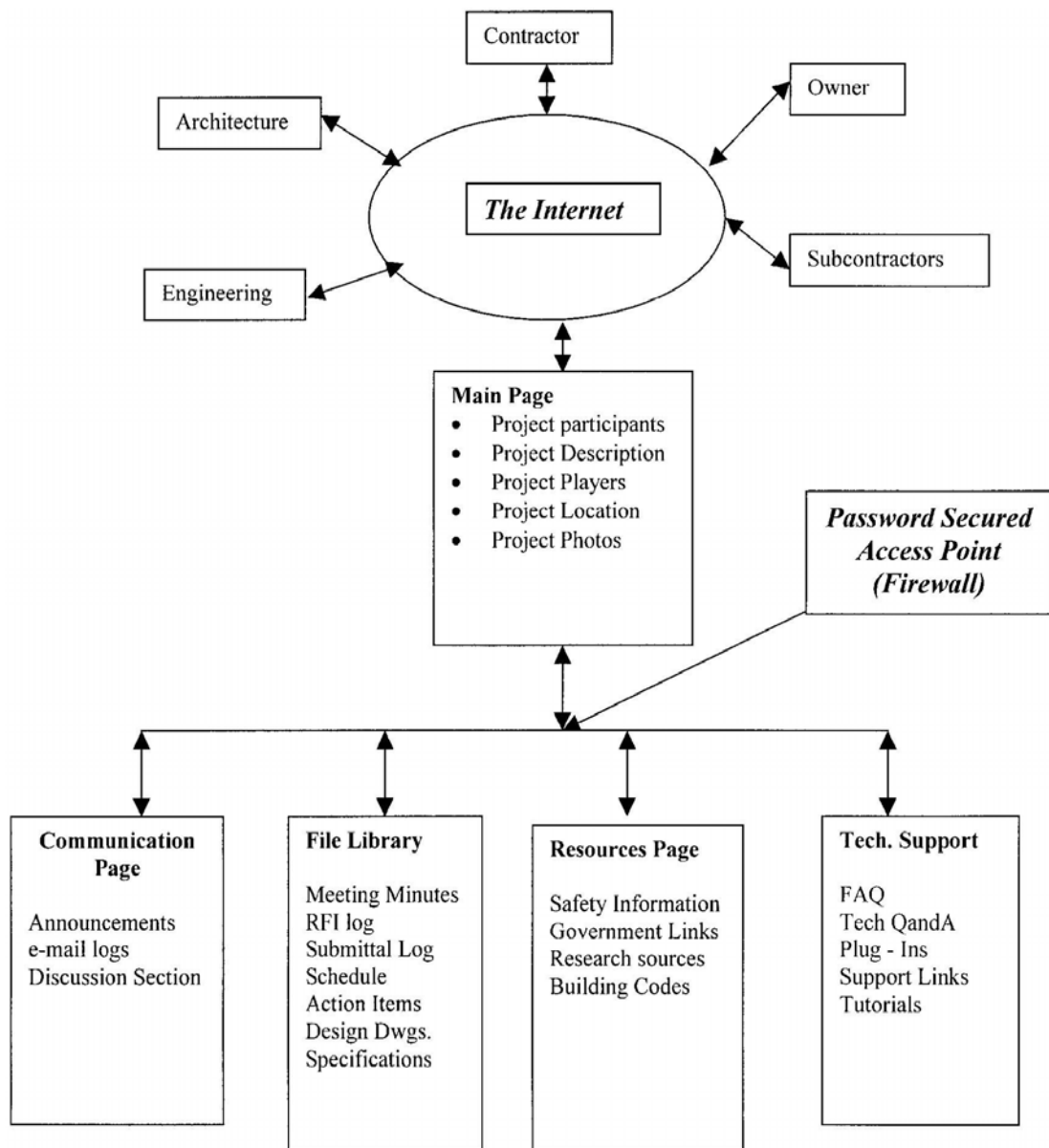


Figure1. The e-Builder Organizational Structure<sup>2</sup>  
 (Example of project specific web-site structure)

### 2.1.3 Transformation of the Companies

The third big change is the result of the first two big changes "Transformation of the Enterprises".

<sup>2</sup>Tony Thorpe, "PROJECT-SPECIFIC WEB SITES:FRIEND OR FOE?" Journal of Construction Engineering and Management,September/October 2001



The company of the 21<sup>st</sup> century is changing and getting more complex day by day with the emergence of globalization and with the benefits of improving Information Systems.

Large, bureaucratic organizations, which primarily developed before the computer age, are often inefficient, slow the change, and less competitive. Some of these organizations have downsized, reducing the number of employees and the number of levels in their organizational hierarchies.

Laudon identifies the transformation of the business firms as:

“The traditional business firm was – and still is – a hierarchical, centralized, structured arrangement of specialists that typically relies on a fixed set of standard operating procedures to deliver a mass-produced product (or service). The new style of business firm is a flattened (less hierarchical), decentralized, flexible arrangement of generalist who rely on nearly instant information to deliver mass-customized products and services uniquely suited to specific markets or customers. This new style of organization is not yet firmly entrenched; it is still evolving. Nevertheless, the direction is clear, and this new direction would be unthinkable without information technology.”<sup>3</sup>

The focus of modern management is on complex organizations which deal with complex problems using sophisticated system solutions.

Construction industry is also changing as the rest of the business world changes. Today’s construction companies are more complex, diversified, decentralized, and operate in a more competitive environment than the past. The construction companies should prepare themselves to take place in the competitive international marketplace with the help of emerging information systems.

The companies who don’t see this truth will lose their competitiveness and will not survive in the next few years.

## **2.2 CONSTRUCTION COMPANIES**

### **2.2.1 Characteristics of Core Business**

The main characteristics of construction projects are:

1. Construction projects are “**temporary**”. Construction projects are not ongoing operations. It means they have a definite start and definite ending date. Generally the project team is generally disbanded when the project objectives are accomplished. Generally each project team consist of the members that didn’t

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<sup>3</sup> **Laudon Kenneth C.** and **Laudon Jane Price** “Management Information Systems, 6<sup>th</sup> Edition- Organization and Technology in the Networked Enterprise, Prentice Hall,1999

work together before. That issue emphasizes the importance of the head office control over project teams.

2. All of the Construction projects include a degree of **“uncertainty”**. Construction projects usually last longer than 1 year may last up to 10 years in bigger construction projects. There are many external influences that are difficult to be estimated like: (soil and environment, design changes, local factors...) as a result of the effects of the abundant stakeholders and the long project duration, none of the construction projects are accomplished as planned before. That's why the “continuous monitoring, re-planning, re-visualizing of the schedule and the budget is essential.
3. Final product of construction projects is **“unique”**. That means each project is different from the others for ex. an office building has many differences from the other office buildings. (Design, location, structure, etc.) As a result of this, usually there are no standard production processes in the construction industry. There may be many technological challenges based on the improvements of construction engineering.
4. Construction projects are generally executed in the **“different geographical locations”** all over the world. The projects are managed under the direction of the Project managers who are resident on site. These projects can be thought as independent and strategic business units of a Construction Company. For the top managers (who are located in the Head office) an effective control of the Construction sites is critical challenge. Integration of these different projects can be disseminated with the use of a strong infrastructure of IT (Information Technologies).

### **2.2.2 Management Levels in Construction Companies**

In today's construction, the management of a typical large size construction can be divided into five levels namely:

- I. Board of Director's Level
- II. President's Level
- III. Construction Management Level
- IV. Project Management Level
- V. Functional Management Level

The first level includes the members of the Board of Directors and the Chairman of the Board of Directors, and represents the highest level in the organization. The President, Vice Presidents, as well as the Director of Procurement, Chief Engineer, Public Relations Director and Chief Accountant are in the second level. Construction Management Level, consist of the Procurement Manager, Operations Manager, Construction Manager and

Labor Relations Manager, as well as the Chief Estimator, District/Division Engineer, Assistant Deputy Chief Engineer and Public Relations Officer. The Project Management Level and Functional Management Level consist of the field personnel in a project organization. The Project Manager, Purchasing Agent, Planning Scheduling Engineer, Cost Engineer, Estimator, Assistant Deputy Chief Estimator, Research Project Engineer, Safety Engineer, Labor Relations Officer and Accountant are all included in the Project Management Level. The Functional Management Level consists of the General Superintendent, Superintendent, Foremen, and Field Engineers.

### **2.2.3 Construction / Project Management Concept**

Project Management procedures are generally applied in construction management field. Project management concept is defined by PMI<sup>4</sup> ;

“ Project management is the application of knowledge, skills, tools and techniques to project activities to meet project requirements. Project management is accomplished through the use of processes such as initiating, planning, executing, controlling and closing. The project team manages the work of the projects, and the work typically involves :

- Competing demands for: scope, time, cost, risk and quality.
- Stakeholders with differing needs and expectations
- Identified requirements

For the construction management purposes, of all of the management levels mentioned above (in part 2.2.2), the Construction Management Level is the key level in the organization in terms of project direction and accomplishments. The primary function of managers at the Construction Management Level (CML) is to plan, administer, and control the overall construction program to suit the Owner's project objectives. Basic Owner's objectives include minimizing overall project cost, including the economic benefits of minimum design-construction time, complying with recognized Owner's administrative and control requirements, and obtaining specified quality and utility in the finished product. Managers at the CML are directly responsible to the Owner, Architecture / Engineer and Contractors, and provide a wide range of professional services during the planning, design and construction phase.

## **2.3 MANAGEMENT INFORMATION SYSTEMS**

### **2.3.1 What is a Management Information System?**

Laudon described the MIS as; “Management Information Systems serve the management level of the organization, providing managers with the reports,

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<sup>4</sup> **Project Management Institute (PMI)**, “A guide to the Project Management Body of Knowledge (PMBOK Guide) 2000 Edition, page 6.

and in some cases, with on-line access to the organization's current performance and historical records" <sup>5</sup>. Typically, these systems are oriented almost exclusively to internal, not environmental or external, events. MIS primarily serve the functions of planning, controlling, and decision making at the management level. Generally, these systems are dependent on underlying transaction systems for their data.

Information systems can be defined technically as a set of interrelated components that collect (or retrieve), process, store, and distribute information to support decision making and control in an organization. In addition to supporting decision making, coordination, and control information systems may also help managers and workers analyze problems, visualize complex subjects, and create new products.

To develop integrated, multinational information systems, businesses must develop global hardware, software, and communications standards and create cross-cultural accounting and reporting structures (Roche, 1992).<sup>6</sup>

Management Information systems are too important to be left entirely to a small technical group in the corporation. Managers must take the initiative to identify the types of systems that would provide a strategic advantage to the firm.

### **2.3.2 The Use of MIS in Other Industries**

Many companies now use information technology for enterprise resource planning. Enterprise resource planning (ERP) is a business management system that integrates all facets of the business, including planning, manufacturing, sales, and finance so that they can become more closely coordinated by sharing information.

### **2.3.3 Telecommunication and Network Revolution**

Telecommunications can be defined as the communication of information by electronic means, usually over some distance. We are currently in the middle of a telecommunications revolution that is spreading communications technology and telecommunications services throughout the globe

The explosive growth in computing power and networks, including the Internet, is turning organization into networked enterprises, allowing information to be instantly distributed within and beyond the organization. This capability can be used to redesign and reshape organizations, transforming their structure, scope of operations, reporting and control

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<sup>5</sup> **Laudon Kenneth C. and Laudon Jane Price** "Management Information Systems 6<sup>th</sup> Edition- Organization and Technology in the Networked Enterprise, Prentice Hall, 1999

<sup>6</sup> **Roche, Edward M.** *Managing Information Technology in Multinational Corporations*. New York: Macmillan (1992)

mechanisms, work practices, work flows, products, and services. New ways of conducting business electronically have emerged.

With the emergence of global networks such as the Internet, team members can collaborate closely even from distant locations. These changes mean that the management span of control has also been broadened, allowing high-level managers to manage and control more workers spread over greater distances. Many companies have eliminated thousands of middle managers as a result of these changes.

### **2.3.4 Internet, Intranets and Extranets**

The Internet is perhaps the most well-known, and the largest, implementation of internet-working, linking hundreds of thousands of individual networks all over the world. The internet has a range of capabilities that organizations are using to exchange information internally or to communicate externally with other organizations. This giant network of networks has become a major catalyst for both electronic commerce and electronic business.

The Internet is based on client/server technology. Individuals using the Net control what they do through client applications, using graphical user interfaces or character-based products that control all functions. All the data, including e-mail messages, databases, and Web sites, are stored on servers. Servers dedicated to the Internet or even to specific Internet functions are the heart of the information on the Net.

Organizations can use Internet networking standards and Web technology to create private networks called “**Intranets**”. “Intranet is an internal organizational network that can provide access to data across the enterprise. It uses the existing company network infrastructure along with Internet connectivity standards and software developed for the World Wide Web. Intranets can create networked applications that can run on many different kinds of computers throughout the organization.”

The principle difference between the Web and an intranet is that whereas the Web is open to anyone, the intranet is private and is protected from public visits by “**Firewalls-security systems**” with specialized software to prevent outsiders from invading private networks. The firewall consists of hardware and software placed between an organization’s internal network and an external network, including the Internet. The firewall is programmed to intercept each message packet passing between the two networks, examine its characteristics, and reject unauthorized messages or access attempts.

Intranets require no special hardware and can run over any existing network infrastructure. Intranet software technology is the same as that of the World Wide Web. Intranets use HTML to program Web pages and to establish dynamic, point-and-click hypertext links the other sites. The Web browser and Web server software used for intranets are the same as those on the

Web. A simple intranet can be created by linking a client computer with a Web browser to a computer with Web server software via a TCP/IP network. A firewall keeps unwanted visitors out.<sup>7</sup>

Some firms are allowing people and organizations outside the firm to have limited access to their internal intranets. Private intranets that are extended to authorized user outside the company are called “**Extranets**”. For example, Clients could link to a portion of a company’s intranet from the public Internet to obtain information about the cost and features of its products. The company can use firewalls to ensure that access to its internal data is limited and remains secure; firewalls can also authenticate users, making sure that only authorized people can access the site.

Extranets are especially useful for linking organizations with customers or business partners. They often are used for providing product-availability, pricing, and shipment data, and electronic data interchange (EDI), or for collaborating with other companies on joint development or training efforts.

Organizations can be linking their LAN’s (Local Area Network) and WAN’s (Wide Area Network) to create networks that link entire enterprises. In enterprise network, the organization’s hardware, software, telecommunications, and data resources are arranged to put more computing power on the desktop and to create a company wide network linking many smaller networks. These enterprise networks also may be linked to the networks of other organizations outside the firm or the Internet.

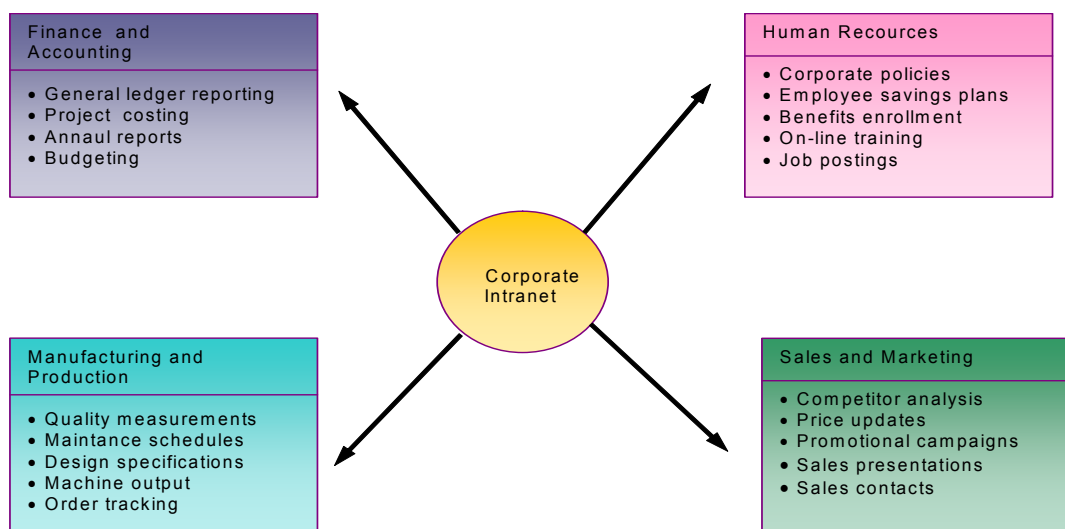


Figure 2. Corporate Intranet <sup>8</sup>

<sup>7</sup> “How to Use Intranets to Support Business Applications.” *I/S Analyzer Case Studies* 35, no. 5 (May 1996) page.13

## 2.3.5 Database Environment

Database technology can cut through many of the problems created by traditional file organization. A more rigorous definition of a database is a collection of data organized to serve many applications efficiently by centralizing the data and minimizing redundant data.

### 2.3.5.1 Designing Databases

There are alternative ways of organizing data and representing relationships among data in a database. Conventional DMCS use one of three principal logical database models for keeping track of entities, attributes, and relationships. The three principal logical database models are hierarchical, network, and relational. Each logical model has certain processing advantages and certain business.

#### Hierarchical Data Model

The earliest DMBS's were hierarchical. The **hierarchical** data model presents data to users in a treelike structure. Within each record, data elements are organized into pieces of records called *segments*. To the user, each record looks like an organization chart with one top-level segment called the *root*. An upper segment is connected logically to a lower segment in a parent-child relationship. A parent segment can have more than one child, but a child can have only one parent.

#### Network Data Model

The **network data model** is a variation of the hierarchical data model. Indeed, databases can be translated from hierarchical to network and vice versa to optimize processing speed and convenience. Whereas hierarchical structures depict one-to-many relationships, network structures depict data logically as many-to-many relationships. In the other words, parents can have multiple children, and a child can have more than one parent.

#### Relational Data Model

The **relational data model**, the most recent of these three database models, overcomes some of limitations of the other two models. The relational model represents all data in the database as simple two-dimensional tables called *relations*. The tables appear similar to flat files, but the information in more than one file can be easily extracted and combined. Sometimes the tables are referred to as files.

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<sup>8</sup> *Figure.1* : **Laudon Kenneth C. and Laudon Jane Price** “Management Information Systems 6<sup>th</sup> Edition-Organization and Technology in the Networked Enterprise, Prentice Hall,1999

### Advantages and disadvantages of Database Models

Both hierarchical and network systems are programming intensive, time consuming, difficult to install, and difficult to remedy if design error occurs. They do not support ad hoc, English language-like inquiries for information. The strengths of relational DBMS are great flexibility in regard to ad hoc queries, power to combine information from different sources, simplicity of design and maintenance, and the ability to add new data and records without disturbing existing programs and applications.

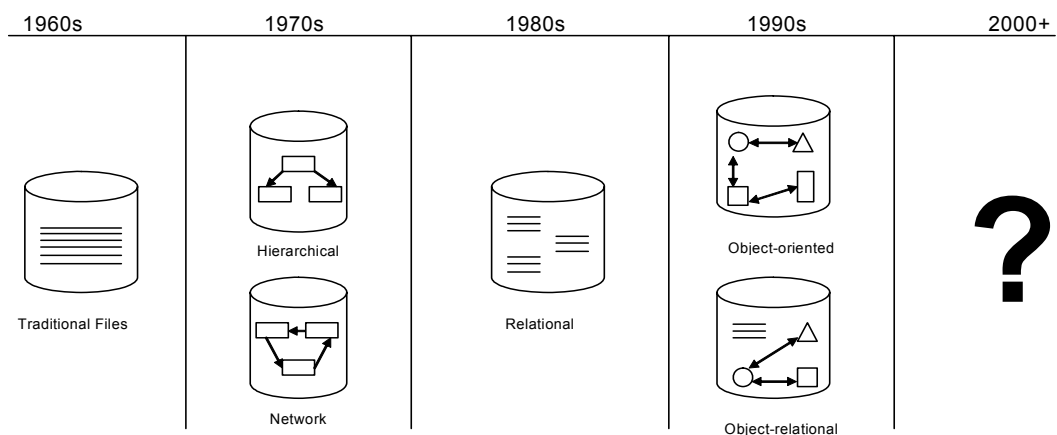


Figure 3. Evolution of Database Systems <sup>9</sup>

### 2.3.5.2 Components of Database Environment

The major components of a typical database environment and their relations are shown in Figure 3. Following is a brief description of the nine components shown in Figure 3.

1. *Computer-aided software engineering (CASE) tools* – automated tools used to design database and application programs. We describe the use of CASE tools for database design and development throughout the text.
2. *Repository*: Centralized storehouse for all data definitions, data relationships, screen and report formats, and other system components. A repository contains an extended set of metadata important for managing databases as well as other components of an information system.
3. *Database Management System (DMBS)*: Commercial software (and occasionally, hardware and firmware) system used to define, create, maintain, and provide controlled access to the database and also to the repository.

<sup>9</sup> **Modern Database Management**, (6<sup>th</sup> edition), Jeffrey A.Hoffer, Mary B Prescottt, Fred R McFadden, Prentice Hall, 2002



4. *Database*: An organized collection of logically related data, usually designed to meet the information needs to multiple users in an organization. It is important to distinguish between the database and the repository. The repository contains *definitions* of data, whereas the database contains *occurrences* of data.
5. *Application programs*: Computer programs that are used to create and maintain the database and provide information to users.
6. *User Interface*: Languages, menus, and other facilities by which users interact with various system components, such as CASE tools, application programs, the DBMS, and the repository.
7. *Data Administrator*: Person who are responsible for the overall information resources of an organization. Data administrators use CASE tools to improve the productivity of database planning and design.
8. *Systems Developers*: Persons such as systems analysts and programmers who design new application programs. System developers often use CASE tools for system requirements analysis and program design.
9. *End users*: Persons throughout the organization who add, delete, and modify data in the database and who request or receive information from it. All user interactions with the database must be routed through the DBMS.

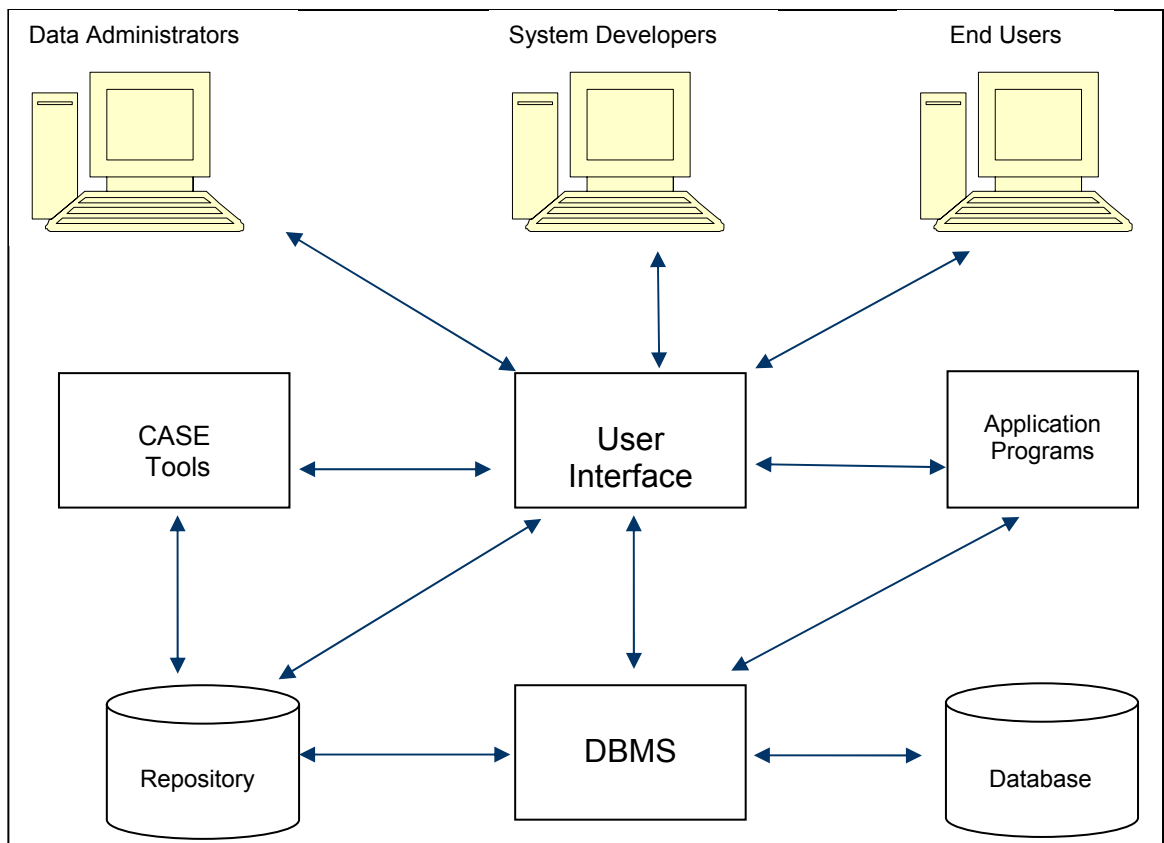


Figure 4. Components of Database Environment<sup>10</sup>

### 2.3.5.3 Databases in Construction Business

In a construction company few databases are required to run a project. The Tendering department maintains a database of tenders submitted. The database contains such information as the priced BQ, particular specifications, locations, job descriptions, clients, architects, engineers, drawings, and photos, calculations for building up rates, remarks and decisions made for the tender submission and so on. When a tender is successful, this database is passed to the project team and QS section for running.

The Project Management team inherits the tender database from the Tendering department when a job is won and maintains databases of all jobs in progress. Interim statements will be generated from these databases and so will be variations, claims and final accounts. Completed jobs will be archived for reference by the tendering department. These cost-oriented databases will have to be accessible by site staff for such purposes as updating interim statements and substantiating variations and claims. The PM team will also generate a schedule of material requirements for the Purchasing department to negotiate contracts with suppliers.

The Purchasing department will maintain a database of material suppliers, costs, contracts contacts. It will receive material schedules from the PM department once a job is started. Actual delivery schedules will be communicated from site. Delivery dockets and invoices will be exchanged between site offices so that proper payment instructions can be made to the Accounting department.

The Accounting department will set up a database to handle outgoing payments (to suppliers, subcontractors and site personnel), incoming payments (from client), job costing and financial status of particular project.

The Personnel department will maintain a record of site employees which can be project based or permanent staff of the company.

A site office, the project needs to run a number of databases. These include a quality system to handle the QA process; a document system to handle correspondence, instructions, drawing, and so on. It will also keep records of projects planning and progress monitoring, minutes of meetings, subcontractor information, method statements, and material stock and so on.

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<sup>10</sup> **Modern Database Management**, (6<sup>th</sup> edition), Jeffrey A.Hoffer, Mary B Prescott, Fred R McFadden, Prentice Hall,

## **2.4 Accounting Information as a Key Management Tool**

Accounting information lies at the heart of any business. If we are to fully appreciate the activities of companies and other business organizations, it is essential to understand their financial operations. Day to day accounting information is needed in order to run business and an accounting system allows a record of all the business economic transactions to be kept. But more important than transaction recording accounting helps the management to make decisions which have financial implications and aids the planning of future activities.

The Accounting information within an organization includes “Management Accounting” information and “Financial accounting” information. Information differs in their objectives, the nature of their inputs and outputs.

### **2.4.1 Financial Accounting**

Financial accounting aims to present a true and fair view of economic transactions through financial statements. Essentially, this implies that the financial statements are a faithful reflection of the economic activities of the organizations. The financial statements are drawn up within a regulatory framework which is very important for large companies. This means that the organization must prepare the financial statements according to legislation and other regulations. In addition, the financial statements use a number of accounting assumptions which have been established as general principles.

### **2.4.2 Management and Cost Accounting**

Management accounting identifies, collects, measures, classifies and reports information that is useful to managers in planning, controlling and decision making.

The managers of the business need this information to enable them to plan the progress of the business, control the activities and understand the financial implications of any decisions they make take. Unlike financial accounting, management accounting is not governed by the legislation or other regulations.

Cost accounting is part of management accounting. It's concerned with establishing budgets and standard costs. It's also concerned with establishing actual costs.

### **2.4.3 Financial Reports**

#### **2.4.3.1 Balance Sheet**

When a contractor presents itself to the outside world, it has to use some time-honored statements and follow generally accepted accounting principles in preparing them. The first and oldest of these is the balance sheet. Some main issues about the Balance Sheet are as follows;

- a) It reflects the position of the company at a specific date (such as December 31, 2002).
- b) It employs different measures for different accounts (current value for cash, historical value for fixed assets).
- c) It indicates the contractor's resources that are available to it for future activity (assets).
- d) It also indicates who financed those resources. Financing that comes from other parties (suppliers, lending banks, subcontractors) are called liabilities. Everything the owners contribute to the company, and all the company's profits, are called equity or net worth.
- e) Main rule "Assets = Liabilities + Shareholder's Equity"<sup>11</sup>

Accounts receivable will be liquidated, turned into cash, more quickly than company's inventory, and inventory will be liquidated faster than long-term investments in land and equipment. Traditionally current assets are separated from investments and property and equipment assets for that reason. Company expects to liquidate the current assets, and holds on to the others as long as they are productive.

On the other side of the balance sheet current liabilities are listed separately because these are the obligations that will be liquidated soon, during the present year. Suppliers come first, and then bank principal due this year, lease payments due this year, subcontractors, unpaid salaries and credit card interest, etc. After that come long-term liabilities. Obligations that will not be paid until future years. These include life insurance loans, mortgages and lines of credit.

Finally come the values that belong to the owners, the company's equity. They come at the end because balance sheets are used so much by banks and by courts. Whenever a final liquidation takes place, the creditors get paid first, and what is left over goes to the owners. That is why equity is also called 'net worth'.

The basic analyze of balance sheet is made on a common size scale. Each individual asset balance is compared to the total of all asset balances, and calculates the percentage of total assets represented by that individual asset. Using the balance sheet of Enka (see table 1.1, the company's cash balance is equal to 10% of total assets (divide \$147,553,119 by \$1,466,704,822). The

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<sup>11</sup> Florida International University, Department of Construction Management, Course notes: CONSTRUCTION ACCOUNTING , Instructor: Paul J. Schlachter

company's total equity balance is equal to 60% of total liabilities and equity together (divide \$884,861,815 by \$1,466,704,822). Common size analysis is very important when we want to compare our company's situation today with its situation last year or next year, or if we want to compare our company's situation with that of other companies.

All the external users of financial statements (bankers, sureties, IRS) are familiar with common size statements. They are used heavily in the financial ratios published by international associations. A ratio is just a simpler way to express the relationship between two numbers. Two important balance sheet ratios are "**current ratio**" and "**leverage ratio**". To get the current ratio, we divide total current asset balances by total current liability balances. This ratio is a rough indicator of a company's liquidity, its ability to pay its current obligations easily. A financially strong contractor might report a lower current ratio (around 1.30) than another contractor that turns its current assets into cash more slowly (and has a ratio closer to 1.75 or 2.00). To get the leverage ratio, divide total liability balances by total equity balances. This indicates how much the company depends on others for credit rather than use its own capital and profits. The typical contractor depends much more on outside credit, so we see leverage ratios closer to 2.00.

Balance sheets involve many management decisions about how to run the business. Too often a decision is made merely because it will make the balance sheet look more attractive to investors and bankers. There are several examples here.

a) Should the contractor purchase or rent its equipment? If it finances the purchase, it's going to have some current liabilities (equipment contracts payable). If it rents the equipment, that will not affect the balance sheet. Since it does not report a current liability, the contractor's current ratio will appear to be higher. Or the contractor may form a separate company to handle the lease financing of the equipment. This decision should always be made on the basis of what will help the contractor work more effectively as a builder.

b) Should the contractor invest in real estate? If it does, and if it finances the investment, it's going to have a current liability (payments currently due on the real estate loan). The effect will be just like (a). It could form a new company to handle the real estate, so that the liability will not appear on the contractor's balance sheet.

c) Should the owners of the company take out a loan (or a mortgage on the property) in their own names, or should the loan (mortgage) be shown in the company's name? If the owners take out the loan, the property will appear as equity on the company's balance sheet, and not as debt. Does that make the company any stronger in fact, in substance?

d) If the shareholders inject personal funds in the company, should they list the funds as a loan (liability) or as a capital contribution (equity)? Of course the banker doesn't care what they call it, because the lender will require the shareholders to subordinate their loan to the bank's loan, and keep it in the company. Reporting these funds as a loan can save the shareholders some income tax, but the IRS does not allow them to continue reporting the funds as a shareholder loan indefinitely.

### **2.4.3.2 Income Statement**

This statement has grown in use during the past 100 years, and now is the main focus of attention from the financial world. Every publicly held company is supposed to set an 'earnings per share' target and investors watch to see if it will meet that target. Again the companies have to follow generally accepted accounting principles when they report their income, but we can expect to find a lot of creativity in the way those principles are applied.

a) An income statement summarizes the activity of a company in financial terms for a specific period of time (such as the 12-month period ended December 31, 2002).

b) It recognizes revenue earned by the company for work done during that time period, and also the related costs incurred to do the work. Costs for work that is not completed are not charged against income until a future time period.

c) It reports a series of 'bottom lines' that indicate the returns to the company for work finished: gross profit (revenues less the related costs), net income on operations (gross profit less the operating expenses during that time period) and net income (what remains after all other expenses and tax provisions are recorded).

d) At the end of the period, the net income (also called net profit or net earnings) reported for that period is added to the retained earnings balance on the balance sheet, which increases the company's equity. In other words, the net income is considered to belong to the shareholders and is available to pay dividends or retained in the company.

e) Net income is not cash flow! We may be entitled to the cash because we did the work, but if the customer does not pay us, our profits will only be on paper.

g) An income statement can be prepared for each one of the company's projects, for a division of the company or for the company as a whole (consolidated income).

h) Certain judgment calls can affect the amount of net income a company will report. For example, when does an uncollected account become a bad debt? When do we write off worthless supply inventories? How quickly do we depreciate our equipment?

i) Finally, the company's owners may report payments to themselves as salary expenses or distribution of company profits. Salary expenses lead to lower net income, but they are the preferred way to report these payments. Distributions are taxed both for the corporation and for the shareholders.

The accounts are listed in this order on the income statement:

a) **Construction revenue**, the portion of the contract price that corresponds to work done during the period or finished in the period.

b) **Cost of construction revenue**, the various purchases and payments related to the work done.

c) **Operating expenses** include payments for other staff and services not related to the contract work itself, and other expenses that are not related to running the company (e.g., financing).

d) **The provision for income taxes** comes last, because there will not be a provision if the company reports a net loss.

We can calculate a common size income statement. Each item in the statement is compared to the company's total revenues (total sales and fees) and calculate the percentage of gross revenues that each one represents. Again, this analysis is very important when we want to compare our company's performance this year with its performance last year or its projected results for next year, or if we want to compare our company with other companies.

The performance ratios usually involve an item from the income statement (such as net income) and a balance-sheet balance (such as ending inventory). Here are two important performance ratios.

a) **Receivables turnover** ('Revenues / Receivables') is calculated by dividing the contractor's contract revenues by its ending accounts receivable balance. For example the result 12 turns of customer receivables per year. This is equivalent to turning our receivables once a month; we got that result dividing 365 days by 12 turns.

**b) Return on assets** ('% Profit before taxes / Total assets') is calculated by dividing those two numbers.

It is the income statement that provides the subject matter for most contracting decisions. We have the results from this year. Now we want to forecast the coming year. If we forecast an increase in revenue, we need to forecast an increase in costs and expenses, too. And our costs probably don't grow at the same rate as our revenue. Many company owners have been dismayed to see that their company's net profit goes south even when their sales increase. They may not keep a tight rein on their operating expenses, or they may decide to spend company money on activities not directly related to putting up a building. These kinds of income forecasts can help the contractor keep its profit goals in sight and achieve them.

After calculating the ratio, it's possible to chart the trend shown by the ratio over a period of time. For example, the relationship between revenues and operating expenses can be watched from one month to another. Because contractors work in very competitive industries and often submit low bids for the work they do, they tend to have very low gross profit margins (under 10% of total sales). That is why they find it critical to keep operating expenses under control, usually no higher than 5% of total sales. Now suppose we broke out sales and operating expenses by month. We could calculate a ratio for each month and chart it for the whole year to get a trend.

<u>Month</u>	<u>Operating expenses</u>	<u>Sales</u>	<u>Ratio</u>
January	\$50,000	\$500,000	0.100
February	55,000	600,000	0.092
March	48,000	600,000	0.080

Since the goal of the construction companies is to control operating expenses and limit them as much as possible to be more competitive in the market, benchmarking data is like a target ratio of 0.050.

### **2.4.3.3 Cash flows**

The greatest financial concern for a construction manager is the company's success in raising enough cash to meet its obligations. Especially in construction, the receipt of cash from project developers may be slower than expected, but the payment of company cash on time is essential to keep all the suppliers of goods and services happy. The balance sheet may be misleading because the receivables (billings and retainage) may be slow to convert into cash. The income statement may be misleading because the company's income measures work completed and not cash received.



The normal cash cycle for a construction firm begins with purchase of materials, and then continues to payment of labor and other inputs. All this time cash is being paid out. Cash is not received and the cycle completed until the work is completed, the project developer is billed and payment is received. Some suppliers offer credit terms which help to shorten the cash cycle and ease the contractor's burden. But it is the time lag between our payments to suppliers of goods and services (employees, subcontractors, suppliers, utilities, etc.) and our receipts for the work we finished that makes systematic construction management difficult

There are 3 key account balances used to calculate a company's cash flow cycle. First is accounts payable, which is credit from our suppliers. This credit comes free of charge but only up to a point. We want to keep our relationships strong and the flow of goods steady, so we cannot afford to delay any payments too long. Next is inventory, which we keep on hand because we cannot afford to run out of certain crucial materials. But this inventory is not free; it uses up our cash, and we could have more effective operations if we implemented just-in-time measures. Finally we have accounts receivable waiting for collection, which is really a way for us to finance our customers. And this is not free either, especially when we don't collect them and we have to borrow additional funds to keep our operations going.

The construction manager is responsible for overall cash flow of the company. Even though the daily routines of paying bills and collecting from customers are delegated to others, the manager always has the need to compare overall results with projections. And since it is one company working on all these projects, an overall cash budget is necessary. In such a budget some policies have to be set in advance:

- a) Do we want a minimum cash balance at all times?
- b) What do we do when our projected transactions leave us with a cash balance below the required minimum? The manager has to discover these projected shortfalls in advance, because lines of credit are not approved overnight and they do not come free.

In any cash flow projection, the beginning cash balance of one period has to be equal to the ending cash balance of the previous period.

Keep in mind that the largest contractors depend on as much free credit as they can find (from subcontractors, suppliers, and developers in the form of advances) before they will borrow money with interest from a bank or finance company.

For the last 30 years the financial world has been using a third financial statement that indicates the ways in which companies have received cash

and used that cash for company purposes. At one time the statement focused on the company's 'financial condition,' which meant its working capital position. Working capital is the difference between current assets and current liabilities. Today's cash flow statement examines three activities that generate cash for the company: normal operations, capital investments and outside financing. Every company should show a strongly positive operating cash flow, ('cash provided by operating activities'). That positive cash flow can be used to increase equipment and other investments and to repay loans. When a contractor is in a mature stage and full of activity, it will typically have negative cash flows for its capital investments and possibly even for its outside financing. That is because it spends cash to lease more equipment and uses cash to repay its loans.

ENKA Insaat ve Sanayi A.S.  
CONSOLIDATED BALANCE SHEET (Currency -- US. Dollars )

<b>ASSETS</b>		<b>LIABILITIES AND SHAREHOLDERS' EQUITY</b>	
<b>Non-Current Assets</b>		<b>Equity</b>	
Property, plant and equipment, net		Share capital	56,263,395
Company	140,330,629	Revaluation surplus	12,679,206
Company's share in joint ventures	35,494,011	Legal reserves and accumulated profit	815,919,214
Intangible assets, net	17,543,699	<b>Total Equity</b>	<b><u>884,861,815</u></b>
Investment properties	413,916,762	<b>Minority Interests</b>	<b><u>102,648,271</u></b>
Investments in associates	223,806,514	<b>Non-Current Liabilities</b>	
Investments in subsidiaries	1,858,738	Long-term bank borrowings	127,387,231
Investments available-for-sale	4,587,419	Accounts payable	12,605,074
Trade Receivables	25,029,532	Employee termination benefit	5,562,098
Company's share in non-current assets of joint ventures	8,376,965	Deferred tax liability	114,391,682
Other non-current assets	14,513,574	Other non-current liabilities and accrued expenses	1,460,474
<b>Total Non-Current Assets</b>	<b><u>885,457,843</u></b>	Company's share in non-current liabilities of joint ventures	14,891,500
<b>Current Assets</b>		<b>Total Non-Current Liabilities</b>	<b><u>276,298,059</u></b>
Inventories	37,963,840	<b>Current Liabilities</b>	
Accounts receivable	82,010,012	Short-term bank borrowings	23,274,473
Other current assets	25,864,053	Current portion of long-term bank borrowings	21,221,167
Investment in securities	215,766,870	Accounts payable	57,809,420
Cash and cash equivalents	147,553,199	Other current liabilities and accrued expenses	48,557,339
Company's share in non-current assets of joint ventures	70,223,992	Taxation on income	6,980,843
Cost and estimated earnings in excess of billings on uncompleted contracts	1,865,013	Company's share in current liabilities of joint ventures	42,146,644
<b>Total Current Assets</b>	<b><u>581,246,979</u></b>	Billings in excess of costs and estimated earnings on uncompleted contracts	2,906,791
		<b>Total Current Liabilities</b>	<b><u>202,896,677</u></b>
<b>Total Assets</b>	<b><u>1,466,704,822</u></b>	<b>Total Equity and Liabilities</b>	<b><u>1,466,704,822</u></b>

Table 1. Example of Balance Sheet <sup>12</sup>

<sup>12</sup> Official Web-site: [www.enka.com](http://www.enka.com) (ENKA Insaat Audited Financial Report)

<u>ENKA Insaat ve Sanayi A.S.</u>		
<u>CONSOLIDATED ( Unaudited ) STATEMENT OF INCOME</u>		
<u>( Currency -- U.S.Dollars )</u>		
	<b>30/06/2003</b>	<b>30/06/2002</b>
Revenues	464,232,578	416,396,514
Cost of revenues	(341,027,698)	(299,017,565)
<b><u>Gross profit</u></b>	<b><u>805,260,276</u></b>	<b><u>715,414,079</u></b>
Selling and administrative expense	(49980385)	(37800501)
Other operating income	15,378,558	17,236,768
Other operating expense	(19,141,621)	(23,821,008)
<b><u>Profit from operations</u></b>	<b><u>889,760,840</u></b>	<b><u>794,272,356</u></b>
Financial income	20,885,662	23,196,642
Financial expenses	(8146702)	(12,731,255)
Income from associates	135,334	0
<b><u>Profit from operations before taxes minority interests and net translation gain</u></b>	<b><u>918,928,538</u></b>	<b><u>830,200,253</u></b>
Taxation charge		
Current	(12,451,648)	(11,926,463)
Deferred	(807,912)	(2,128,013)
	<b>(13,259,560)</b>	<b>(14,054,476)</b>
Minority interests	(4,231,051)	(2,891,323)
<b><u>Profit before net translation gain</u></b>	<b><u>936,419,149</u></b>	<b><u>847,146,052</u></b>
Translation gain	3,256,887	(6,077,191)
<b><u>Net profit</u></b>	<b><u>939,676,036</u></b>	<b><u>853,223,243</u></b>

Table 2. Income Statement <sup>13</sup>

<sup>13</sup> Official Web-site: www.enka.com (ENKA Insaat Audited Financial Report)

#### 2.4.4 Recognizing profit in Financial Reports

Construction projects take a long time to complete and may span more than one accounting period. In the context of private construction firms, particular problems arise in the treatment of uncompleted contracts in financial reports.

There are two accounting methods of stating profit in the financial statements.

Under the "**completed-contract**" method, income is only reported for completed projects. Work on projects underway is only reported on the balance sheet, representing an asset if contract billings exceed costs or a liability if costs exceed billings. When a project is completed, the total net profit (or loss) is reported in the final period as income.

Under the "**percentage-of-completion**" method, actual costs are reported on the income statement plus a proportion of all project revenues (or billings) equal to the proportion of work completed during the period. The proportion of work completed is computed as the ratio of costs incurred to date and the total estimated cost of the project. Thus, if twenty percent of a project was completed in a particular period at a direct cost of \$180,000 and on a project with expected revenues of \$1,000,000, then the contract revenues earned would be calculated as  $\$1,000,000(0.2) = \$200,000$ . This figure represents a profit and contribution to overhead of  $\$200,000 - \$180,000 = \$20,000$  for the period. Note that billings and actual receipts might be in excess or less than the calculated revenues of \$200,000. On the balance sheet of an organization using the percentage-of-completion method, an asset is usually reported to reflect billings and the estimated or calculated earnings in excess of actual billings.

As another example of the difference in the "percentage-of-completion" and the "completed-contract" methods, consider a three year project to construct a plant with the following cash flow for a contractor:

Year	Contract Expenses	Payments Received
1	\$700,000	\$900,000
2	180,000	250,000
3	320,000	150,000
Total	\$1,200,000	\$1,300,000

The supervising architect determines that 60% of the facility is complete in year 1 and 75% in year 2. Under the "percentage-of-completion" method, the net income in year 1 is \$780,000 (60% of \$1,300,000) less the \$700,000 in expenses or \$80,000. Under the "completed-contract" method, the entire profit of \$100,000 would be reported in year 3.

The "percentage-of-completion" method of reporting period earnings has the advantage of representing the actual estimated earnings in each period. As a

result, the income stream and resulting profits are less susceptible to precipitate swings on the completion of a project as can occur with the "completed contract method" of calculating income. However, the "percentage-of-completion" has the disadvantage of relying upon estimates which can be manipulated to obscure the actual position of a company or which are difficult to reproduce by outside observers. There are also subtleties such as the deferral of all calculated income from a project until a minimum threshold of the project is completed. As a result, interpretation of the income statement and balance sheet of a private organization is not always straightforward. Finally, there are tax disadvantages from using the "percentage-of-completion" method since corporate taxes on expected profits may become due during the project rather than being deferred until the project completion.

“Complementary procedures to those used in traditional financial accounting are required to accomplish effective project control. While financial statements provide consistent and essential information on the condition of an entire organization, they need considerable interpretation and supplementation to be useful for project management.”<sup>14</sup>

#### **2.4.5 Management Decision based on Financial Statements**

Majority of the contractor's efforts are expressed as project costs, which vary in amount with the amount of projects being worked on and finished. Most of these direct (traceable) costs are also variable (they vary with the work load). By contrast, most of the contractor's other expenses (selling and administrative) have less to do with the amount of construction work, and seem to stay fixed or seem to grow in their own special ways. Because we think we know how 'costs behave,' we can make some forecasts of our company's success under certain scenarios.

There are two other ratios that are used widely in measuring a company's financial performance

**Return on equity** = Net income / Total shareholder's equity. We try to answer the question of whether the company's owners received a good return for the amount they invested. Usually the ratio is lower for older companies, because they report a lot of profit they have accumulated over the years in the Retained earnings balance. An acceptable return for the average company would be 0.20 (20%).

**Return on assets** = Net income / Total assets. We want to know whether the company received a good profit in relation to the assets it was using to generate that profit. Most companies report a ratio in the range of 0.05 to 0.10 (5-10%). One problem with these two ratios is that the net income

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<sup>14</sup> **Project Management for Construction**, "Fundamental Concepts for Owners, Engineers, Architects and Builders" by Chris Hendrickson, Prentice Hall, 1989 with co-author Tung Au.

figure is measured for the current year while many of the asset and equity balances are based on older calculations that do not allow for the effects of inflation.

There are at least 3 ways in which a contract manager can take a company's statements and use them to project the company's fortunes in the coming year. Net income could be increased if any of those steps were taken;

- a) Increase sales volume, expecting that our various profits will also increase. Not necessarily! If we lower our contract price to get more work, that will affect our gross profit. And we may have to hire more persons back at the office.
- b) Increase gross profit (or gross margin), by only taking work that leaves us a higher margin. But what if we keep turning down work that doesn't give us a sufficient margin?
- c) Lower our overhead, by 'trimming the fat' or eliminating discretionary expenses. Could we still keep the same schedule with half the staff? Could we delay implementing information systems that we need? It sounds easy until we try it. It is true that only 5-7% of our total costs occur in selling and administration, but we may be able to find unnecessary activities going on there.

A company's profits can rise impressively if it raises its costs more slowly than it increases sales volume, because it can take advantage of bulk purchases and efficient use of resources. Of course, it's necessary to keep administrative costs (overhead) under control, but if we do the results will be good. Each of these kinds of cost and expense behaves in a different way.

#### Break even analysis:

Another widely used way to forecast a company's income prospects is to calculate its break-even point, which is the point of activity at which a company will realize zero net profit. In other words, at that point the company's sales equal its costs and expenses and it 'breaks even.' In such analysis we hold operating (administrative) expenses constant and we set a target for gross margin on sales. Then we just have to divide the operating expenses by the target gross margin percentage to get the amount of revenue we have to complete. For example, operating expenses of \$200,000 and a target gross margin of 0.10 would give us a break-even level of \$2,000,000.

The idea of using break-even analysis is not to set precise sales targets, as much as it is to understand how much we have to build if we want to achieve our targets, or perhaps how much administration (and pay raises and sky boxes) we can afford. It can also help us to set contract prices in our bids, because we will know the consequences of a low bid. Figure 13-3 on page

265 shows three ways a company could respond to a request for bids. When it submits its bid it must recover all its direct costs of construction and at least some of the operating expenses. Of course the direct costs must always be covered, but we have to make all our other payments sooner or later or else the company will go out of business.

#### **2.4.6 Nature of Costing in Contracted Construction Projects**

Costing of large, long-term contracts, for construction and civil engineering projects, there are some differences from the costing of a manufacturing company. Construction projects are conducted off the contractor's premises, usually abroad. The client appoints a contractor and a formal contract is drawn up which includes details of what work is to be carried out, the method and timing of payments and any financial penalties that can be invoked if the work is not completed to the required standard and in the agreed time. Contract costing allows the relevant costs for each contract to be identified and collected, and the profit or loss to be calculated on a contract at the end of financial period.

The main characteristics of Costing in a Contracted Construction project are as follows:

- a. Each contract takes a long time to complete and may span more than one accounting period.
- b. Most material is ordered specifically for each contract.
- c. A method must be found to charge plant and machinery used on site to the contract and the most appropriate is usually a time basis.
- d. Nearly all the overhead costs can be identified as head office costs.
- e. An architect or surveyor inspects the work periodically and issues certificates to the contractor which detail satisfactorily completed work. Such work is valued at selling price and the contractor send the certificate to the client with an invoice to obtain interim payments.
- f. The contract often states that the client can withhold a proportion of the contract value for a period after final completion. This is know as retention monies and until the date when this is finally settle the contractor must make good any defects appearing in the work.
- g. Because of the conditions on site and the involvement of non-clerical staff, great attention must be paid to collecting prime documentation and controlling costs.

#### **2.4.7 Cost Concepts in Construction Business**

From an accounting point of view, the manager's information needs most often relate to the costs of the organization. In management accounting, the term cost is used in many different types of costs and these costs are classified differently according to the immediate needs of management. To



use accounting information for the management purposes it's necessary to understand all types of cost and cost classification.

The cost information is more useful if the costs are classified. By classifying costs we can obtain more detailed information and use it in a variety of ways for planning, controlling and decision making.

Cost has to do with the inputs we use to get our building work done, and so it is at the center of all our activity. Costs are always related to the building process, and they are charged against income in the period when the building takes place. Expenses, on the other hand, have to do with other activities not directly related to building. Many of these activities are included under administrative overhead and charged against income immediately whenever we purchase or pay for them. An example of expenses would be payments for services at company headquarters.

The main classifications of costs and expenses in a construction project can be basically classified as:

- a) Direct construction-related costs
  - Direct Material
  - Direct Labor
  - Equipment Costs
  - Subcontractor Costs
- b) Indirect construction-related costs
  - Construction Overheads
- c) Head Office or administrative expenses
  - General and Administrative Expenses
  - Taxes, insurances etc.

**Direct costs** are easy to trace to the specific project, when the inputs are the materials used in the project, the labor spent in building the project, and the subcontractors who worked on the project. We acquired each of these inputs for the purpose of completing a specific project, and our records tell us how much we spent on each input.

If a certain cost was necessary to complete a single project or various projects, and we have trouble tracing that cost to each specific project (such as cost for fuel or materials storage), then we have an **indirect cost**. The difference between direct and indirect costs is just one example of how we can define costs as contractors. Indirect costs are also can be called **construction overhead**. Since they are not easy to trace to individual projects, we usually gather information about them at a higher level and control them at that same higher level of the company.

In Construction Costing, direct materials (which become part of finished product-building) plus direct labor (which converts direct materials into the finished product), plus direct expenses (such as subcontracted work or special tools) gives prime cost. If you then add the site overheads, which are the indirect costs arising from the provision of the production resources; you arrive at the production costs. By adding administration, sales overheads, and distribution overheads (which are the indirect costs analyzed by function), you arrive at the total construction cost.

**Elements of Total Cost in a Construction Project**

		\$	\$
<b>Add</b>	Direct Materials	X	
	Direct Labor	X	
	Direct Equipment	X	
	Subcontractor Costs	X	
	<b>Direct Cost</b>		<b>X</b>
<b>Add</b>	Construction Indirect Costs (Construction Overhead)	X	
	<b>Prime Cost</b>		<b>X</b>
	<b><i>Head Office Distribution (Overheads)</i></b>		
<b>Add</b>	General Administration Expenses	X	
	Marketing etc...	X	
	Operating Expenses	X	
	<b>Total Product Cost</b>		<b>X</b>

Table 3. Elements of Total Cost in Construction Project <sup>15</sup>

**2.4.8 Overhead Allocation**

Many of the contracting costs that a business incurs are easy to assign to projects because there is documentary evidence that the resources were used on specific projects. There are purchase orders and delivery records that prove that materials were needed and used at such a site. The materials in question are direct materials. There are also work records and payroll reports that show that certain persons spent time working at such a site. The labor costs in question are direct labor. It makes no difference whether we focus on the entire project or on a single phase, a single week or a single day:

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<sup>15</sup> Adopted from, Shim, Jae K.; Siegel, Joel G, Modern Cost Management and Analysis (Barron's Business Library)

we always have clear proof that these materials and these labor costs were expended on this project and on no other.

Construction overheads (indirect costs) are also can be traced to specific projects like mobilization costs, site utilities, supervision costs, site office consumables, design costs related to project

Some costs that are more difficult to trace to specific projects or jobs, there may be fuel costs for vehicles that move from one job site to another, as well as supervisors and inspectors who have responsibility for more than one project, and materials storage for the entire contractor. These would also be part of construction overhead. And then there are the front office activities including selling and administration that form part of administrative overhead. So far we are focusing on an entire project throughout its life cycle: the cost object is the entire project. Suppose we want to focus on one week of that project; then the cost object will be that one week and nothing else. It would make very little sense to try to trace some of these overall project-related costs to a smaller time period. But it makes a great deal of sense to study these costs at the level of the entire contractor.

Accountants would say, from a theoretical point of view, that the construction overhead should be added to the cost of each job for purposes of measuring the profitability of the jobs. They are all needed to get our construction work finished. They would also caution, however, that adding some administrative overhead to the cost of a project tells us nothing at all about the profitability of the project itself and may lead to poor pricing decisions that cause us to lose out in a bidding process. Contractors would reply, from a practical point of view, that administrative overhead has to be added also because many project developers want them to add it. These developers, including governments, want assurance that a contractor will have enough cash flow to meet all its obligations, regardless of whether they are construction-related or administrative. So we will present some thoughts on both kinds of overhead, never forgetting that they are different in nature.

When we do our business planning as contractors, we can talk about the individual projects we hope to build and complete. And each of these projects has its costs that are incurred during the project lifetime and are traceable to the project, whether those costs are direct or indirect. These costs can be estimated in the project budget, and the actual results can be compared with the budget as the project moves forward.

The construction overhead costs and administrative overhead expenses, however, can be incurred at any time before, during or after the project lifetime and are not traceable to the project. This makes it impossible to track overhead as such as the project is progressing to conclusion. For that reason, contractors always use estimates of overhead in our budgets and reports until we report actual expenses in our year-end financial statements.

Generally applied overhead allocation method is as follows;

It is a very simple and imperfect method, but we don't mind as long as these construction overheads and administrative expenses make up a very small part of all the contractor's costs.

- a) First, we make our estimate of total non-traceable construction overhead and total administrative overhead for the year
- b) Then, we select a type of input that occurs in all our building activity, the predetermined base. For example 'estimated project direct cost' for the whole year, or another construction input or output for the base, such as direct labor hours, direct labor cost, or square feet, yearly turnover
- c) Finally, we find the application rate for overhead by dividing the estimated overhead by the base amount. Then the application rate which is applicable to one unit is applied to a specific project with estimated total cost input.

#### **2.4.9 Cost Control Methodology Based on Cost Accounting Principles**

As the works proceed in the field cost accounting methods are applied to determine the actual costs of production. These costs are continuously compared with the budget. The cost control method usually makes provision for recording and reporting actual performance to date and during a specific period; projection or forecasting to completion; variances in absolute and/or relative terms; reasons or conditions associated with excessive variances. The most important use of a cost control system is that of drawing immediate attention to any operation in which expenses are excessive and of taking effective action against cost overruns.

##### **2.4.9.1 Costing for Materials**

In the case of materials, we have the amount of each material we plan to use and the estimated unit price for each. When we multiply the amount of any material times its unit price, we have a total cost for that material. And when we get that actual cost outcome we can compare it with the outcome we wanted to achieve in our budget. The difference between our budgeted cost and our actual cost is called cost variance by accountants. This is not the variance used in statistics, but a simple difference between one number and another. And when a significant cost variance happens, we can go back and look at the components to find the reason for the variance. Was the variance due to a change in price (price variance) or a change in the amount used (usage variance)?

Suppose we find that our cost for sand was actually \$1,800 when we budgeted \$1,750. The cost variance for sand was negative, \$50 or 2.9% over budget. We may decide that this is too small to worry about and not study it further; maybe it is too small. Or maybe we want to look further because we use sand in other projects and we can't afford any more slippage in our costs. So we go back to the purchase orders and invoices and discover that we used 36 truckloads @ \$50 per truckload. In the budget we only planned for 35 truckloads @\$50 per truckload. In this case the cost variance is caused completely by the increased usage of sand, not by a change in price. If we want to solve our problem we don't study the price, but we could study the size of the trucks, the quality of the sand, the way the sand was used in the project, etc. And we can do the same review of any of our material costs, all of which form part of the total budget for the project.

#### **2.4.9.2 Costing for Labor**

Something like this happens with direct labor, too. We know the typical time that each worker is needed on the project and the wage rate in effect for that worker. Using this information we get a direct labor cost for each kind of worker and a total labor cost for the project. If a cost variance happens for our labor, and we think it is important enough to study further, we can check to see whether it was due to a change in wage rate (rate variance) or a change in the amount of time spent on the job (efficiency variance).

Contractors must also keep track of their labor costs in order to comply with the tax laws. All employers are charged by government with collecting and paying various kinds of payroll-based taxes. The employer may also deduct some amounts from an employee's gross pay for voluntary contributions to a health plan, a pension plan, a stock purchase plan or other matters. The most common payroll-based taxes are as follows.

#### **2.4.9.3 Costing for Equipment**

If construction companies, and contractors in general, make substantial purchases of equipment and machinery then they have very valuable assets to take care of. Even if they rent everything that they use in their construction work, they need to keep track of it and return it in satisfactory condition. The objects in question have to have a useful life of at least 3 years and have to be expensive enough so that they are not replaced from one day to another. Small tools, for example, are charged immediately as an expense in the same period we purchased them.

Part of effective management is to plan in a timely way for the company's needs. One of the first steps in starting a company is to plan to have the necessary equipment available, and then locate the suppliers who will sell or rent it. Once the equipment is received equipment records are created for different purposes: identification, usage and maintenance, even application of cost.

Identification has to do with control and with warranty servicing. We want to demonstrate to ourselves and others that this particular piece of equipment is the one shown on our purchasing records. We may also want to identify the way we are paying for it, through lease financing or a cash purchase. Some of the items in this record, such as the serial number and the equipment's generic name, will also appear in other records and will help to link them.

Usage refers to the use of equipment on company jobs and to its present condition. Maintenance belongs here; too, because the length of maintenance cycles depends greatly on the number of hours the equipment has been used.

Because the equipment is used in our building work, its use forms part of the building cost that has to be recorded. If we have rented it, the rental forms part of the fixed expenses for the year that are applied to projects. If something is used on a single project it is easy to trace the cost to that project. The rental information will figure in the budget estimates and bid information at least, where it is more useful for calculation of profit. It also forms part of the reporting of project costs for purposes of determining project gross profit.

If equipment is rented, rent payments are treated as an expense in income statements and a deduction in tax returns. Rented equipment does not appear on a company's balance sheet. But if it is purchased and owned, it will appear in all financial statements. It will be an asset (a long-lived asset), and usually an obligation to pay a leasing company for financing that asset. These asset and liability accounts go right on the balance sheet. But they also go on the income statement. Accounting legislations does not let contractors write off all equipment expense in the year the equipment is purchased. And neither do accounting principles. The cost of the equipment has to be written off (depreciated) over the period of time that we believe the equipment will be used by the company (its useful life).

That is why we have to depreciate equipment cost. For depreciation 3 basic things needed to know about the equipment: (1) its starting book value, which includes purchase price, taxes, shipping and installation; (2) the years of its expected useful life; and (3) its ending book value, what is expected to receive for it when we finish using it.

Every piece of large equipment is given a book value when first acquired. That book value will be reduced from year to year by a charge to company expenses that is called depreciation. A complete depreciation schedule is set up at that time, so that budget for equipment expenses and actual equipment expenses on books will be the same. This expense is the difference between the starting book value and the ending book value for the year.

There are many kinds of depreciation methods that can be used. The most logical method is probably one that takes into account the amount of use the equipment received. Some companies use that method. In practice, companies usually report depreciation based on a time period in which the equipment is used. In the simplest case they report an equal amount of expense in each year; this is the straight-line method and the easiest of all to calculate. If a vehicle with a useful life of 5 years, then each year 20% of its cost will be depreciated on the books. This method is permitted to be used in the company's own books when it reports net income.

Accelerated methods have this in common: they recognize a greater amount of depreciation in the early years and less in the later years. They work this way under the supposition that equipment is used more heavily when it is new and in better condition, but also because the tax legislations requires companies to use an accelerated method on their tax returns.

#### **2.4.9.4 Subcontractor Costs**

Subcontractor costs are straightforward to trace and assign to any work item. These costs can be considered as direct expense to the construction works.

#### **2.4.10 Project Budgeting**

Converting a final cost estimate into a project budget compatible with an organization's cost accounts is not always a straightforward task. Cost estimates are generally disaggregated into appropriate functional or resource based project categories. For example, labor and material quantities might be included for each of several physical components of a project. For cost accounting purposes, labor and material quantities are aggregated by type no matter for which physical component they are employed. For example, particular types of workers or materials might be used on numerous different physical components of a facility. Moreover, the categories of cost accounts established within an organization may bear little resemblance to the quantities included in a final cost estimate. This is particularly true when final cost estimates are prepared in accordance with an external reporting requirement rather than in view of the existing cost accounts within an organization.

One particular problem in forming a project budget in terms of cost accounts is the treatment of contingency amounts. These allowances are included in project cost estimates to accommodate unforeseen events and the resulting costs. However, in advance of project completion, the source of contingency expenses is not known. Realistically, a budget accounting item for contingency allowance should be established whenever a contingency amount was included in the final cost estimate.

A second problem in forming a project budget is the treatment of inflation. Typically, final cost estimates are formed in terms of real dollars and an item reflecting inflation costs is added on as a percentage or lump sum. This

inflation allowance would then be allocated to individual cost items in relation to the actual expected inflation over the period for which costs will be incurred.

### **3 MIS Development**

*“When we try to pick out anything by itself, we find it hitched to everything else in the universe”*

*John Muir*

#### **3.1 Model Construction Company chosen for System Development**

The model company chosen for proposed MIS is a large scale Construction Company operating 3 different geographical locations of the world. Company is operating mostly in Russia, Turkey and in the other CIS countries. There are currently more than 15 big on-going construction projects in different geographical locations of Russia, CIS countries and in Turkey.

The yearly turnover of the company is nearly 200 million USD in 2003 and the company is increasing the market piece in Russia.

#### **3.2 Brief Description of Developed MIS**

In the proposed Management Information System Company Chart of Accounts (COA) is classified and organized according needs of construction business to provide valuable and meaningful information to:

- a) Project Managers to monitor actual costs according to accounting job cost reports and the variances with the budget so PM can take corrective actions to where the big cost overruns is arisen.
- b) Regional Department Managers can monitor financial performances the construction sites in their regions and use accounting information for planning, controlling and decision making aims.
- c) Owners, the shareholders and the Board of Directors Level of the company can monitor the overall performance of the Company by using Financial Reports.



Inter company Cost Coding System is established suited to the activities of the company. By using this general cost coding system actual cost data can be stored in the company database and provide accurate information for the future projects. This coding system also allows the Project Management Teams and company departments (Accounting Dept., Tender Dept. etc.....) to speak in the same language.

Company Chart of Accounts is designed to provide activity based information needs especially for company operations. Equipment Cost Center is established to monitor actual Equipment Costs.

Company Chart of Accounts is designed to be able to consolidate three regional departments which can be considered as “strategic business units” of the company.

In the MIS Model a “**Company Intranet**” is proposed to link each construction site to the Regional Head Offices and the Regional Head Offices are linked to the Company Central Head Office in one point.

### **3.3 Proposed Corporate Network**

In the proposed model each department has its own LAN (Local Area Network) which are connected to the corporate backbone. Each network will share and contribute information with the central database in the head office.

Telecommunication equipment (database server) is used to connect site offices to the Headquarters. Wherever he locates any project team member or a construction manager who has a notebook can access to the most up to date and single source of information within the limits of authorization given by using a dial-up connection.

Company network has many extra benefits besides collecting and consolidating financial information. Project specific web-sites also can be established for project based information transmission. (See Chapter 2.1.2)

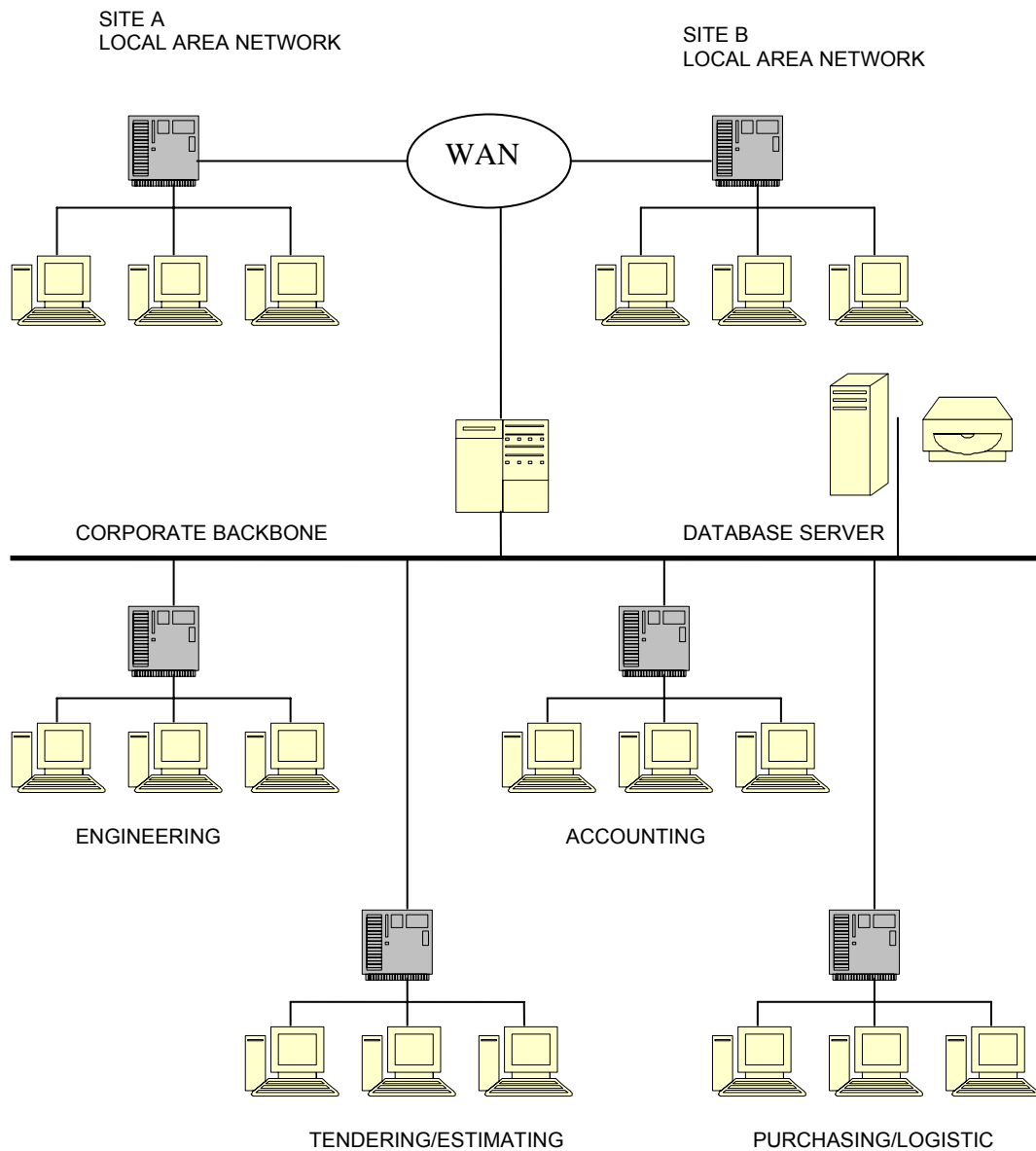


Figure 5. Proposed LAN- WAN Network Infrastructure

### 3.4 Proposed Company Chart of Accounts

Without a good chart of accounts, information is subject to misclassification; insufficient detail exist to interpret the information presented; users aren't able to distinguish the profitable operations from the unprofitable; and eventually, the financial statements fail to benefit upper management because they simply are not meaningful.

The proposed chart of accounts are developed for the construction sites and for the company head office separately. Please see the Appendix 1 and Appendix 2 for the proposed Chart of Accounts.

### **3.4.1 The structure of Accounts**

- 100-299:** All asset account numbers (cash, receivables, construction in process, supplies, retainage, equipment)
- 300-499:** All liability account numbers (notes and accounts payable, billings in excess of costs, accrued taxes and wages, long term debt) will begin with 2.
- 500-599:** All equity account numbers (owners' paid in capital, common stock, retained earnings, dividends) will begin with 5. Most banks prefer to use the term net worth instead of equity, because they are evaluating the company's ability to borrow more money.
- 600-699:** All income statement account numbers (construction work completed and ready to bill, fees for services, sales, and gains on equipment sales) will begin with 4.
- 700-799:** All the cost accounts. Numbers directly related to our jobs or contracts (materials, labor, and subcontractors) will begin with **74**. These costs are the most detailed and cover a wide range of accounts.  
All other operating expense account numbers (expenses not related directly to construction such as selling and advertising, office and executive salaries, computer systems, legal counsel, utilities, office supplies) will begin with **77**.  
All construction cost account numbers that are hard to trace to specific jobs or contracts (indirect costs such as equipment maintenance and depreciation, small tools, warehouse) will begin with **73**. (Construction overheads)
- 900-999:** Any income tax-related obligations, deferrals and payments will begin with 9.

### **3.4.2 Creating an Equipment Cost Center**

To capture all equipment costs an additional divisional income statement. For is set up. See proposed the Income Statement accounts.

The revenue for this division would be called inter company equipment rental income and offset by accounts within each division called (surprisingly) inter company equipment rental expense. Entries to these accounts would be made based on predetermined rental rates set by management and then reported on field reports or time cards.

#### **4 CASE STUDY : "Financial Control of on-going projects"**

A Turkish construction company in which the author of this thesis is currently working had a serious problem in financial control and estimating profit targets of on-going construction activities

The company is currently operating in Russian Federation and CIS countries. The company was founded in 1991 in St. Petersburg, Russian Federation. In the first years company had a big success in St.Petersburg area and top management decided to open branches in Moscow, Kazakhstan and Ukraine. As a result of this decision Moscow branch of the company was founded in 1999 with a new management team. In the first 4 years Moscow branch is awarded by several construction contracts and in the year 2003 has reached approximately 100.000.000 USD yearly turnover. The company was growing very fast and everything was going good.

In the year 2003 two of the biggest projects of the company completed. These Projects were reported during their life-time with 10-12 % percentage profit target by the Cost Control department. Top management was very satisfied by these forecast reports with these good profit targets in this competitive construction market.

But by the end of the fiscal year Accounting Department has published the financial reports for the evaluation of the company's owner and for the top management. These financial tables reported "0" profit for these two completed projects which were reported by the Cost Control Department all along the construction period with very satisfying profit targets.

The top management has started to search which department is saying right things. All the financial documentation available for these two projects investigated but the calculation and recording methods of these two departments were absolutely different and it was very hard to match the information provided by the Accounting Department and the Cost Control Department.

Management staff couldn't clear the situation completely after the investigation. But many faults were found both in the cost control reporting system and in the Accounting system. Main issues about the findings of the research were as below;

- It was found that there was a lack of communication between the cost control and accounting department. These departments were working separately, without any coordination. Their recording and calculating methods were different. For example cost control dept. was calculating the workmanship costs per hour including salaries, camping, catering, transportation, visa, registration expenses etc. Accounting dept. was

recording all these costs separately and their records were more accurate.

- Cost control dept. consisted of technical persons like architects and engineers and they had not enough knowledge to evaluate and understand the information provided by the accounting department. They did not consider many indirect costs like payments to local authorities, regulatory expenses for workers, head office distribution, bank and bond expenses, amortization etc...
- The records of accounting department were more reliable and everything was depending on documentation but unfortunately heart of the accounting system "Chart of Accounts" was not designed to get meaningful information from the accounting activities. It was clear that accounting system focused mostly on "balancing the accounts". "Management Accounting" principals were not established in the accounting system to provide valuable information for the management decisions.
- Also accounting dept. was too much to slow for the reporting activities. The incomes from the construction site were being approved and sent to the Head office. The head office was recording and paying all the invoices coming from different project sites. This system was working very slowly and it was not effective.

As a result of all these above company management wasn't able to get reliable information to make management decisions both from the Cost Control department and Accounting department. It was not possible to give the company a future perspective if it's not known where the company stands today.

Company management has faced with all these problems above and decided to implement a MIS (Management Information System) based on accounting information. Accounting information was more reliable but it was too much slow for reporting and needed to be organized and classified according to construction activities.

Company followed the steps below for the implementation of new MIS;

- A Russian accounting program is chosed for the MIS software. Software company has modified his accounting program according to reporting requirements of the company. Menus are also translated in to Turkish language for the use of Turkish management staff and operators.
- MIS software is programmed to serve all the related departments and persons (tender, personnel, logistics, etc...) within the limits of the authorization given.

- Inside the company an IT department is established. IT department has set up an inter company communication network which connects all the construction sites to the main server in the head office.
- Every site started to employ their own accounting personnel and started to make all accounting operations from the site.
- Head office accounting department is obligated with only financing, planning and reporting operations.

New MIS model started to work successfully. But more time should pass to evaluate results of this new information system. Some of the report outputs of this MIS are attached in the appendices. (Pls. see attachment 4)

## 5 RESULTS AND CONCLUSIONS

Proposed MIS allows the top managers to control and follow day to day financial performance of the geographically dispersed construction sites by using accounting information.

**“Intranet Model”** proposed in this study makes it possible to integrate each construction site to the Head office by using Internet infrastructure while restricting the people outside the firm to reach private financial information.

Corporate Intranet provides real-time financial control of the construction sites from the Head office, eliminates the problems arisen from the decentralized structure and improves the communication all over the company.

Each transaction recorded states far from the Head office will be instantly received and progressed by the Head Office. Cost Reports and Financial Statement like Balance Sheets and Loss-Profit Tables will be updated automatically. The top managers knows where the company stands today.

This strong control of the head office management over the construction sites will allow the company to decrease the medium management levels in the company.

Relying of the objective accounting data in spite of subjective judgments will create a stronger communication across the company.

For the success of the proposed MIS top managers should believe to the benefits of these information systems and they should fight with the organizational resistance to change.

## 6 APPENDICES

### 6.1 APPENDIX 1: "PROPOSED COA FOR CONSTRUCTION SITE"

<b>ASSETS</b>	
<b>1</b>	<b>CURRENT ASSETS</b>
<b>10</b>	<b>CASH ASSETS (LIQUID ASSETS)</b>
100	CASH ON HAND
101	CHECKS RECEIVED
102	CASH IN BANKS
103	CHECKS GIVEN AND PAYMENT ORDERS
108	OTHER CASH AND CASH EQUIVALENTS
<b>12</b>	<b>TRADE RECEIVABLES</b>
120	CLIENTS
121	NOTES RECEIVABLE
122	DISCOUNTS OF NOTES RECEIVABLE (-)
123	RETAINAGE RECEIVABLE
124	RECEIVABLES FROM PROGRESS PAYMENTS
126	DEPOSITS AND GURANTEES GIVEN
127	OTHER TRADE RECEIVABLES
128	DOUBTFUL TRADE RECEIVABLES
129	ALLOWANCES FOR DOUBTFUL CURRENT TRADE RECEIVABLES
<b>15</b>	<b>INVENTORIES</b>
150	RAW MATERIALS AND SUPPLIES (Site Warehouse)
158	RESERVE ADJUSTING INVENTORIES (-)
159	ADVANCES TO SUPPLIERS FOR GOODS&SERVICES
<b>17</b>	<b>CONSTRUCTION AND REPAIR COSTS</b>
170	CONSTRUCTION AND REPAIR COSTS
179	ADVANCES GIVEN TO SUB-CONTRACTORS
<b>18</b>	<b>PREPAID EXPENSES AND INCOME RECEIVABLES</b>
180	PREPAID EXPENSES
181	ACCRUED INCOME
<b>19</b>	<b>OTHER CURRENT ASSETS</b>
190	DEFFERED VAT
191	DEDUCTIBLE VAT
192	OTHER VAT
193	PREPAID TAXES AND FUNDS
195	JOB ADVANCES
196	ADVANCES TO PERSONNEL
197	INVENTORY SHORTAGES
198	OTHER VARIOUS CURRENT ASSETS

199		PROVISIONS FOR OTHER CURRENT ASSETS
<b>2</b>		<b>NON-CURRENT ASSETS</b>
<b>22</b>		<b>TRADE RECEIVABLES</b>
220		CUSTOMERS
221		NOTES RECEIVABLES
222		DISCOUNTS ON NOTES RECEIVABLES (-)
226		DEPOSITS AND GURANTEES GIVEN (NON-CURRENT)
227		OTHER TRADE RECEIVABLES
229		PROVISIONS FOR DOUBTFUL TRADE RECEIVABLES (-)
<b>23</b>		<b>OTHER RECEIVABLES</b>
231		RECEIVABLE FROM SHAREHOLDERS
232		RECEIVABLE FROM PARTICIPATION
233		RECEIVABLE FROM SUBSIDIARY COMPANIES
235		RECEIVABLE FROM PERSONNEL
236		OTHER RECEIVABLES
237		REDISCOUNT ON OTHER NOTES RECEIVABLE (-)
239		PROVISIONS FOR OTHER DOUBTFUL RECEIVABLES
<b>25</b>		<b>TANGIBLE ASSETS</b>
250		LAND
251		LAND IMPROVEMENTS
252		BUILDINGS
253		MACHINERY AND EQUIPMENTS
254		MOTOR VEHICLES
255		FURNITURE AND FIXTURES
256		OTHER TANGIBLE FIXED ASSETS
257		ACCUMULATED DEPRECIATION
259		ADVANCES TO SUPPLIERS OF TANGIBLE FIXED ASSETS
<b>26</b>		<b>INTANGIBLE ASSETS</b>
262		PRE-OPERATING EXPENSES
263		RESEARCH, DEVELOPMENT EXPENSES
264		LEASEHOLD IMPROVEMENTS
267		OTHER INTANGIBLE FIXED ASSETS
268		ACCUMULATED AMORTIZATION OF INTANGIBLE ASSETS
269		ADVANCES TO SUPPLIERS
<b>28</b>		<b>PREPAID EXPENSES AND INCOME ACCRUALS</b>
280		PREPAID EXPENSES FOR FUTURE PERIODS
281		INCOME ACCRUALS
<b>29</b>		<b>OTHER FIXED ASSETS</b>
291		DEDUCTIBLE VAT IN FUTURE PERIODS
292		OTHER VAT
293		INVENTORIES TO BE USED IN LONG-TERM
294		INVENTORIES AND TANGIBLE FIXED ASSETS TO BE SOLD
295		PREPAID TAXES AND DUTIES
297		OTHER VARIOUS NON-CURRENT ASSETS
298		RESERVE ADJUSTING INVENTORIES TO BE SOLD
299		ACCUMULATED DEPRECIATION OF TANGIBLE FIXED ASSETS TO BE SOLD



<b>LIABILITIES</b>	
<b>3</b>	<b>CURRENT LIABILITIES</b>
<b>30</b>	<b>FINANCIAL LIABILITIES (F.BORROWINGS)</b>
300	BANK LOANS
303	CURRENT PORTION OF LONG-TERM LOANS
304	CURRENT PRINCIPAL, INTEREST AND INSTALMENT PAYABLES ON BONDS
305	COMMERCIAL PAPER
306	OTHER MARKETABLE SECURITIES ISSUED
308	VALUE DIFFERENCE IN ISSUANCE OF MARKETABLE SECURITIES
309	OTHER CURRENT FINANCIAL PAYABLES
<b>32</b>	<b>TRADE LIABILITIES</b>
320	ACCOUNTS PAYABLE
321	NOTES PAYABLE
322	DISCOUNT OF NOTES PAYABLE (-)
326	GUARANTEE DEPOSITS RECEIVED
327	OTHER CURRENT TRADE PAYABLES
<b>33</b>	<b>OTHER LIABILITIES</b>
331	OTHER PAYABLES TO SHAREHOLDERS
332	OTHER PAYABLES TO PARTICIPATIONS
333	OTHER PAYABLES TO SUBSIDIARY COMPANIES
335	PAYABLES TO EMPLOYEES
336	OTHER VARIOUS PAYABLES
337	DISCOUNT OF OTHER NOTOS PAYABLE (-)
<b>34</b>	<b>ADVANCES</b>
340	ADVANCES FROM CUSTOMERS
349	OTHER ADVANCES RECEIVED
<b>35</b>	<b>CONSTRUCTION AND REPAIR PROGRESS BILLINGS</b>
350	CONSTRUCTION AND REPAIR PROGRESS BILLINGS
<b>36</b>	<b>INCOME TAXES PAYABLE AND OTHER LIABILITIES</b>
360	TAXES PAYABLES
361	SOCIAL SECURITY DUTIES PAYABLE
368	UNPAID, RESCHEDULED TAXES AND DUTIES PAYABLE
369	OTHER DUTIES PAYABLE
<b>37</b>	<b>PROVISIONS FOR DUE AND EXPENSE</b>
370	PROVISIONS FOR TAXATION INCOME AND RELATED
371	PREPAID INCOME TAXES AND RELATED DUTIES
372	RESERVE FOR EMPLOYEE TERMINATION INDEMNITIES
373	RESERVE FOR COSTS
379	OTHER PROVISIONS AND ACCRUED LIABILITIES
<b>38</b>	<b>DEFERRED INCOME AND ACCRUED EXPENSES</b>

380		DEFERRED INCOME
381		ACCRUED EXPENSES
<b>39</b>		<b>OTHER SHORT TERM LIABILITIES</b>
391		VAT RECEIVED
392		OTHER VAT RECEIVED
393		HEAD OFFICE AND BRANCH CURRENT ACCOUNTS
397		INVENTORY OVERRAGES
399		OTHER VARIOUS CURRENT LIABILITIES
<b>4</b>		<b>LONG-TERM LIABILITIES</b>
<b>40</b>		<b>FINANCIAL LIABILITIES (F.BORROWINGS)</b>
400		BANK LOANS
409		OTHER FINANCIAL LIABILITIES
<b>42</b>		<b>TRADE LIABILITIES</b>
420		SUPPLIERS
421		NOTES PAYABLE
422		DISCOUNT OF NOTES PAYABLE (-)
426		DEPOSITS AND GUARANTEES RECEIVED
429		OTHER TRADE PAYABLES
<b>43</b>		<b>OTHER LIABILITIES</b>
433		DUE TO SUBSIDIARY COMPANIES
436		OTHER NON-CURRENT VARIOUS PAYABLES
437		REDISCOUNT OF OTHER NOTES PAYABLE (-)
438		NON-CURRENT UNPAID, RESCHEDULED PAYABLES TO GOVERNMENT
<b>44</b>		<b>ADVANCE RECEIVED</b>
440		ADVANCES FROM CUSTOMERS
449		OTHER ADVANCES RECEIVED
<b>47</b>		<b>PROVISIONS FOR DUE AND EXPENSE</b>
472		RESERVE FOR EMPLOYEE TERMINATION INDEMNITIES
479		OTHER PROVISIONS AND ACCRUED LIABILITIES
<b>48</b>		<b>DEFERRED INCOME AND ACCRUED EXPENSES</b>
480		DEFERRED INCOME
481		ACCRUED EXPENSES
<b>49</b>		<b>OTHER LONG-TERM LIABILITIES</b>
492		VAT DEFERRED TO FOLLOWING YEARS
493		INSTALLATION PARTICIPATION
499		OTHER VARIOUS NON-CURRENT LIABILITIES
<b>5</b>		<b>SHAREHOLDERS' EQUITY (STOCKHOLDERS' EQUITY)</b>
<b>50</b>		<b>PAID - IN CAPITAL</b>

500		CAPITAL
501		UNPAID CAPITAL (-)
<b>54</b>		<b>PROFIT RESERVE</b>
540		LEGAL RESERVE
541		STATUTORY RESERVE
542		EXTRAORDINARY RESERVE
548		OTHER PROFIT RESERVES
549		SPECIAL FUNDS
<b>57</b>		<b>PRIOR YEAR PROFIT</b>
570		RETAINED EARNINGS
<b>58</b>		<b>PRIOR YEAR LOSS (-)</b>
580		ACCUMULATED LOSS
<b>59</b>		<b>PROFIT FOR THE PERIOD (LOSS)</b>
590		NET PROFIT FOR THE PERIOD
591		NET LOSS FOR THE PERIOD (-)
<b>6</b>		<b>INCOME STATEMENT ACCOUNTS</b>
<b>60</b>		<b>GROSS SALES</b>
600		DOMESTIC SALES
601		EXPORT SALES
602		OTHER SALES
<b>61</b>		<b>SALES RETURNS AND ALLOWANCES</b>
612		OTHER DEDUCTIONS (-)
<b>62</b>		<b>COST OF GOOD SOLD</b>
622		COST OF SERVICES RENDERED (-)
623		COST OF SALES (OTHER) (-)
<b>63</b>		<b>OPERATING EXPENSES</b>
630		RESEARCH AND DEVELOPMENT EXPENSES (-)
631		MARKETING, SELLING AND DISTRIBUTION EXPENSES (-)
632		GENERAL ADMINISTRATIVE EXPENSES (-)
<b>64</b>		<b>OTHER OPERATING REVENUES (INCOME)</b>
642		INTEREST AND OTHER FINANCIAL INCOME
646		EXCHANGE GAINS
649		OTHER VARIOUS INCOME FROM OPERATIONS
<b>65</b>		<b>OTHER OPERATING EXPENSES ()</b>
650		RESEARCH AND DEVELOPMENT EXPENSES .
653		COMMISSION EXPENSES (-)
654		PROVISIONS (-)
655		LOSS ON SALE OF MARKETABLE SECURITIES

656			EXCHANGE LOSSES
657			INCOME FROM DISCOUNT OF NOTES RECEIVABLE
659			OTHER EXPENSES (-)
<b>66</b>			<b>FINANCIAL EXPENSES</b>
660			FINANCIAL EXPENSES ON CURRENT BORROWINGS
661			FINANCIAL EXPENSES ON NON-CURRENT BORROWINGS
<b>67</b>			<b>EXTRAORDINARY INCOME AND PROFIT</b>
671			PRIOR PERIOD REVENUES AND PROFITS (-)
679			OTHER EXTRAORDINARY INCOME
<b>68</b>			<b>EXTRAORDINARY EXPENSES AND LOSS</b>
680			IDLE CAPACITY EXPENSES (-)
681			PRIOR PERIOD EXPENSES (-)
689			OTHER EXTRAORDINARY EXPENSES (-)
<b>7</b>			<b>COST ACCOUNT AS REQUIRED BY 7/A OPTION</b>
<b>70</b>			<b>COST CONTROL ACCOUNT</b>
700			COSTS CONTROL ACCOUNT
701			COST CHARGE ACCOUNT
<b>71</b>			<b>DIRECT RAW AND OTHER MATERIAL EXPENSES</b>
710			DIRECT RAW AND OTHER MATERIAL EXPENSES
711			DIRECT RAW AND OTHER MATERIAL EXPENSES APPLIED
712			DIRECT RAW AND OTHER MATERIAL PRICE VARIANCE
713			DIRECT RAW AND OTHER MATERIAL UNIT VARIANCE
<b>72</b>			<b>DIRECT LABOUR EXPENSES</b>
720			DIRECT LABOUR EXPENSES
721			DIRECT LABOUR EXPENSES APPLIED
722			DIRECT LABOUR WAGES VARIANCE
723			DIRECT LABOUR TIME VARIANCE
<b>730</b>			<b>SITE OVERHEAD EXPENSES</b>
<b>730</b>	<b>0</b>		<b>Salaries</b>
<b>730</b>	<b>01</b>		<b>Unproductive Foreign Personnel Salaries</b>
730	01	01	Management Staff Salaries
730	01	02	Department Chiefs Salaries
730	01	03	Field Personnel Salaries
730	01	04	Administrative Personnel Salaries
<b>730</b>	<b>02</b>		<b>Unproductive Local Personnel Salaries</b>
730	02	01	Management Staff Salaries
730	02	02	Department Chiefs Salaries
730	02	03	Field Personnel Salaries
730	02	04	Administrative Personnel Salaries
<b>730</b>	<b>03</b>		<b>Personnel Expenses</b>
730	03	01	Food Expenses for Site Personnel
730	03	02	Accommodation Expenses

730	03	03	Health Expenses
730	03	04	Visa and Registration Expenses
730	03	05	Travel Expenses
<b>730</b>	<b>04</b>		<b>Indirect Transportation and Cargo Expenses</b>
<b>730</b>	<b>05</b>		<b>Site Vehicles</b>
730	05	01	Site Vehicles (automobiles,busses,gazel etc.)
<b>730</b>	<b>06</b>		<b>Equipment Operations (Equipment Cost Center)</b>
730	06	01	( Internal equipment rental income )
730	06	02	Depreciation
730	06	03	Repairs & maintenance
730	06	04	Tires
730	06	05	Insurance
730	06	06	Taxes & licenses
730	06	07	Fuel & oil
<b>730</b>	<b>07</b>		<b>Handtools and Inventories</b>
730	07	01	Small Equipments
730	07	02	Hand tools
730	07	03	Office Inventories
<b>730</b>	<b>08</b>		<b>Site Office Operating Expenses</b>
730	08	01	Provided Services
730	08	02	Water, Gas, Electricity Expenses
730	08	03	Telephone and Fax Expenses
730	08	04	Mobile Phone (GSM) Expenses
730	08	05	Job Site Security Expenses
730	08	06	Consultancy Expenses
730	08	07	Photocopy, Xerox Expenses
<b>730</b>	<b>09</b>		<b>Construction and Work Permit Expenses</b>
<b>730</b>	<b>10</b>		<b>Office Consumables</b>
<b>730</b>	<b>11</b>		<b>Guarantee Period Expenses</b>
<b>730</b>	<b>12</b>		<b>Contractual Expenses (Prelimineries)</b>
<b>730</b>	<b>13</b>		<b>Insurance Expenses</b>
731			OVERHEAD COSTS APPLIED
732			OVERHEAD COSTS BUDGET VARIANCE
733			OVERHEAD COSTS PRODUCTIVITY VARIANCE
734			OVERHEAD COSTS CAPACITY VARIANCE
<b>74</b>			<b>DIRECT COST OF CONSTRUCTION WORKS</b>
740	2000		<b>PROJECT ACTIVITIES (DIRECT COSTS)</b>
740	2100		<b>MOBILIZATION / DEMOBILIZATION</b>
740	2110		<b>Temporary Facilities</b>
740	2111		Prefabricated Site Office
740	2112		Container Offices
740	2113		Closed Warehouse
740	2114		Canteen
740	2115		Dormitories for Workers
740	2116		Carpentry Workshop
740	2117		Steel Structure Workshop
740	2118		Precast Workshop
740	2119		Wheel washing Facilities

740	2120		<b>SITE MOBILIZATION</b>
740	2121		Temporary Fence
740	2122		Temporary Roads
740	2123		Temporary Heating Facility
740	2124		Temporary Electricity Supply
740	2125		Temporary Water Supply
740	2126		Site Drainage
740	2127		Open Stock Area
740	2128		Assembling and disambing of Tower Crane
740	2200		<b>DESIGN WORKS</b>
740	2110		<b>Detailed Design Works</b>
740	2120		<b>Shop Drawings</b>
740	2130		<b>As-built Drawings</b>
740	2300		<b>Earth works</b>
740	2310		<b>Excavation</b>
740	2311		<b>Site grading with bulldozer up to 20 cm, transportation up to 100 m</b>
740	2311	01	Direct Material
740	2311	02	Direct Labor
740	2311	03	Direct Equipment
740	2311	04	Subcontractor Cost
740	2312		<b>Excavation and transportation on site up to 1 km</b>
740	2312	01	Direct Material
740	2312	02	Direct Labor
740	2312	03	Direct Equipment
740	2311	04	Subcontractor Cost
740	2320		<b>Sand backfill</b>
740	2320	01	Direct Material
740	2320	02	Direct Labor
740	2320	03	Direct Equipment
740	2311	04	Subcontractor Cost
740	2330		<b>Gravel backfill</b>
740	2331		<b>Backfill with crush-stone 20-40, with compacting, thickness = 370 mm (sub base for pavments)</b>
740	2331	01	Direct Material
740	2331	02	Direct Labor
740	2331	03	Direct Equipment
740	2311	04	Subcontractor Cost
740	2332		<b>Backfill with crush-stone 5-10, with compacting, thickness = 100 mm</b>
740	2332	01	Direct Material
740	2332	02	Direct Labor
740	2332	03	Direct Equipment
740	2311	04	Subcontractor Cost
740	2400		<b>Drainage works</b>
740	2401		<b>Installation of PVC drainage pipes, incl. earth works up to depths 2,5 m, with 15 cm sand bed, backfill with compaction d = 250</b>
740	2401	01	Direct Material
740	2401	02	Direct Labor

740	2401	03	Direct Equipment
740	2401	04	Subcontractor Cost
740	2402		<b>Installation of PVC drainage pipes, incl. earth works up to depths 2,5 m, with 15 cm sand bed, backfill with compaction d = 300</b>
740	2402	01	Direct Material
740	2402	02	Direct Labor
740	2402	03	Direct Equipment
740	2402	04	Subcontractor Cost
740	2403		<b>Installation of PVC drainage pipes, incl. earth works up to depths 2,5 m, with 15 cm sand bed, backfill with compaction d = 400</b>
740	2403	01	Direct Material
740	2403	02	Direct Labor
740	2403	03	Direct Equipment
740	2403	04	Subcontractor Cost
740	2404		<b>Installation of Concrete drainage pipes, incl. earth works up to depths 2,5 m, with 15 cm sand bed, backfill with compaction d = 500</b>
740	2404	01	Direct Material
740	2404	02	Direct Labor
740	2404	03	Direct Equipment
740	2404	04	Subcontractor Cost
740	2405		<b>Installation of Concrete drainage pipes, incl. earth works up to depths 2,5 m, with 15 cm sand bed, backfill with compaction d = 600</b>
740	2405	01	Direct Material
740	2405	02	Direct Labor
740	2405	03	Direct Equipment
740	2405	04	Subcontractor Cost
740	2406		<b>Installation of Concrete drainage pipes, incl. earth works up to depths 2,5 m, with 15 cm sand bed, backfill with compaction d = 800</b>
740	2406	01	Direct Material
740	2406	02	Direct Labor
740	2406	03	Direct Equipment
740	2406	04	Subcontractor Cost
740	2407		<b>Installation of Concrete drainage pipes, incl. earth works up to depths 2,5 m, with 15 cm sand bed, backfill with compaction d = 1000</b>
740	2407	01	Direct Material
740	2407	02	Direct Labor
740	2407	03	Direct Equipment
740	2407	04	Subcontractor Cost
740	2408		<b>Installation of Concrete drainage pipes, incl. earth works up to depths 2,5 m, with 15 cm sand bed, backfill with compaction d = 1200</b>
740	2408	01	Direct Material
740	2408	02	Direct Labor
740	2408	03	Direct Equipment
740	2408	04	Subcontractor Cost

740	2409		<b>Installation of rain water drainage manholes depth 15 cm concrete walls with grill for roads, incl. earth works to the depth of 2,5 m 60X60X150</b>
740	2409	01	Direct Material
740	2409	02	Direct Labor
740	2409	03	Direct Equipment
740	2409	04	Subcontractor Cost
740	2410		<b>Manholes with trapdoors, sizes (cm) 60x60x150</b>
740	2410	01	Direct Material
740	2410	02	Direct Labor
740	2410	03	Direct Equipment
740	2410	04	Subcontractor Cost
740	2411		<b>Manholes with trapdoors, sizes (cm) 80x80x150</b>
740	2411	01	Direct Material
740	2411	02	Direct Labor
740	2411	03	Direct Equipment
740	2411	04	Subcontractor Cost
740	2412		<b>Manholes with trapdoors, sizes (cm) 100x100x200</b>
740	2412	01	Direct Material
740	2412	02	Direct Labor
740	2412	03	Direct Equipment
740	2412	04	Subcontractor Cost
740	2413		<b>Manholes with trapdoors, sizes (cm) 120x120x200</b>
740	2413	01	Direct Material
740	2413	02	Direct Labor
740	2413	03	Direct Equipment
740	2413	04	Subcontractor Cost
740	2414		<b>Manholes with trapdoors, sizes (cm) 140x140x200</b>
740	2414	01	Direct Material
740	2414	02	Direct Labor
740	2414	03	Direct Equipment
740	2414	04	Subcontractor Cost
740	2500		<b>Concrete works and r/c structure</b>
740	2510		<b>Lean concrete</b>
740	2511		<b>Concrete base, concrete class B 7,5, thickness = 100mm</b>
740	2511	01	Direct Material
740	2511	02	Direct Labor
740	2511	03	Direct Equipment
740	2512		<b>Side walking B22,5, F 100 thick 100 mm, width 1,0m</b>
740	2512	01	Direct Material
740	2512	02	Direct Labor
740	2512	03	Direct Equipment
740	2520		<b>R/C structure</b>
740	2521		<b>Foundation</b>
740	25211		<b>Installation and removal of shuttering and formwork</b>
740	25211	01	Direct Material
740	25211	02	Direct Labor
740	25211	03	Direct Equipment
740	25212		<b>Steel Reinforcement</b>



740	25212	01	Direct Material
740	25212	02	Direct Labor
740	25212	03	Direct Equipment
740	25213		<b>Concrete B25</b>
740	25213	01	Direct Material
740	25213	02	Direct Labor
740	25213	03	Direct Equipment
740	2522		<b>Column and beams</b>
740	25221		<b>Installation and removal of shuttering and formwork</b>
740	25221	01	Direct Material
740	25221	02	Direct Labor
740	25221	03	Direct Equipment
740	25222		<b>Steel Reinforcement</b>
740	25222	01	Direct Material
740	25222	02	Direct Labor
740	25222	03	Direct Equipment
740	25223		<b>Concrete B25</b>
740	25223	01	Direct Material
740	25223	02	Direct Labor
740	25223	03	Direct Equipment
740	2523		<b>Walls</b>
740	25231		<b>Installation and removal of shuttering and formwork</b>
740	25231	01	Direct Material
740	25231	02	Direct Labor
740	25231	03	Direct Equipment
740	25232		<b>Steel Reinforcement</b>
740	25232	01	Direct Material
740	25232	02	Direct Labor
740	25232	03	Direct Equipment
740	25233		<b>Concrete B25</b>
740	25233	01	Direct Material
740	25233	02	Direct Labor
740	25233	03	Direct Equipment
740	2524		<b>Slab on grade</b>
740	25241		<b>Installation and removal of shuttering and formwork</b>
740	25241	01	Direct Material
740	25241	02	Direct Labor
740	25241	03	Direct Equipment
740	25242		<b>Steel Reinforcement</b>
740	25242	01	Direct Material
740	25242	02	Direct Labor
740	25242	03	Direct Equipment
740	25243		<b>Concrete B25</b>
740	25243	01	Direct Material
740	25243	02	Direct Labor
740	25243	03	Direct Equipment
740	2600		<b>Steel structure</b>
740	2601		<b>Supply and installation of anchor bolts</b>
740	26011	01	Direct Material

740	26011	02	Direct Labor
740	26011	03	Direct Equipment
740	26011	04	Subcontractor Cost
740	<b>2602</b>		<b>Corrugated Sheet 6 mm thick</b>
740	26021	01	Direct Material
740	26021	02	Direct Labor
740	26021	03	Direct Equipment
740	26021	04	Subcontractor Cost
740	<b>2603</b>		<b>Load bearing structure - steel structure with anti-corrosion coating, painted</b>
740	26031	01	Direct Material
740	26031	02	Direct Labor
740	26031	03	Direct Equipment
740	26031	04	Subcontractor Cost
740	<b>2700</b>		<b>Walls</b>
740	2710		<b>Light block walls, thickness = 200 mm</b>
740	2710	01	Direct Material
740	2710	02	Direct Labor
740	2710	03	Direct Equipment
740	2720		<b>Supply and installation of interior sandwich-panels, 50 mm thick, Pe/Pe, color - standard Russia Made</b>
740	2720	01	Direct Material
740	2720	02	Direct Labor
740	2720	03	Direct Equipment
740	<b>2800</b>		<b>Floor covering</b>
740	2810		<b>Floor Hardener ( Master top 100 ) thickness = 3-4 mm (Germany)</b>
740	2810	01	Direct Material
740	2810	02	Direct Labor
740	2810	03	Direct Equipment
740	<b>2900</b>		<b>Fasad</b>
740	2910		<b>Sandwich panel walls</b>
740	<b>2911</b>		<b>Supply and installation of exterior sandwich-panels, 50 mm thick, PVF2 RR/Pe, color - standard Russia Made</b>
740	2911	01	Direct Material
740	2911	02	Direct Labor
740	2911	03	Direct Equipment
740	<b>2912</b>		<b>Sandwich panel façade, thickness = 100 mm, PVF2 RR/Pe, color - standard, mineral wool insulated. Russia Made</b>
740	2912	01	Direct Material
740	2912	02	Direct Labor
740	2912	03	Direct Equipment
740	2920		<b>Three layer r /c concrete schol panel walls h = 0,80m</b>
740	2920	01	Direct Material
740	2920	02	Direct Labor
740	2920	03	Direct Equipment
740	2930		<b>Exterior paint works (preparing and painting)</b>
740	2930	01	Direct Material
740	2930	02	Direct Labor
740	2930	03	Direct Equipment

740	<b>3000</b>		<b>Water and Heat Insulation</b>
740	3001		Vertical water insulation
740	3002		Poliethilen cover 200 mkm
740	3003		Brick wall over water insulation
740	3004		Expended polystyrene ПСБ-С-35 heat insulation 100 mm thick
740	<b>3100</b>		<b>Roof works</b>
740	<b>3101</b>		<b>Corrugated sheet H 60-845-0,8, one side painted RAL 9003, other side - primer painted</b>
740	3101	01	Direct Material
740	3101	02	Direct Labor
740	3101	03	Direct Equipment
740	<b>3102</b>		<b>Roof Waterproofing "TPO" (1 layer), Italy</b>
740	3102	01	Direct Material
740	3102	02	Direct Labor
740	3102	03	Direct Equipment
740	<b>3103</b>		<b>Heat insulation - "Roof Butts-H 125 kg/m3 60mm thick + "Roof Butts-B 180 kg/m3 40mm thick</b>
740	3103	01	Direct Material
740	3103	02	Direct Labor
740	3103	03	Direct Equipment
740	<b>3104</b>		<b>Vapour barrier poliethilen cover 200 mkm</b>
740	3104	01	Direct Material
740	3104	02	Direct Labor
740	3104	03	Direct Equipment
740	<b>3200</b>		<b>Doors and gates</b>
740	<b>3210</b>		<b>Metal doors</b>
740	3211		Steel Door, heat insulated , 1,0x2,0,with furniture, inswing arm U-Kolle (or similar) with door closer
740	3211		Steel Door, heat insulated 1,2x2,2,with furniture, inswing arm U-Kolle (or similar) with door closer
740	3211		Steel Door, not glazed, 2,4x2,4,with furniture, inswing arm U-Kolle (or similar) with door closer
740	<b>3220</b>		<b>Gates</b>
740	3221		External , vertical.sectional, steel lamels,heat insulated, glazed, with electric drive WA100, with access door, SPU 40 Hoermann, 3,0x4,0 m
740	3222		External , vertical.sectional, steel lamels,heat insulated, glazed, with electric drive WA100, with access door, SPU 40 Hoermann, 4,0x5,0 m
740	3223		External , vertical.sectional, steel lamels,heat insulated, glazed, with electric drive WA100, without access door, SPU 40 Hoermann, 4,0x5,0 m
740	3224		External , vertical.sectional, steel lamels,heat insulated, glazed, with electric drive WA100, with access door, SPU 40 Hoermann, 4,0x6,0 m
740	3225		External , vertical.sectional, steel lamels,heat insulated, glazed, with electric drive WA100, without access door, SPU 40 Hoermann, 4,75x6,0 m

740	3226	External , vertical,sectional, steel lamels,heat insulated, glazed, with electric drive WA100, without access door, SPU 40 Hoermann, 5,0x5,0 m
740	3227	External , vertical,sectional, steel lamels,heat insulated, glazed, with electric drive WA100, witht access door, SPU 40 Hoermann, 5,0x5,0 m
740	3228	External , vertical,sectional, steel lamels,heat insulated, glazed, with electric drive WA100, without access door, SPU 40 Hoermann, 5,0x5,0 m
740	3229	External , vertical,sectional, steel lamels,heat insulated, glazed, with electric drive WA100, witht access door, SPU 40 Hoermann, 5,0x5,5 m
740	3230	External , vertical,sectional, steel lamels,heat insulated, glazed, with electric drive WA100, with access door, SPU 40 Hoermann, 5,0x5,0 m
740	3231	External , vertical,sectional, steel lamels,heat insulated, glazed, with electric drive WA100, with access door, SPU 40 Hoermann, 5,5x4,0 m
740	3232	External , vertical,sectional, steel lamels,heat insulated, glazed, with electric drive WA100, without access door, SPU 40 Hoermann, 5,5x5,5 m
740	<b>3300</b>	<b>Windows and shopfront</b>
740	3310	<b>PVC windows works</b>
740	3311	Supply and installation of internal PVC windows, glass (double glazed), openable. Heat transfer coefficient $K \leq 1,8 \text{ BT/ m}^2\text{K}$ . Color white
740	3312	Supply and installation of internal PVC frame, poly carbonate windows ( 1 layer, 4mm , %25 of total area openable) (for warehouse $t = +5 \text{ C}$ )
740	3313	Supply and installation of internal PVC frame, poly carbonate windows ( 3 layer, 16mm , %25 of total area openable) (for production areas $t = +17 \text{ C}$ )
740	3320	<b>Skylights</b>
740	3321	Skylights openable, polycarbonate, aluminum profile,
740	3322	Skylights non openable, polycarbonate, aluminum profile
740	<b>3400</b>	<b>Others</b>
740	3410	<b>Interior metal works</b>
740	3411	Supply and installation of metal stairs and steps (Russia)
740	<b>3500</b>	<b>Landscaping</b>
740	3501	2 layers of Asphalt ( 70 mm rough layer, 50mm fine layer)
740	3502	Fence h=2,0 m with foundation
741		COST OF SERVICES RENDERED APPLIED
742		COST OF SERVICES RENDERED VARIANCE
<b>75</b>		<b>RESEARCH AND DEVELOPMENT EXPENSES</b>
750		RESEARCH AND DEVELOPMENT EXPENSES .
751		RESEARCH AND DEVELOPMENT EXPENSES APPLIED
752		RESEARCH AND DEVELOPMENT EXPENSES VARIANCE
<b>76</b>		<b>MARKETING SALES AND DISTRIBUTION EXPENSES</b>
760		MARKETING, SALES AND DISTRIBUTION EXPENSES'

761		MARKETING, SALES AND DISTRIBUTION EXPENSES APPLIED
762		MARKETING, SALES AND DISTRIBUTION EXPENSES VARIANCE
<b>77</b>		<b>GENERAL ADMINISTRATION EXPENSES</b>
770		GENERAL ADMINISTRATION EXPENSES
771		GENERAL ADMINISTRATION EXPENSES APPLIED
772		GENERAL ADMINISTRATION EXPENSES VARIANCE
<b>78</b>		<b>FINANCIAL EXPENSES</b>
780		FINANCIAL EXPENSES
781		FINANCIAL EXPENSES APPLIED
782		FINANCIAL EXPENSES VARIANCE

## 6.2 APPENDIX 2: "PROPOSED COA FOR THE COMPANY"

<b>ASSETS</b>		
<b>1</b>		<b>CURRENT ASSETS</b>
100		CASH ON HAND
100	01	Head Office Cash (local currency)
100	02	Head Office Cash (foreign currency)
100	03	Cash in Site A
100	04	Cash in Site B
100	05	Cash in Site C
101		CHECKS RECEIVED
102		CASH IN BANKS
103		CHECKS GIVEN AND PAYMENT ORDERS
108		OTHER CASH AND CASH EQUIVALENTS
<b>11</b>		<b>MARKETABLE SECURITIES</b>
110		SHARE CERTIFICATES
111		PRIVATE SECTOR BONDS
112		PUBLIC SECTOR BONDS
118		OTHER MARKETABLE SECURITIES
119		RESERVE ADJUSTING VALUE OF MARKETABLE SECURITIES
<b>12</b>		<b>TRADE RECEIVABLES</b>
120		CUSTOMERS
121		NOTES RECEIVABLE
122		DISCOUNTS OF NOTES RECEIVABLE (-)
126		DEPOSITS AND GURANTEES GIVEN
127		OTHER TRADE RECEIVABLES
128		DOUBTFUL TRADE RECEIVABLES
129		ALLOWANCES FOR DOUBTFUL CURRENT TRADE RECEIVABLES
<b>13</b>		<b>OTHER RECEIVABLES</b>
131		RECEIVABLE FROM SHAREHOLDERS
132		RECEIVABLE FROM PARTICIPATIONS
133		RECEIVABLE FROM SUBSIDIARY COMPANIES
135		RECEIVABLE FROM EMPLOYEES
136		OTHER VARIOUS RECEIVABLES
137		DISCOUNT OF OTHER RECEIVABLE (-)
138		DOUBTFUL OTHER RECEIVABLES
139		ALLOWANCE FOR DOUBTFUL OTHER RECEIVABLES
<b>15</b>		<b>INVENTORIES</b>
150		RAW MATERIALS AND SUPPLIES
151		WORK-IN-PROCESS
152		FINISHED PRODUCTS
153		MERCHANDISE
157		OTHER MATERIALS

158	RESERVE ADJUSTING INVENTORIES (-)
159	ADVANCES TO SUPPLIERS FOR GOODS&SERVICES
<b>17</b>	<b>CONSTRUCTION AND REPAIR COSTS</b>
170	CONSTRUCTION AND REPAIR COSTS
171	ADVANCES GIVEN TO SUB-CONTRACTORS
<b>18</b>	<b>PREPAID EXPENSES AND INCOME RECEIVABLES</b>
180	PREPAID EXPENSES
181	ACCRUED INCOME
<b>19</b>	<b>OTHER CURRENT ASSETS</b>
190	DEFFERED VAT
191	DEDUCTIBLE VAT
192	OTHER VAT
193	PREPAID TAXES AND FUNDS
195	JOB ADVANCES
196	ADVANCES TO PERSONNEL
197	INVENTORY SHORTAGES
198	OTHER VARIOUS CURRENT ASSETS
199	PROVISIONEN FOR OTHER CURRENT ASSETS
<b>2</b>	<b>FIXED ASSETS</b>
<b>22</b>	<b>TRADE RECEIVABLES</b>
220	CUSTOMERS
221	NOTES RECEIVABLES
222	DISCOUNTS ON NOTES RECEIVABLES (-)
226	DEPOSITS AND GURANTEES GIVEN
227	OTHER TRADE RECEIVABLES
229	PROVISIONEN FOR DOUBTFUL TRADE RECEIVABLES (-)
<b>23</b>	<b>OTHER RECEIVABLES</b>
231	RECEIVABLE FROM SHAREHOLDERS
232	RECEIVABLE FROM PARTICIPATION
233	RECEIVABLE FROM SUBSIDIARY COMPANIES
235	RECEIVABLE FROM PERSONNEL
236	OTHER RECEIVABLES
237	REDISCOUNT ON OTHER NOTES RECEIVABLE (-)
239	PROVISIONEN FOR OTHER DOUBTFUL RECEIVABLES
<b>24</b>	<b>FINANCIAL FIXED ASSETS</b>
240	SECURITIES HELD AS LONG-TERM INVESTMENTS
241	RESERVE ADJUSTING THE VALUE OF SECURITIES HELD AS L/T INVESTMENS
242	PARTICIPATIONS
243	COMMITMENTS TO PARTICIPATIONS
244	RESERVE ADJUSTING THE VALUE OF PARTICIPATIONS
245	INVESTMENTS IN SUBSIDIARY COMPANIES
246	COMMITMENTS TO SUBSIDIARY COMPANIES

247	RESERVE ADJUSTING THE VALUE INVESTMENTS
248	OTHER FINANCIAL ASSETS
249	RESERVE ADJUSTINGS THE VALUE OF OTHER FINANCIAL ASSETS
<b>25</b>	<b>TANGIBLE ASSETS</b>
250	LAND
251	LAND IMPROVEMENTS
252	BUILDINGS
253	MACHINERY AND EQUIPMENTS
254	MOTOR VEHICLES
255	FURNITURE AND FIXTURES
256	OTHER TANGIBLE FIXED ASSETS
257	ACCUMULATED DEPRECIATION
258	CONSTRUCTIONS IN PROGRESS
259	ADVANCES TO SUPPLIERS OF TANGIBLE FIXED ASSETS
<b>26</b>	<b>INTANGIBLE ASSETS</b>
260	RIGHTS
261	GOODWILL
262	PRE-OPERATING EXPENSES
263	RESEARCH, DEVELOPMENT EXPENSES
264	LEASEHOLD IMPROVEMENTS
267	OTHER INTANGIBLE FIXED ASSETS
268	ACCUMULATED AMORTIZATION OF INTANGIBLE
269	ADVANCES TO SUPPLIERS
<b>27</b>	<b>EXTRA ORDINARY USEFULL LIFE ASSETS</b>
271	RESEARCH EXPENSES
272	PREPERATION AND IMPROVEMENT EXPENSES
277	OTHER ASSETS SUBJECT TO SPECIAL AMORTIZATION
278	ACCUMULATED AMORTIZATION
279	ADVANCES TO SUPPLIERS OF ASSETS SUBJECT TO SPECIAL AMORTIZATION
<b>28</b>	<b>PREPAID EXPENSES AND INCOME ACCRUALS</b>
280	PREPAID EXPENSES FOR FUTURE PERIODS
281	INCOME ACCRUALS
<b>29</b>	<b>OTHER FIXED ASSETS</b>
291	DEDUCTIBLE VAT IN FUTURE PERIODS
292	OTHER VAT
293	INVENTORIES TO BE USED IN LONG-TERM
294	INVENTORIES AND TANGIBLE FIXED ASSETS TO BE SOLD
295	PREPAID TAXES AND DUTIES
297	OTHER VARIOUS NON-CURRENT ASSETS
298	RESERVE ADJUSTING INVENTORIES TO BE SOLD
299	ACCUMULATED DEPRECIATION OF TANGIBLE FIXED ASSETS TO BE SOLD



<b>LIABILITIES</b>	
<b>3</b>	<b>CURRENT LIABILITIES</b>
<b>30</b>	<b>FINANCIAL LIABILITIES (F.BORROWINGS)</b>
300	BANK LOANS
303	CURRENT PORTION OF LONG-TERM LOANS
304	CURRENT PRINCIPAL, INTEREST AND INSTALMENT PAYABLES ON BONDS
305	COMMERCIAL PAPER
306	OTHER MARKETABLE SECURITIES ISSUED
308	VALUE DIFFERENCE IN ISSUANCE OF MARKETABLE SECURITIES
309	OTHER CURRENT FINANCIAL PAYABLES
<b>32</b>	<b>TRADE LIABILITIES</b>
320	ACCOUNTS PAYABLE
321	NOTES PAYABLE
322	DISCOUNT OF NOTES PAYABLE (-)
326	GUARANTEE DEPOSITS RECEIVED
327	OTHER CURRENT TRADE PAYABLES
<b>33</b>	<b>OTHER LIABILITIES</b>
331	OTHER PAYABLES TO SHAREHOLDERS
332	OTHER PAYABLES TO PARTICIPATIONS
333	OTHER PAYABLES TO SUBSIDIARY COMPANIES
335	PAYABLES TO EMPLOYEES
336	OTHER VARIOUS PAYABLES
337	DISCOUNT OF OTHER NOTOS PAYABLE (-)
<b>34</b>	<b>ADVANCES</b>
340	ADVANCES FROM CUSTOMERS
349	OTHER ADVANCES RECEIVED
<b>35</b>	<b>CONSTRUCTION AND REPAIR PROGRESS BILLINGS</b>
350	CONSTRUCTION AND REPAIR PROGRESS BILLINGS
<b>36</b>	<b>INCOME TAXES PAYABLE AND OTHER LIABILITIES</b>
360	TAXES PAYABLES
361	SOCIAL SECURITY DUTIES PAYABLE
368	UNPAID, RESCHEDULED TAXES AND DUTIES PAYABLE
369	OTHER DUTIES PAYABLE
<b>37</b>	<b>PROVISIONS FOR DUE AND EXPENSE</b>
370	PROVISIONS FOR TAXATION INCOME AND RELATED
371	PREPAID INCOME TAXES AND RELATED DUTIES
372	RESERVE FOR EMPLOYEE TERMINATION INDEMNITIES
373	RESERVE FOR COSTS
379	OTHER PROVISIONS AND ACCRUED LIABILITIES
<b>38</b>	<b>DEFERRED INCOME AND ACCR UED EXPENSES</b>

380	DEFERRED INCOME
381	ACCRUED EXPENSES
<b>39</b>	<b>OTHER SHORT TERM LIABILITIES</b>
391	VAT RECEIVED
392	OTHER VAT RECEIVED
393	HEAD OFFICE AND BRANCH CURRENT ACCOUNTS
397	INVENTORY OVERAGES
399	OTHER VARIOUS CURRENT LIABILITIES
<b>4</b>	<b>LONG-TERM LIABILITIES</b>
<b>40</b>	<b>FINANCIAL LIABILITIES (F.BORROWINGS)</b>
400	BANK LOANS
405	BONDS ISSUED
407	OTHER MARKETABLE SECURITIES ISSUED
408	VALUE DIFFERENCE IN ISSUANCE OF SECURITIES ISSUED
409	OTHER FINANCIAL LIABILITIES
<b>42</b>	<b>TRADE LIABILITIES</b>
420	SUPPLIERS
421	NOTES PAYABLE
422	DISCOUNT OF NOTES PAYABLE (-)
426	DEPOSITS AND GUARANTEES RECEIVED
429	OTHER TRADE PAYABLES
<b>43</b>	<b>OTHER LIABILITIES</b>
431	DUE TO SHAREHOLDERS
432	DUE TO PARTICIPATIONS
433	DUE TO SUBSIDIARY COMPANIES
436	OTHER NON-CURRENT VARIOUS PAYABLES
437	REDISCOUNT OF OTHER NOTES PAYABLE (-)
438	NON-CURRENT UNPAID, RESCHEDULED PAYABLES TO GOVERNMENT
<b>44</b>	<b>ADVANCE RECEIVED</b>
440	ADVANCES FROM CUSTOMERS
449	OTHER ADVANCES RECEIVED
<b>47</b>	<b>PROVISIONS FOR DUE AND EXPENSE</b>
472	RESERVE FOR EMPLOYEE TERMINATION INDEMNITIES
479	OTHER PROVISIONS AND ACCRUED LIABILITIES
<b>48</b>	<b>DEFERRED INCOME AND ACCRUED EXPENSES</b>
480	DEFERRED INCOME
481	ACCRUED EXPENSES
<b>49</b>	<b>OTHER LONG-TERM LIABILITIES</b>
492	VAT DEFERRED TO FOLLOWING YEARS
493	INSTALLATION PARTICIPATION

499	OTHER VARIOUS NON-CURRENT LIABILITIES
<b>5</b>	<b>SHAREHOLDERS' EQUITY (STOCKHOLDERS' EQUITY)</b>
<b>50</b>	<b>PAID - IN CAPITAL</b>
500	CAPITAL
501	UNPAID CAPITAL (-)
<b>52</b>	<b>CAPITAL RESERVE</b>
520	SHARES OF STOCKS ISSUANCE PREMIUMS
521	INCOME ON CANCELLED SHARES OF STOCKS
522	REVALUATION SURPLUS OF TANGIBLE FIXED ASSETS
523	REVALUATION SURPLUS OF PARTICIPATIONS
529	OTHER CAPITAL RESERVES
<b>54</b>	<b>PROFIT RESERVE</b>
540	LEGAL RESERVE
541	STATUTORY RESERVE
542	EXTRAORDINARY RESERVE
548	OTHER PROFIT RESERVES
549	SPECIAL FUNDS
<b>57</b>	<b>PRIOR YEAR PROFIT</b>
570	RETAINED EARNINGS
<b>58</b>	<b>PRIOR YEAR LOSS (-)</b>
580	ACCUMULATED LOSS
<b>59</b>	<b>PROFIT FOR THE PERIOD (LOSS)</b>
590	NET PROFIT FOR THE PERIOD
591	NET LOSS FOR THE PERIOD (-)
<b>6</b>	<b>INCOME STATEMENT ACCOUNTS</b>
<b>60</b>	<b>GROSS SALES</b>
600	DOMESTIC SALES
601	EXPORT SALES
602	OTHER SALES
<b>61</b>	<b>SALES RETURNS AND ALIOWANCES</b>
610	SALES RETURNS (-) .
611	SALES DISCOUNTS (-)
612	OTHER DEDUCTIONS (-)
<b>62</b>	<b>COST OF GOOD SOGD</b>
620	COST OF GOODS SOLD (PRODUCT) (-)
621	COST OF GOODS SOLD (MERCHANDISE) (-)
622	COST OF SERVICES RENDERED (-)
623	COST OF SALES (OTHER) (-)
<b>63</b>	<b>OPERATING EXPENSES</b>

630	RESEARCH AND DEVELOPMENT EXPENSES (-)
631	MARKETING, SELLING AND DISTRIBUTION EXPENSES (-)
632	GENERAL ADMINISTRATIVE EXPENSES (-)
<b>64</b>	<b>OTHER OPERATING REVENUES (INCOME)</b>
640	DIVIDENDS RECEIVED-PARTICIPATIONS
641	DIVIDENDS RECEIVES-SUBSIDIARY COMPANIES
642	INTEREST AND OTHER FINANCIAL INCOME
643	COMMISSION INCOME
644	PROVISIONS NO LONGER REQUIRED ,
645	PROFIT ON SALE OF MARKETABLE SECURITIES
646	EXCHANGE GAINS
647	INCOME FROM DISCOUNTS OF NOTES PAYABLE
649	OTHER VARIOUS INCOME FROM OPERATIONS
<b>65</b>	<b>OTHER OPERATING EXPENSES ()</b>
650	RESEARCH AND DEVELOPMENT EXPENSES .
653	COMMISSION EXPENSES (-)
654	PROVISIONS (-)
655	LOSS ON SALE OF MARKETABLE SECURITIES
656	EXCHANGE LOSSES
657	INCOME FROM DISCOUNT OF NOTES RECEIVABLE
659	OTHER EXPENSES (-)
<b>66</b>	<b>FINANCIAL EXPENSES</b>
660	FINANCIAL EXPENSES ON CURRENT BORROWINGS
661	FINANCIAL EXPENSES ON NON-CURRENT BORROWINGS
<b>67</b>	<b>EXTRAORDINARY INCOME AND PROFIT</b>
671	PRIOR PERIOD REVENUES AND PROFITS (-)
679	OTHER EXTRAORDINARY INCOME
<b>68</b>	<b>EXTRAORDINARY EXPENSES AND LOSS</b>
680	IDLE CAPACITY EXPENSES (-)
681	PRIOR PERIOD EXPENSES (-)
689	OTHER EXTRAORDINARY EXPENSES (-)
<b>7</b>	<b>COST ACCOUNT AS REQUIRED BY 7/A OPTION</b>
<b>70</b>	<b>COST CONTROL ACCOUNT</b>
700	COSTS CONTROL ACCOUNT
701	COST CHARGE ACCONT
<b>71</b>	<b>DIRECT RAW AND OTHER MATERIAL EXPENSES</b>
711	DIRECT RAW AND OTHER MATERIAL EXPENSES APPLIED
712	DIRECT RAW AND OTHER MATERIAL PRICE VARIANCE
713	DIRECT RAW AND OTHER MATERIAL UNIT VARIANCE
<b>72</b>	<b>DIRECT LABOUR EXPENSES</b>
720	DIRECT LABOUR EXPENSES

721	DIRECT LABOUR EXPENSES APPLIED
722	DIRECT LABOUR WAGES VARIANCE
723	DIRECT LABOUR TIME VARIANCE
<b>73</b>	<b>MANUFACTURING OVERHEAD EXPENSES</b>
730	OVERHEAD COSTS
731	OVERHEAD COSTS APPLIED
732	OVERHEAD COSTS BUDGET VARIANCE
733	OVERHEAD COSTS PRODUCTIVITY VARIANCE
734	OVERHEAD COSTS CAPACITY VARIANCE
<b>74</b>	<b>COST OF SERVICES RENDERED</b>
740	COST OF SERVICES RENDERED
741	COST OF SERVICES RENDERED APPLIED
742	COST OF SERVICES RENDERED VARIANCE
<b>75</b>	<b>RESEARCH AND DEVELOPMENT EXPENSES</b>
750	RESEARCH AND DEVELOPMENT EXPENSES .
751	RESEARCH AND DEVELOPMENT EXPENSES APPLIED
752	RESEARCH AND DEVELOPMENT EXPENSES VARIANCE
<b>76</b>	<b>MARKETING SALES AND DISTRIBUTION EXPENSES</b>
760	MARKETING, SALES AND DISTRIBUTION EXPENSES'
761	MARKETING, SALES AND DISTRIBUTION EXPENSES APPLIED
762	MARKETING, SALES AND DISTRIBUTION EXPENSES VARIANCE
<b>77</b>	<b>GENERAL ADMINISTRATION EXPENSES</b>
770	GENERAL ADMINISTRATION EXPENSES
771	GENERAL ADMINISTRATION EXPENSES APPLIED
772	GENERAL ADMINISTRATION EXPENSES VARIANCE
<b>78</b>	<b>FINANCIAL EXPENSES</b>
780	FINANCIAL EXPENSES
781	FINANCIAL EXPENSES APPLIED
782	FINANCIAL EXPENSES VARIANCE

### 6.3 APPENDIX 3: "PROPOSED COMPANY COST CODE SYSTEM"

<b>1000</b>			<b>PROJECT INDIRECT COSTS (SITE OVERHEADS)</b>
	<b>1100</b>		<b>Salaries</b>
		<b>1110</b>	<b>Unproductive Foreign Personnel Salaries</b>
		<b>1111</b>	Management Staff Salaries
		<b>1112</b>	Department Chiefs Salaries
		<b>1113</b>	Field Personnel Salaries
		<b>1114</b>	Administrative Personnel Salaries
		<b>1120</b>	<b>Unproductive Local Personnel Salaries</b>
		<b>1121</b>	Management Staff Salaries
		<b>1122</b>	Department Chiefs Salaries
		<b>1123</b>	Field Personnel Salaries
		<b>1124</b>	Administrative Personnel Salaries
	<b>1200</b>		<b>Personnel Expenses</b>
		<b>1210</b>	<b>Food Expenses for Site Personnel</b>
		<b>1220</b>	<b>Accommodation Expenses</b>
		<b>1230</b>	<b>Health Expenses</b>
		<b>1240</b>	<b>Visa and Registration Expenses</b>
		<b>1250</b>	<b>Travel Expenses</b>
	<b>1300</b>		<b>Indirect Transportation and Cargo Expenses</b>
	<b>1400</b>		<b>Vehicles and Equipments Rentals</b>
		<b>1410</b>	<b>Site Vehicles (automobiles,busses,gazel etc.)</b>
		<b>1420</b>	<b>Work Machines</b>
		<b>1430</b>	<b>Site Equipments (Tower Crane,mobile cranes etc.)</b>
		<b>1440</b>	<b>Batch Plant</b>
	<b>1500</b>		<b>Handtools and Inventories</b>
		<b>1510</b>	<b>Small Equipments</b>
		<b>1520</b>	<b>Hand tools</b>
		<b>1530</b>	<b>Office Inventories</b>
	<b>1600</b>		<b>Site Office Operating Expenses</b>
		<b>1610</b>	<b>Provided Services</b>
		<b>1611</b>	Water, Gas, Electricity Expenses
		<b>1612</b>	Telephone and Fax Expenses
		<b>1613</b>	Mobile Phone (GSM) Expenses
		<b>1614</b>	Job Site Security Expenses
		<b>1615</b>	Consultancy Expenses
		<b>1616</b>	Photocopy, Xerox Expenses
		<b>1620</b>	<b>Construction and Work Permit Expenses</b>
		<b>1630</b>	<b>Office Consumables</b>
		<b>1640</b>	<b>Advertising and Marketing Expenses</b>
	<b>1700</b>		<b>Guarantee Period Expenses</b>
	<b>1800</b>		<b>Contractual Expenses (Prelimineries)</b>
		<b>1810</b>	<b>Client's premises</b>
		<b>1820</b>	<b>Client's special requirements</b>
		<b>1830</b>	<b>Bank Guarantee Expenses</b>
	<b>1900</b>		<b>Insurance Expenses</b>

		<b>1910</b>	<b>All-risk insurance</b>
<b>2000</b>			<b>PROJECT ACTIVITIES (DIRECT COSTS)</b>
	<b>2100</b>		<b>MOBILIZATION / DEMOBILIZATION</b>
		<b>2110</b>	<b>Temporary Facilities</b>
		<b>2111</b>	Prefabricated Site Office
		<b>2112</b>	Container Offices
		<b>2113</b>	Closed Warehouse
		<b>2114</b>	Canteen
		<b>2115</b>	Dormitories for Workers
		<b>2116</b>	Carpentry Workshop
		<b>2117</b>	Steel Structure Workshop
		<b>2118</b>	Precast Workshop
		<b>2119</b>	Wheel washing Facilities
		<b>2120</b>	<b>SITE MOBILIZATION</b>
		<b>2121</b>	Temporary Fence
		<b>2122</b>	Temporary Roads
		<b>2123</b>	Temporary Heating Facility
		<b>2124</b>	Temporary Electricity Supply
		<b>2125</b>	Temporary Water Supply
		<b>2126</b>	Site Drainage
		<b>2127</b>	Open Stock Area
		<b>2128</b>	Assembling and disassembling of Tower Crane
	<b>2200</b>		<b>DESIGN WORKS</b>
		<b>2110</b>	<b>Detailed Design Works</b>
		<b>2120</b>	<b>Shop Drawings</b>
		<b>2130</b>	<b>As-built Drawings</b>
	<b>2300</b>		<b>INFRASTRUCTURAL WORKS</b>
		<b>2310</b>	<b>Excavation works</b>
		<b>2320</b>	<b>Diaphragm wall works (pile plunge)</b>
		<b>2330</b>	<b>Drainage works</b>
		<b>2340</b>	<b>Foundation strengthening works, piling work</b>
	<b>2400</b>		<b>LANDSCAPING WORKS</b>
		<b>2410</b>	<b>Landscaping works</b>
		<b>2420</b>	<b>Fencing works</b>
		<b>2430</b>	<b>Asphalt works</b>
		<b>2440</b>	<b>Roads and walkways</b>
		<b>2450</b>	<b>Greening and plantation</b>
	<b>2500</b>		<b>CIVIL WORKS</b>
		<b>2510</b>	<b>Demolition and dismantling works</b>
		<b>2520</b>	<b>Backfilling works</b>
		<b>2521</b>	Sand earth backfilling works
		<b>2522</b>	Gravel backfilling works
		<b>2530</b>	<b>Scaffolding installation and dismantling.</b>
		<b>2540</b>	<b>Formworks</b>
		<b>2541</b>	Formworks (foundation)
		<b>2542</b>	Formworks (walls)
		<b>2543</b>	Formworks (floor + stairs)
		<b>2544</b>	Formworks (column and beam)

		<b>2545</b>	Formworks (slab on grade)
	<b>2550</b>		<b>Steel reinforcement works</b>
		<b>2551</b>	Steel reinforcement works (foundation)
		<b>2552</b>	Steel reinforcement works (wall)
		<b>2553</b>	Steel reinforcement works (floor + stairs )
		<b>2554</b>	Steel reinforcement works (column and beam)
		<b>2555</b>	Steel reinforcement works (slab on grade)
	<b>2560</b>		<b>In situte Concrete works</b>
		<b>2561</b>	Concrete works (foundation)
		<b>2562</b>	Concrete works (wall)
		<b>2563</b>	Concrete works (floor)
		<b>2564</b>	Concrete works (column and beam)
		<b>2565</b>	Concrete works (slab on grade)
		<b>2566</b>	Lean concrete works
	<b>2570</b>		<b>Fiber reinforced concrete slab</b>
	<b>2580</b>		<b>Precast concrete works</b>
	<b>2590</b>		<b>Steel construction works</b>
		<b>2591</b>	Steel Structure Columns
		<b>2592</b>	Steel Structure Roof Trusses
		<b>2593</b>	Anchor bolts and plates
		<b>2594</b>	Steel construction fire resistance paint works
<b>2600</b>			<b>ARCHITECTURAL WORKS</b>
	<b>2610</b>		<b>WALL WORKS</b>
		<b>2611</b>	Brick wall works
		<b>2612</b>	Hollow block works
		<b>2613</b>	Gypsum board partitions
		<b>2614</b>	Glass partitions
		<b>2615</b>	inside panel partition walls
		<b>2616</b>	Other partition walls (metal mesh, wooden)
		<b>2617</b>	WC cubical works
		<b>2618</b>	Plastering works (with or without steel mesh)
		<b>2619</b>	Ceramic wall tiling works
		<b>2620</b>	Wall paper works
		<b>2621</b>	Fintex wall covering works
		<b>2622</b>	Gypsum board wall covering works
		<b>2623</b>	Decorative plaster (mineral) and wall covering works
		<b>2624</b>	Wooden wall covering works
		<b>2625</b>	Wall surface preparation works
		<b>2626</b>	Wall paints works
		<b>2627</b>	Granite wall covering works
	<b>2630</b>		<b>FLOOR COVERING WORKS</b>
		<b>2631</b>	Screed works (with or without re-bar)
		<b>2632</b>	Self levelling works
		<b>2633</b>	Keramizit floor fill works
		<b>2634</b>	Floor ceramic tiling works
		<b>2635</b>	Floor marble tiling works
		<b>2636</b>	Floor linoleum works
		<b>2637</b>	Floor granite tiling works
		<b>2638</b>	Floor carpet covering works



			<b>2639</b>	Floor parquet works
			<b>2640</b>	Floor terrazzo tiles works
			<b>2641</b>	Floor mosaic covering works
			<b>2642</b>	Floor covering works + surfaceharders
			<b>2643</b>	Raised floor works
			<b>2644</b>	Floor Epoxy covering works
		<b>2640</b>		<b>CEILING WORKS</b>
			<b>2641</b>	Aluminium suspended ceiling works
			<b>2642</b>	Acoustic (Armstrong) suspended ceiling works
			<b>2643</b>	Gypsum board suspended ceiling works
			<b>2644</b>	Ceiling surface preparation works
			<b>2645</b>	Ceiling paint works
		<b>2650</b>		<b>FAÇADE WORKS</b>
			<b>2651</b>	Sandwich panel cladding works
			<b>2652</b>	Metal cassette system exterior covering works
			<b>2653</b>	Exterior paint works
			<b>2654</b>	Exterior plastering works
			<b>2655</b>	Decorative plaster exterior covering systems
			<b>2656</b>	Decorative brick wall covering works
			<b>2657</b>	Socle panel works
			<b>2658</b>	Exterior covering works
		<b>2660</b>		<b>ROOF WORKS</b>
			<b>2661</b>	Plate roof covering works
			<b>2662</b>	Pitched roof covering works
			<b>2663</b>	Panel system roof covering works
			<b>2664</b>	Plate roof waterproofing works
			<b>2665</b>	Plate roof heat insulation works
			<b>2666</b>	Plate roof vapour barrier insulation
			<b>2667</b>	Pitched roof waterproofing works
			<b>2668</b>	Pitched roof heat insulation works
			<b>2669</b>	Roof Keramizit fill works
			<b>2670</b>	Pitched roof vapour barrier insulation
		<b>2770</b>		<b>DOORS, WINDOWS &amp; CURTAIN WALL WORKS</b>
			<b>2771</b>	Wooden door works
			<b>2772</b>	Metal door works
			<b>2773</b>	Industrial doors
			<b>2774</b>	Wooden windows and works
			<b>2775</b>	Aluminium window works
			<b>2776</b>	PVC window works
			<b>2777</b>	Shopfront works
			<b>2778</b>	Skylight works
		<b>2880</b>		<b>INSULATION WORKS</b>
			<b>2881</b>	Concrete waterproofing works
			<b>2882</b>	Concrete heat insulation works
			<b>2883</b>	Wall heat insulation works
			<b>2884</b>	Water insulation of premises
			<b>2885</b>	Sound insulation works
			<b>2886</b>	Vibroinsulation
			<b>2887</b>	Constructional joints and profile works

<b>2700</b>		<b>MECHANICAL WORKS</b>
	<b>2710</b>	<b>Heating and Ventilation</b>
	<b>2711</b>	Interior heat supply system
	<b>2712</b>	External heat supply system
	<b>2713</b>	Ventilation system works
	<b>2720</b>	<b>Plumbing and Sewage Works</b>
	<b>2730</b>	<b>Air Conditioning Works</b>
	<b>2740</b>	<b>Waste Water Drainage Works</b>
	<b>2750</b>	<b>Compression and vacuum systems</b>
	<b>2760</b>	<b>Mechanical automation</b>
	<b>2770</b>	<b>Gas Pipeline &amp; Connections</b>
	<b>2880</b>	<b>Other mechanical works.</b>
<b>2800</b>		<b>ELECTRICAL WORKS</b>
	<b>2810</b>	Interior area power supply systems
	<b>2811</b>	External power supply systems
	<b>2812</b>	Interior lighting systems works
	<b>2813</b>	External lighting
	<b>2814</b>	Interior low voltage systems works
	<b>2815</b>	Exterior low voltage systems works
	<b>2816</b>	Other electrical works
	<b>2817</b>	Electrical automation
	<b>2818</b>	Exterior lightning and grounding
<b>2900</b>		<b>OTHERS</b>
	<b>2910</b>	Canopy works
	<b>2920</b>	Other carpentry works
	<b>2930</b>	Interior metal works
	<b>2940</b>	Exterior metal works
	<b>2950</b>	Information Signs
	<b>2960</b>	Furniture
	<b>2990</b>	Cement purchasing for Concrete Batching Plant
	<b>3000</b>	Additive for Concrete Batching Plant
<b>3000</b>		<b>External Utilities</b>
	<b>3010</b>	External Gas Pipeline & Connections
	<b>3020</b>	External Heat Supply system
	<b>3030</b>	External Water Supply system
	<b>3040</b>	External Waste Water System
	<b>3050</b>	External Firefighting Water Supply System
	<b>3060</b>	External Storm Water Works
<b>3600</b>		<b>Installed Equipment</b>
	<b>3610</b>	Elevators
	<b>3620</b>	Lifts
	<b>3630</b>	Assembling of crane and industrial equipments
	<b>3620</b>	Kitchen Equipments
<b>4000</b>		<b>HEAD OFFICE DISTRIBUTION</b>
	<b>4100</b>	Head office consumable materials
	<b>4200</b>	Security and supervising expenses
	<b>4300</b>	Representing and hosting
	<b>4400</b>	Commission payments

<b>4500</b>		<b>Head office rental expenses</b>
<b>4600</b>		<b>Head office movable</b>
<b>4700</b>		<b>Tax payments</b>
<b>4800</b>		<b>Insurance payments</b>
<b>4900</b>		<b>Other expenses</b>

## 6.4 APPENDIX 4: “EXAMPLES OF MIS REPORTS (CASE STUDY) “

1С:Предприятие - Management Information System (MIS)

Файл Действия KATALOGLAR DOKUMANLAR DOKUMAN LİSTELERİ RAPORLAR İSLEMLER Сервис Окна Помощь

Контроль затрат

eklesme Tarihi 01.07.04 Son 06.07.04

Объекты:

Secilen Haric

Статьи затрат:

Secilen Haric

Maliyet Turu

Группировать по

Object ile

Maliyet Kontrol Kodu ile

Secilen Haric

RUR

USD

Hepsi

Tum Faaliyetleri Goster

Detayli Dokuman Listesi

Kapat Olustur

Загрузка интерфейса - Атрибут в Отчет/MainCostControl/Форма с кодом HerVerham не найден!

Контроль затрат

Для выбора значения нажмите клавишу F4.

ТА: 06.07.04 20:00:14 БИ: 3 квартал 2004 г. ТП:

1С:Предприятие - Management Information System (MIS)

Файл Действия KATALOGLAR DOKUMANLAR DOKUMAN LİSTELERİ RAPORLAR İSLEMLER Сервис Окна Помощь

Muavin Defteri

Baslangic Tarihi 01.01.04 Bitis Tarihi 06.07.04

Hesap Planı

Santiye

Hesap Turu

Butce Kodu

Firma

Gruplama Sirasi

Prio	Group	Name
<input checked="" type="checkbox"/>	Hesaba Gore	
<input type="checkbox"/>	Firmaya Gore	
<input type="checkbox"/>	Santiyeye Gor	
<input type="checkbox"/>	Butce Koduna	
<input type="checkbox"/>	Sozlesmeye Go	

Coklu Secim

R: P95

D: USD

Hepsi

Yonetim

Finans

Muavin Defteri (Detayli)

Kontragentleri Sayfalara Ayir

Sifir Bakiyeleri Gosterme

Sadece Hareket Gorenler

OK Olustur Kapat

Muavin Defteri

Для получения подсказки нажмите F1.

ТА: 06.07.04 20:00:14 БИ: 3 квартал 2004 г. ТП:

COST CONTROL ( 15.06.04 по 23.06.04 ) tum maliyet kodlari ve tipleri; secilileri goster			
Kod	Aciklama	TOPLAM:	02 MALZEME
	<b>TOPLAM:</b>	<b>3,546,845.15</b>	<b>770,330.21</b>
<b>1</b>	RC MSK	<b>3,500,298.65</b>	770,330.21
<b>0</b>	DOVIZ DEGISIM HAREKETI	<b>16.17</b>	16.17
15.06.2004	Списание 0000000681,	<b>16.17</b>	16.17
<b>1010</b>	Diger giderler	<b>1,000.00</b>	
15.06.2004	Касса РКО-000219,	<b>1,000.00</b>	
<b>1080</b>	Kontrat oncesi giderler		
<b>1111</b>	Yabancı endirekt odemeler	<b>42,486.11</b>	
15.06.2004	ДвижениеДС 00000516,	<b>42,486.11</b>	
<b>1151</b>	Pasif gorevlerdeki Turk isciler	<b>43,543.05</b>	
15.06.2004	ДвижениеДС 00000516,	<b>43,543.05</b>	
<b>1200</b>	Genel personel giderleri (ulastirma,yemek,saglik,	<b>1,794,748.08</b>	3,382.59
15.06.2004	Списание 0000000681,	<b>478.86</b>	478.86
15.06.2004	КассаПрочие ДРК-001100,	<b>1,000.00</b>	
16.06.2004	КассаПрочие ДРК-001101,	<b>1,447.00</b>	
17.06.2004	Списание 0000000692,	<b>445.44</b>	445.44
17.06.2004	КассаПрочие ДРК-001130,	<b>293,500.00</b>	
18.06.2004	Касса РКО-000225,	<b>1,160.00</b>	
18.06.2004	Списание 0000000702,	<b>229.86</b>	229.86
18.06.2004	КассаПрочие ДРК-001122,	<b>3,868.49</b>	
18.06.2004	КассаПрочие ДРК-001139,	<b>2,610.00</b>	
19.06.2004	Акт приемки сервисного обслуживания 61,	<b>746,550.00</b>	
19.06.2004	Акт приемки сервисного обслуживания 62,	<b>738,650.00</b>	
19.06.2004	КассаПрочие ДРК-001126,	<b>1,150.00</b>	
21.06.2004	Списание 0000000705,	<b>1,692.00</b>	1,692.00
21.06.2004	КассаПрочие ДРК-001132,	<b>1,430.00</b>	
<b>1300</b>	Genel nakliye giderleri	<b>19,720.00</b>	
15.06.2004	Акт приемки сервисного обслуживания 20,	<b>19,720.00</b>	
<b>1401</b>	Еkipman, makina ve oto satin alimi ve y/p	<b>6,440.47</b>	940.47
16.06.2004	КассаПрочие ДРК-001101,	<b>2,500.00</b>	

18.06.2004	Списание 0000000702,	752.47	752.47
18.06.2004	КассаПрочие ДРК-001122,	3,000.00	
19.06.2004	Списание 0000000703,	188.00	188.00
<b>1402</b>	<b>Genel ekipman, makina ve oto kiralama</b>	<b>5,018.76</b>	<b>18.76</b>
17.06.2004	Акт приемки сервисного обслуживания 461,	4,600.00	
18.06.2004	Списание 0000000702,	18.76	18.76
18.06.2004	КассаПрочие ДРК-001122,	400.00	
<b>1500</b>	<b>El aletleri, satın alma, tamir ve y/p</b>	<b>929.49</b>	<b>929.49</b>
16.06.2004	Списание 0000000691,	591.21	591.21
21.06.2004	Списание 0000000705,	338.28	338.28
<b>1701</b>	<b>Santiye guvenlik ve danisma giderleri</b>	<b>142,796.00</b>	
16.06.2004	Касса РКО-000221,	14,510.00	
22.06.2004	Касса РКО-000229,	128,286.00	
<b>1704</b>	<b>Santiye onaylari, infaat ve calisma izinleri</b>	<b>2,500.00</b>	
18.06.2004	КассаПрочие ДРК-001122,	2,500.00	
<b>1710</b>	<b>Santiye diger giderler</b>	<b>12,176.26</b>	<b>7,881.26</b>
17.06.2004	Списание 0000000692,	3,194.30	3,194.30
18.06.2004	Списание 0000000702,	3,846.21	3,846.21
18.06.2004	КассаПрочие ДРК-001122,	4,195.00	
20.06.2004	Списание 0000000704,	840.75	840.75
<b>2100</b>	<b>Mobilizasyon, demobilizasyon isleri</b>	<b>8,614.46</b>	<b>8,614.46</b>
15.06.2004	Списание 0000000681,	228.14	228.14
16.06.2004	Списание 0000000691,	992.59	992.59
17.06.2004	Списание 0000000692,	1,205.51	1,205.51
19.06.2004	Списание 0000000703,	1,756.51	1,756.51
20.06.2004	Списание 0000000704,	3,088.92	3,088.92
21.06.2004	Списание 0000000705,	1,155.66	1,155.66
<b>3147</b>	<b>Dıs mekanlar yagmur suyu tesisati</b>	<b>2,750.00</b>	
18.06.2004	КассаПрочие ДРК-001122,	2,750.00	
<b>3550</b>	<b>Cevre citi isleri</b>	<b>9,210.01</b>	<b>9,210.01</b>
16.06.2004	Списание 0000000691,	5,450.00	5,450.00
21.06.2004	Списание 0000000705,	3,760.01	3,760.01
<b>4141</b>	<b>Kum ve toprak dolgu isleri</b>	<b>12,887.48</b>	<b>12,887.48</b>
19.06.2004	Списание 0000000703,	12,887.48	12,887.48
<b>4142</b>	<b>Cakil dolgu isleri</b>	<b>200.00</b>	

18.06.2004	КассаПрочие ДРК-001122,	200.00	
<b>4215</b>	<b>Kalip (dolgu ist. beton ) isleri</b>	<b>25,294.90</b>	25,294.90
15.06.2004	Списание 0000000681,	1,976.41	1,976.41
16.06.2004	Списание 0000000691,	2,237.90	2,237.90
17.06.2004	Списание 0000000692,	10,042.13	10,042.13
21.06.2004	Списание 0000000705,	9,908.55	9,908.55
<b>4225</b>	<b>Demir (dolgu ist beton ) isleri</b>	<b>1,491.79</b>	1,491.79
17.06.2004	Списание 0000000692,	954.73	954.73
18.06.2004	Списание 0000000702,	386.24	386.24
21.06.2004	Списание 0000000705,	150.82	150.82
<b>4231</b>	<b>Beton (Temel) isleri</b>	<b>20,537.46</b>	20,537.46
16.06.2004	Списание 0000000691,	20,537.46	20,537.46
<b>4233</b>	<b>Beton (doseme + merdiven) isleri</b>	<b>453,026.18</b>	453,026.18
16.06.2004	Списание 0000000691,	451,824.08	451,824.08
19.06.2004	Списание 0000000703,	22.Eki	22.Eki
20.06.2004	Списание 0000000704,	1,180.00	1,180.00
<b>4234</b>	<b>Beton (kolon kiris) isleri</b>	<b>6,845.82</b>	6,845.82
16.06.2004	Списание 0000000691,	6,845.82	6,845.82
<b>4235</b>	<b>Beton (dolgu ist. beton ) isleri</b>	<b>55,767.52</b>	6,880.02
16.06.2004	Списание 0000000691,	6,845.82	6,845.82
16.06.2004	Акт приемки сервисного обслуживания 22,	48,887.50	
19.06.2004	Списание 0000000703,	34.20	34.20
<b>4300</b>	<b>Demirsiz beton isleri (grobeton)</b>	<b>6,845.82</b>	6,845.82
16.06.2004	Списание 0000000691,	6,845.82	6,845.82
<b>4400</b>	<b>Celik konstruksiyon isleri</b>	<b>51,625.00</b>	10,735.00
15.06.2004	Списание 0000000681,	5,131.88	5,131.88
16.06.2004	Списание 0000000691,	1,827.42	1,827.42
16.06.2004	Акт приемки сервисного обслуживания 110356,	40,890.00	
19.06.2004	Списание 0000000703,	2,388.73	2,388.73
20.06.2004	Списание 0000000704,	1,078.23	1,078.23
21.06.2004	Списание 0000000705,	308.74	308.74
<b>5130</b>	<b>Alcipan bolme duvar</b>	<b>13,010.93</b>	13,010.93
15.06.2004	Списание 0000000681,	1,116.83	1,116.83
16.06.2004	Списание 0000000691,	1,522.07	1,522.07

17.06.2004	Списание 0000000692,	986.33	986.33
18.06.2004	Списание 0000000702,	2,489.12	2,489.12
21.06.2004	Списание 0000000705,	1,168.06	1,168.06
<b>5150</b>	<b>Sandwich panel cephe kaplama isleri</b>	<b>16,806.19</b>	<b>1,871.90</b>
15.06.2004	Списание 0000000681,	117.14	117.14
17.06.2004	Акт приемки сервисного обслуживания 13,	14,934.29	
21.06.2004	Списание 0000000705,	1,754.76	1,754.76
<b>5200</b>	<b>Siva isleri (rabitzli veya rabitsiz)</b>	<b>24,702.56</b>	<b>24,702.56</b>
15.06.2004	Списание 0000000681,	5,321.45	5,321.45
17.06.2004	Списание 0000000692,	2,373.54	2,373.54
18.06.2004	Списание 0000000702,	242.49	242.49
19.06.2004	Списание 0000000703,	485.43	485.43
<b>5431</b>	<b>Fayans duvar kaplama isleri</b>	<b>4,562.04</b>	<b>4,562.04</b>
16.06.2004	Списание 0000000691,	36.31	36.31
18.06.2004	Списание 0000000702,	3,000.00	3,000.00
21.06.2004	Списание 0000000705,	1,525.73	1,525.73
<b>5438</b>	<b>Duvar boya isleri</b>	<b>53,852.56</b>	<b>53,852.56</b>
17.06.2004	Списание 0000000692,	46,628.89	46,628.89
20.06.2004	Списание 0000000704,	7,223.67	7,223.67
<b>5451</b>	<b>Seramik doseme kaplama isleri</b>	<b>6,832.76</b>	<b>6,832.76</b>
16.06.2004	Списание 0000000691,	1,542.26	1,542.26
20.06.2004	Списание 0000000704,	5,220.68	5,220.68
<b>5460</b>	<b>Yukseltilmis doseme kaplama isleri</b>	<b>43,931.77</b>	<b>43,931.77</b>
17.06.2004	Списание 0000000692,	43,931.77	43,931.77
<b>5530</b>	<b>Dis cephe boya isleri</b>	<b>560,301.00</b>	
17.06.2004	Акт приемки 4,	560,301.00	
<b>5610</b>	<b>Beton su yalitim isleri (temel,bodrum dis duvar)</b>	<b>5,850.00</b>	<b>5,850.00</b>
21.06.2004	Списание 0000000705,	5,850.00	5,850.00
<b>5740</b>	<b>Isiklik isleri</b>	<b>40,178.01</b>	<b>40,178.01</b>
15.06.2004	Списание 0000000681,	40,178.01	40,178.01
<b>5921</b>	<b>Ic metal isleri (korkuluk ,merdiven vs.)</b>	<b>1,800.00</b>	
16.06.2004	КассаПрочие ДРК-001101,	1,800.00	
<b>5922</b>	<b>Dis metal isleri (korkuluk, saft kapagi,pencere ,k</b>	<b>2,000.00</b>	
17.06.2004	КассаПрочие ДРК-001130,	2,000.00	



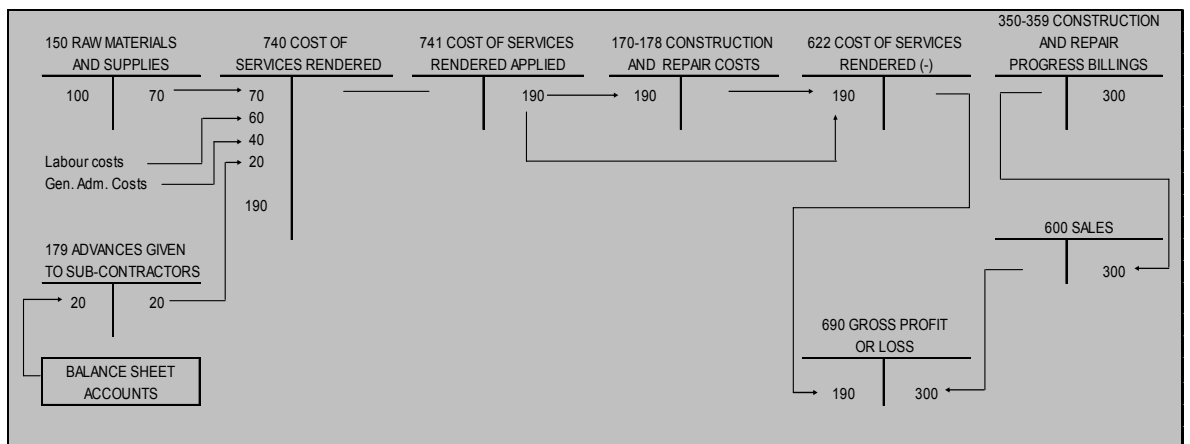
## Invoice Payments Report

Period : from 23.06.2004 until 23.06.2004 in USD

Project: 'AVON RN022' ;all companies

Project / Invoice				Order No	Cost Code	Invoice Total	Paid Total
No	Date	Company	Code				
7660	14.04	ПРОМСТРОЙКОНТ РАКТ ЗАО	[AVO 536]	AVO-536 (03.04.04)	5612	1,683.05	1,683.05
7951	29.04	ТЭКА-СЕРВИС ООО	[AVO 589]	AVO-589 (19.04.04)	3500	6,188.29	6,188.29
8180	17.05	БЭСТОН ООО	[AVO 643]	AVO-643 (12.05.04)	5200	1,502.38	1,502.38
8310	24.05	КОМТЕХ-СЕРВИС С ЗАО	[AVO]	AVO-659 (15.05.04)	4400, 05921	1,453.17	1,453.17
8338	25.05	ВАЛЕГРАНД ООО	[AVO 607]	AVO-607 (23.04.04)	5950	2,640.02	2,640.02
8461	03.06	ТЕХНОНИКОЛЬ ООО	[AVO 597]	AVO-597 (21.04.04)	5650	9,933.63	9,933.63
8518	07.06	ОСТОВ ПКФ ООО	[AVO 706]	AVO-706 (01.06.04)	4235	4,458.28	4,458.28
8525	08.06	ПЕНОПЛАСТ ТД ООО	[AVO 735]	AVO-735 (05.06.04) AVO-734 (05.06.04)	5650, 0562	9,219.09	9,219.09
<b>Total</b>							

### 6.5 APPENDIX 5:“FLOWCHART BETWEEN THE MAIN ACCOUNTS OF COA“



## 7 REFERENCES

1. **Abdayyeh, O.Y.** and **Rasdorf, W.J.**, “Design of Construction Industry Information Systems”, *Journal of Construction Engineering and Management*, ASCE, Vol. 117, No.4 , (December 1991).
2. **Ackoff , R.F.** “Management Misinformation System.” *Management Science* 14, no. 4 (December 1967), B140-B116.
3. **Ahuja, H.N.**, *Successful Consrtuctions Cost Control*, John Wiley&Sons Inc., New York, (1980).
4. **Alavi Maryam**, and **Patricia Carlson**. “A Review of MIS Research and Disciplinary Development.” *Journal of Management Information Systems* 8, no.4(Spring 1992).
5. **Allen, Brandt R.**, and **Andrew C. Boynton**. “Information Architecture: In Search of Efficient Flexibility.” *MIS Quarterly* 15, no.4 (December 1991).
6. **Anthony, R.N.** *Planning and Control Systems: A Framework for Analysis*. Cambridge, MA: Harvard University Press (1965)
7. **Bakos J. Yannis**, and **Michael E. Treacy**. “ Information Technology and Corporate Strategy: A Research Perspective.” *MIS Quarterly* (June 1986).
8. **Barret Stephanie S.** “Strategic Alternatives and Interorganizational System Implementations: an Overview.” *Journal of Management Information Systems* (Winter 1986-1987)
9. **Barton, P.**, *Information system in Construction Management*, Batsford Academic and Educational London, 1985.
10. **Cash, James I.,F. Warren McFarlan, James L. McKenney**, and **Lynda M. Applegate**. *Corporate Information Systems Management*, 4<sup>th</sup> ed. Homewood, Il: Irwin (1996)
11. **Date, C. J.** *An Introduction to Databease Systems*, 6<sup>th</sup> ed. Reading, MA: Addison-Wesley (1995)
12. **Davenport, Tom**. “Putting the Enterprise into Enterprise Systems.” *Harvard BusinessReview* (July-August 2998).
13. **Davis, Gordon B.**, and **Margrethe H. Olson**. *Management Information Systems*, 2<sup>nd</sup> ed. New York: McGraw-Hill (1985)
14. **Davis Gordon B.**, and **Margrethe H. Olson**. *Management Information Systems: Conceptual Foundations, Structure, and Development*, 2<sup>nd</sup> ed. New York: McGraw-Hill (1985)
15. **Drucker, Peter**. “The Coming of the New Organization.” *Harvard Business Review* (Jabnuary-February 1988).

16. **Everest, G. C.** *Database Management: Objectives, System Function, and Administration*. New York: McGraw-Hill (1985)
17. **Fiori, Rich.** "The Information Warehouse." *Relation Database Journal* (January-February 1995).
18. **Gorry, G. Anthony** and **Michael S. Scott-Morton.** "A Framework for Management Information Systems" *Sloan Management Review* 13, no. 1 (Fall 1971).
19. **Gurbaxani, V.,** and **S. Whang,** "The Impact of Information systems on Organizations and Markets." *Communications of the ACM* 34, no.1 (Jan 1991)
20. **H.T. Johnson** and **R.S. Kaplan,** *The Rise and Fall of Management Accounting*, Harvard Business School Press., (987).
21. **Hall, Wayne. A.,** and **Robert E. McCauley.** "Planning and Managing a Corporate Network Utility." *MIS Quarterly* (December 1987).
22. "How to Use Intranets to Support Business Applications." *I/S Analyzer Case Studies* 35, no. 5 (May 1996)
23. **Isakowitz, Tomas, Michael Bieber** and **Fabio Vitali.** "Web Information Systems." *Communications of the ACM* 41, no. 7 (July 1998).
24. **Ives, Blake** and **Sirkka Jarvenpaa.** "Applications of Global Information Technology: Key Issues for Management." *MIS Quarterly* 15, no. 1 (March 1991)
25. **Ives, Blake,** and **Gerald P. Learmonth.** "The Information Systems as a Competitive Weapon." *Communications of the ACM* (December 1984)
26. **Karin, Jahangir,** and **Benn R. Konsynski.** "Globalization and information Management Strategies." *Journal of Management Information Systems* 7 (Spring 1991)
27. **Keen, P.G.W.** "Information Systems and Organizational Change." *Communications of the ACM* 24, no. 1 (January 1981)
28. **Laudon Kenneth C.** and **Laudon Jane Price** "Management Information Systems, 6th Edition-Organization and Technology in the Networked Enterprise, Prentice Hall, 1999
29. **Leiner, Barry M.** "Internet Technology," *Communications of the ACM* 37, no. 8 (August 1994)
30. **Levitt, Lee.** "Intranets: Internet Technologies Deployed Behind the Firewall for Corporate Productivity." Process Software Corporation (1996).
31. **Long, L.H. Kotanichik, J.J.,** and **Longcher, R.D.,** "Adoptive Management Information System", *Journal of the Technical Councils of ASCE*, ASCE, Vol. 106, No. Tc1. (August 1980).

32. **Mannheim, Marvin L.** “Global Information Technology:Issues and Strategic Oppurtunities.” *International Information Systems* 1, no. 1 (January 1992).
33. **Mc Farlan, F. Warren.** “Information Technology Changes the Way You Compete.” *Harvard Business Review* (May-June 1984)
34. **McLeod, R., Jr.,** *Management Information System*, 4<sup>th</sup> Ed., Macmillan Pub., New York, (1990).
35. **Mintzberg, Henry.** *The Structure of Organizations*. Englewood Cliffs., NJ: Prentice Hall (1979)
36. **Shim, Jae K.,Siegel, Joel G** ,*Modern Cost Management and Analysis* (Barron's Business Library)
37. **Peter F.**, “Database Structures for Project Management,” *Proceedings of the Seventh Conference on Electronic Computation*, ASCE, (1979).
38. **Pilcher, R.,** *Pmject Cost Control in Constructions*, William Collins Sons & Co., London, (1985).
39. **Roche, Edward M.** *Managing Information Technology in Multinational Corporations*. New York: Macmillan (1992)
40. **Shen, P.**, *Management Information System for Job Cost Control on Construction Projects*, Technical Report No. CE/CM/MSE 92-01, presented to the Department of Civil Engineering, Temple University, Philadelphia, in 1992, in partial fulfillment of the requirements for the degree of Master of Science in Engineering.
41. **Schlick, H.**, “Project Integrated Management System (DIMS), *Journal of the Construction Division*, ASCE, Vol. 107, No.C02, June, 1981.
42. **Sprout, Alison L.** “The Internet Inside Your Company.” *Fortune* (November 27, 1995).
43. **Tenah, K.A.** and **Guevara, J.M.**, *Fundamentals of Construction Management and Organizations*, Reston Pub.,(1985).
44. **Tony Thorpe**, “PROJECT-SPECIFIC WEB SITES:FRIEND OR FOE?” *Journal of Construction Engineering and Management*,September/October 2001
45. **Zachman,J. A.** “Business Systems Planning and Business Information Control Study: A Comparison.” *IBM Systems Journal* 21 (1982).

## 8 CIRRICULUM VITAE

# BAHADIR ŞERBETÇİ

DATE OF BIRTH/PLACE: 05/07/1973-ISTANBUL

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### EXPERIENCE

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**2003–2004 Renaissance Construction Moscow,RF**

#### *Chief of Tender Department*

- Started his career in this company as an architect in the Tender Department after 1 year promoted as Chief of Tender Dept.
- Company is awarded by 5 big construction project in 1,5 year, contract amounts equaling aprox. 100 million USD
- Worked on a new MIS project currently implemented.

**1998–2003 PrM Engineering & Consulting Ltd. Istanbul,TC**

In the Project management and Construction consultancy company served as a project supervisor on site and technical staff in the head office. The responsibilities and projects completed are below.

#### *Project Supervisor*

- As a project supervisor has worked full-time resident on site on the behalf of the Employer fully responsible for monthly statement payments to the Contractors, controlling the quality of works and accordance with the contract conditions in the projects below.

#### ■ **Project : Isik University Sile Campus**

- Contractor: Yapi Merkezi AS.
- Employer: Isik University

#### ■ **Project : FMV Erenkoy High School Reconstruction**

- Contractor: Odak Insaat AS
- Employer: Feyziye Mektepleri Vakfi

#### *Technical office Staff*

- As a technical office staff had work experience as below in many projects;
  - Preparation of complete Tender Package documents including all specifications, work schedules etc.. for a.m. projects and many others

- Preparation of initial cost estimates and WBS for the a.m. projects and many others
- Coordination of design activities with the selected design subcontractors on behalf of Employer.
- Concept design and feasibility studies in many international projects especially in CIS countries.

**1997–1998      Onder Construction LTD.      Istanbul**

*Architect*

- Site chief in the “Reconstruction of Iskender Khalilov Residence Project , Arnavutkoy”
- Interior design studies and supervision on-site
- Working drawings of “Kayseri Erciyes Universitesi Project”

EDUCATION

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- 1992–1999 Mimar Sinan University , Faculty of Architecture (Bachelor degree),
- 2002–2004 Mimar Sinan University , Institute of Science & Tehnology , Project/Construction Management (Master degree-Thesis in progress-not completed)

INTERESTS

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Music, books, cinema , computer science