

**İSTANBUL TECHNICAL UNIVERSITY ★ INSTITUTE OF SCIENCE AND TECHNOLOGY**

**INTERNATIONAL LOGISTICS: APPLICATION IN  
OIL AND GAS INDUSTRY**

**M.Sc. Thesis by  
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**Department : Industrial Engineering**

**Programme: Industrial Engineering**

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OIL AND GAS INDUSTRY**

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**ULUSLARARASI LOJİSTİK: PETROL VE DOĞAL GAZ  
ENDÜSTRİSİNDE BİR UYGULAMA**

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## ABBREVIATIONS

|                  |                                                        |
|------------------|--------------------------------------------------------|
| <b>LM</b>        | : Logistics Management                                 |
| <b>CSCMP</b>     | : The Council of Supply Chain Management Professionals |
| <b>TMS</b>       | : Transportation Management Software                   |
| <b>WMS</b>       | : Warehouse Management Software                        |
| <b>TQM</b>       | : Total Quality Management                             |
| <b>UN</b>        | : United Nations                                       |
| <b>USA</b>       | : The United States of America                         |
| <b>KOC</b>       | : Kuwait Oil Company                                   |
| <b>MTS</b>       | : Machinery Tools and Services                         |
| <b>INCOTERMS</b> | : International Commercial Terms                       |
| <b>ICC</b>       | : International Chamber of Commerce                    |
| <b>EXW</b>       | : Ex Works                                             |
| <b>FCA</b>       | : Free Carrier                                         |
| <b>FAS</b>       | : Free Alongside Ship                                  |
| <b>FOB</b>       | : Free On Board                                        |
| <b>CFR</b>       | : Cost and Freight                                     |
| <b>CIF</b>       | : Cost, Insurance and Freight                          |
| <b>CPT</b>       | : Carriage Paid To                                     |
| <b>CIP</b>       | : Carriage and Insurance Paid to                       |
| <b>DAF</b>       | : Delivered At Frontier                                |
| <b>DES</b>       | : Delivered Ex Ship                                    |
| <b>DEQ</b>       | : Delivered Ex Quay (Duty Paid)                        |
| <b>DDU</b>       | : Delivered Duty Unpaid                                |
| <b>DDP</b>       | : Delivered Duty Paid                                  |
| <b>NAFTA</b>     | : North American Free Trade Agreement                  |
| <b>EEC</b>       | : European Economic Community                          |
| <b>EU</b>        | : European Union                                       |
| <b>APEC</b>      | : Asia Pacific Economic Cooperation                    |
| <b>CACM</b>      | : Central American Common Market                       |
| <b>MERCOSUR</b>  | : Mercado Común del Sur                                |
| <b>LAIA</b>      | : Latin American Integration Association               |
| <b>CARICOM</b>   | : Caribbean Community and Common Market                |
| <b>ECOWAS</b>    | : Economic Community of West African States            |
| <b>SADC</b>      | : Southern African Development Community               |
| <b>SACU</b>      | : Southern African Customs Union                       |
| <b>ASEAN</b>     | : Association of Southeast Asian Nations               |
| <b>GCC</b>       | : Gulf Cooperation Council                             |
| <b>NC</b>        | : National Currency                                    |
| <b>CTC</b>       | : Central Tenders Committee                            |

|                |                                                  |
|----------------|--------------------------------------------------|
| <b>PCHTC</b>   | : Petroleum Corporation Higher Tenders Committee |
| <b>OCTC</b>    | : Oil Company – Tenders Committee                |
| <b>RFQ</b>     | : Request For Quotation                          |
| <b>PO</b>      | : Purchase Order                                 |
| <b>AAA</b>     | : Action/Awareness/Alert                         |
| <b>MR</b>      | : Material Request                               |
| <b>QA</b>      | : Quality Assurance                              |
| <b>R&amp;D</b> | : Research and Development                       |
| <b>RFID</b>    | : Radio Frequency Identification                 |
| <b>UAE</b>     | : United Arab Emirates                           |
| <b>ERP</b>     | : Enterprise Resource Planning                   |

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## **INTERNATIONAL LOGISTICS: APPLICATION IN OIL AND GAS INDUSTRY**

### **SUMMARY**

This study consists of theoretical basis of international logistics and its application in oil and gas industry. As there is no standardized procedure for international logistics, all units, documentations, and facilities of international logistics are discussed in details. Trade Agreements and Trade Unions between countries lead to easier logistics management; also, free zones and bonded warehouses are suitable places to add value. Also, INCOTERMS make international trade agreements easier to understand by identifying responsibilities of buys and sellers. Moreover, a very good transportation is achieved using intermodal transportation, a type of transportation that benefits from advantages of different transportation modes. In addition, RFID is used for managing and monitoring inventory. Furthermore, it is witnessed that developed countries have developed logistics infrastructure, and developing countries have insufficient logistics infrastructure.

Logistics management of supply to oil and gas companies in Gulf region is considered as an application. Oil companies in the region have decided to maintain their needs not directly from manufacturers but supplier companies in order to minimize risks. Of course, this decision excites supplier companies, and an appropriate logistics management system becomes crucial to win cost based or time based tenders. Initially, oil and gas companies' procurement and bidding system is presented in details. Then, a new logistics management system is developed and compared with rival companies' systems. The new system has both fast delivery and low cost advantages over rivals; consequently, the new system is feasible. Also, a financial projection for 5 years is calculated.

**Keywords:** Logistics management, international logistics, intermodal transportation.

## ULUSLARARASI LOJİSTİK: PETROL VE DOĞAL GAZ ENDÜSTRİSİNDE BİR UYGULAMA

### ÖZET

Bu çalışmada, uluslararası lojistiğin teorisi ve petrol ve doğal gaz endüstrisindeki uygulaması yer almıştır. Uluslararası lojistik için mevcut bir standardın olmadığı için, uluslararası lojistikte kullanılan bütün birimler, belgelendirmeler ve teşvikler ele alınmıştır. Ülkeler arasında imzalanan Ticari Anlaşmalar ve oluşturulan Ticari Birlikler, uluslararası lojistiği kolaylaştırdığı görülürken, serbest bölgeler ve antrepoların değer katmak için uygun yerler olduğu sonucuna varılmıştır. INCOTERMS olarak bilinen uluslararası ticaret terimleri satıcı ve alıcının görevlerini tanımladığı için, uluslararası ticari sözleşmeler daha anlayışlı olmaktadır. Farklı taşıma modlarının avantajlarından yararlanmak için kullanılan intermodal transportasyon ile, uygun bir taşıma gerçekleştirilebileceği görülmüştür. Envanter yönetiminin daha doğru sonuçlar vermesi için RFID kullanılmıştır. Gelişmiş ülkelerin lojistik altyapısının da gelişmiş olduğuna ve fakir ülkelerin yetersiz lojistik altyapıya sahip olduklarına şahit olunmuştur.

Ayrıca, uygulama olarak Körfez bölgesindeki petrol ve doğal gaz şirketlerine mal tedarikinin lojistiği ele alınmıştır. Petrol ve doğal gaz şirketleri, riskleri en aza indirmek amacıyla, ihtiyaçlarını direk üreticilerden değil tedarikçi firmalardan alma kararı, tedarikçi firmalar arasına hareketliliği getirmiştir. Maliyet veya zaman bazında yapılan ihaleleri kazamak için, tedarikçi firma için iyi bir uluslararası lojistik modelinin önemi ortaya çıkmıştır. Başta petrol ve doğal gaz şirketlerinin satın alma ve ihale açma prosedürleri anlatılmıştır. Daha sonra yeni bir uluslararası lojistik modeli geliştirilmiştir ve rakip firmaların sistemi ile karşılaştırılmıştır. Yeni modelin hızlı teslim ve düşük maliyet avantajları görülmüştür, ve modelin ihalelerde daha şanslı olacağı sonucuna varılmıştır. Gelecek 5 sene için mali öngörme de yapılmıştır.

**Anahtar Kelimeler:** Lojistik yönetimi, uluslararası lojistik, intermodal transportasyon.

## 1. INTRODUCTION

Though rivalry on the world, in 20th century, made companies concentrate on their core businesses and outsource other services. Logistics is one of those services which plans, implements, and controls the flow and storage of goods, services and related information between the point of origin and the point of destination to meet customers' needs. It is, nowadays, a large industry on itself. **Cheng et al. (2005)** point out that there is an increasing trend in companies who accept logistics management as a “potent strategy to gain competitive advantages in the market place”.

The more expanded companies, the more expanded their markets and customers, and they become international companies: an American company has customers in Russia, China, and Russian company has customers in Americas, Japan and EU. To satisfy international customers, companies have to organize an accurate logistics management. How will a customer in Russia feel if he orders a chocolate from Switzerland for his beloved mother's birthday, and the chocolate arrives a day after the birthday?

As a result of the development of sophisticated manufacturing systems, like JIT and lean production, logistics has become more “complex process which requires expert knowledge” (**Chow et al., 2005**). Imagine the logistics management of Airbus; tens thousands of plane parts are gathered from different parts of the world. Each part has to be delivered on time and on a required quality in order not to stop or slow down the production.

This thesis's aim is to research theoretically the management of the international logistics in order to better meet customers' requirements; apply it in oil and gas industry and discuss the results. Thesis concentrates on oil and gas industry but

applicable to other industries, too. After the first chapter, Introduction, comes the second chapter, Logistics Management. It is about what logistics management is, its history, basic logistics activities, importance of logistics, costs in logistics, and quality and performance measurement in logistics.

In the third chapter, international logistics and international trade are discussed. It includes information about types of international transportation, what the intermodal transportation is, and what is needed to do the intermodal transportation, advantages and disadvantages, importance and management of international trade, use of INCOTERMS and trade blocs.

In the fourth chapter, oil industry and logistics management, information about oil and gas industry, how to manage the industry's logistics, applied standards are given.

The following chapter, chapter five, includes application of this thesis at MTS Middle East FZCo, a company that supplies goods for oil and gas industry in the Gulf region. Chapter six, the final chapter, consists of results of the application and discussions.

## 2. LOGISTICS MANAGEMENT

In this chapter, Logistics Management (LM) will be discussed in details. First of all, objective of the LM will be described, then, its history and basic logistics activities. Also, importance of logistics and costs in logistics will be presented to complete the concept of LM.

### 2.1 Objective of Logistics Management

Customers, mostly of the developed countries, want their needs be available at desired time. Daily fresh fruit and vegetables, or, daily newspapers in the early morning are good examples. To realize it, a well organized LM is required.

LM is delivering goods, services and information from the source to consumers but it is far different from transportation. Its scope is wider than transportation, which is one of the important activities of LM. LM consolidates transported goods in order to reduce costs. To realize this, goods have to be stored at certain places, called warehouses, and traced during transportation and stay at warehouses, delivered to the right place, at the right time, and, at the desired quality.

According to **Bowersox and Closs (1996)**, logistics management

*“... involves the integration of information, transportation, inventory, warehousing, material handling, and packaging”*, and the modern logistics management is a *“... paradox”*.

LM is a duty of delivering the right thing, to the right customer, at required quality and quantity, at the right time. **Wood et al. (2002)** explained logistics management as *“the organized movement of goods, services, and, sometimes, people”*.

The leading logistics management organization, the Council of Supply Chain Management Professionals (**CSCMP**) defines logistics management and supply chain management as follows, consequently:

*“Logistics management is that part of supply chain management that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customers’ requirements.”*

*“Supply Chain Management encompasses the planning and management of all activities involved in sourcing and procurement, conversion, and all Logistics Management activities. Importantly, it also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers. In essence, Supply Chain Management integrates supply and demand management within and across companies.”*

(<http://www.cscmp.org/AboutCSCMP/Definitions/Definitions.asp>)

**Stock and Lambert (2001)** stated that logistics management is the most commonly accepted term, and listed other terms that are used instead. They are:

- Business logistics
- Logistics
- Channel management
- Materials management
- Distribution
- Physical distribution
- Industrial logistics
- Quick-response systems
- Logistical management
- Supply chain management

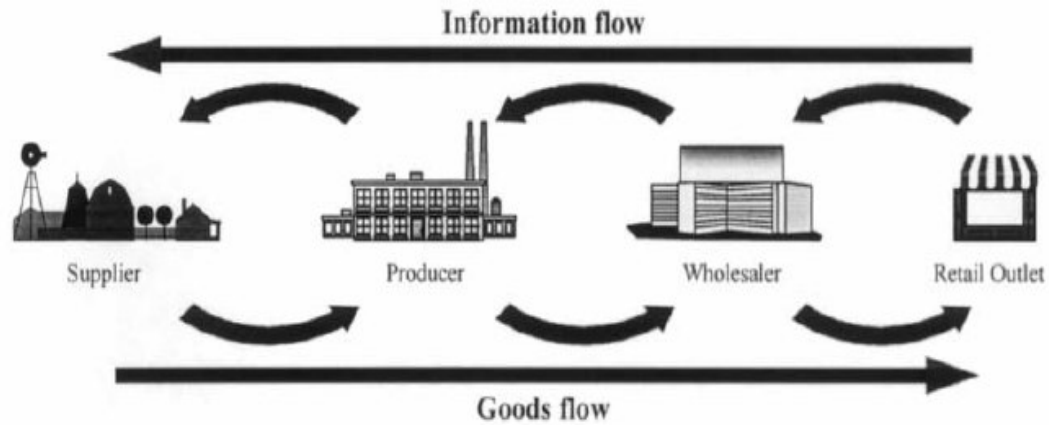


**Figure 2.1:** A model for LM

## 2.2 History of Logistics Management

**Wood et al. (2002)** argues that logistics started in old times. People hunted and buried surpluses in order to eat later when the season is not suitable for hunting. Moreover, when people started to plant, surpluses of the harvest were stored for the future. These are good examples of first applications of warehousing.

After that, boats and ships started to be built: as a result, there appeared new kind of transportation through seas and oceans. This process led to construction of new ports and roads to connect towns to ports.

During world wars, military discovered the logistics. Faster transportation, storage of desired requirements, having goods ready-to-use at required state, better distribution lines, and, control were of crucial importance (**Yıldıztekin, 2001**).

Commercial side of LM developed afterwards. After industrial revolution, companies paid attention to production but logistics until 1962, when Drucker, well-known Professor of Management, called distribution as “*the economy’s dark continent*” and pointed out it to be “*the most sadly neglected, most promising area of... business*” (**Waters, 2003**).

Most important milestone of commercial LM was introduction of containers. Those ones were very convenient equipments for freight. Then, between 1968 and 1970,

International Organization for Standardization (ISO) standardized containers in order to enable easy transfers between modes (**DeBoer, 1992**).

When computers and internet entered our lives, documentation became easier. In stead of millions of papers one single hard disc was enough to store information. Also, computers did not require special rooms and shelves. Moreover, information exchange speeded up, traced more easily and done more correctly. This milestone is revolutionary step (**Mason et al., 2003**).

## **2.3 Basic Logistics Activities**

LM consists of several activities. Different researchers and professionals classify activities differently. Important LM experts **Bowersox and Closs (1996)** classify basic logistics activities as follows, and state that those activities have to be integrated to have a successful LM.

### **2.3.1 Network Design**

Network design is integrating suppliers, production sites, transportation and warehouses, that is, determining which processes are required at what quantity. Inventory has to be appointed correctly in order not to exceed capacity. Locations have to be chosen closer to the market, and number of vehicles has to be determined efficiently. Important affecting factors are security requirements, new trade agreements, space costs, supplier and customer locations, new carriers and products, lane congestion, and fuel costs ([www.logisticstoday.com/displayStory.asp?nID=7990](http://www.logisticstoday.com/displayStory.asp?nID=7990)). Moreover, list of all products and order patterns be frequency, size, season, content are crucial.

### **2.3.2 Information Flow**

To avoid of transportation of wrong goods, or, delivering goods to wrong destination, quick, clear, and accurate information flow has to be established. The less are wrong deliveries, the higher quality is. Also, information can be stored and used for making plans for the future.

Information exchange has become faster, more reliable with computers and internet. What's more, storing information via computers is easier to save and launch than doing it with papers which require extra place for storing.

### **2.3.3 Transportation**

Transportation is moving goods or people from one place to another. According to Encyclopedia Britannica, people used different animals and even birds for moving goods and themselves ([www.britannica.com](http://www.britannica.com)). Transportation developed with wheel invention, and then, use of engine for vehicles. Nowadays, goods and people can be transported by sea, railroad, airway, and, roads.

### **2.3.4 Inventory Management**

Inventory contains list of raw materials (to be used in production), semi-finished goods (to be used in further production), finished goods (ready for sale), goods of resale and reverse logistics. As not all companies are capable of stocking all needs (raw materials, half and finished goods), desired service level has to be maintained with correct inventory management whose purpose is to reach maximum turnover with lower inventory. Inventory has to be arranged properly because there exists risks of get mixed, loss, or become useless due to expiration of date. The following segmentation is advised for inventory management:

- Customer segmentation: Inventory is arranged in order to support most profitable customers, or, core customers.
- Product requirements: When Pareto principle, 20/80, is applicable (less than 20% of total goods form more than 80% of total profit), a fine-line strategy is developed. Core customers are served fast; others less costly way.
- Transport integration: Consolidation of goods to be transported to a certain area but never allow inventory holding cost higher than transportation cost.
- Time-based requirements: Fast delivery, on time delivery minimizes safety stock but increases number and frequency of delivery that lead to higher

logistics costs. Balance has to be established between delivery frequency and customer service level.

- Competitive performance: Companies desire to deliver at a higher speed and consistency; that's why, sometimes keeping inventory in warehouses is inevitable even if it generates extra costs.

### **2.3.5 Warehousing, Material Handling and Packaging**

Warehouse is a place where inventory is kept. Beside keeping inventory against uncertainty and weather conditions, warehouse has economic (consolidation, break bulk and cross dock, processing/postponement, and stockpiling) and service benefits (spot stocking, assortment, mixing, product support).

Also, design of the warehouse, and storage plan are crucial. Warehouse must have a suitable handling infrastructure. Goods must be received, moved, sorted and stored orderly. The higher is number of handling, the higher is the damage, and, consequently, the quality of LM is lower. Material handling can be performed manually, half-automated or automated.

To minimize handling costs, smaller goods, like bottles and small boxes, are gathered in a bigger unit. Those units are usually pallets and containers. Not only does this facility decrease number of units to be handled, but also increases protection of goods (**Bowersox and Closs, 1996**).

### **2.4 Importance of LM to Companies**

Nowadays, companies try to sell goods both to internal and external markets. To maintain their existence, they have to fulfill their duties and responsibilities against customers. It is possible with accurate LM; **Lai (2004)** states that LM brings cost and service advantages.

Logistics department of the company helps to collect information for supply plans for the future, as the company cannot deliver over its capacity. Not maintained customers needs will result in a bad reputation.

According to **Stock and Lambert (2001)**, LM “*leads to competitive advantage*”, “*adds time and place utility*”, “*allows efficient movement to the customer*” and “*is a proprietary asset*”. Competitive advantage is launched when three crucial components of marketing concept are maintained: customer satisfaction, integrated effort, and company profit. Moreover, place utility is a value by making goods available in the right place; and, time utility a value by doing it at the right time. What’s more, efficient movement is described with five rights: right product, right place, right time, right condition and right cost. Furthermore, LM competency cannot be copied by rivals in a short time, so it could be shown as an asset.

If LM is provided from the third party, the company will have a chance to concentrate on its core business while transferring delivery problems with all its risks to a company whose core business is LM.

## **2.5 Costs in Logistics Management**

Costs in LM can be observed in several subtopics.

### **2.5.1 Human Resources**

Costs born from people who work at the company are in this subtopic (mostly people in the office). These include employees` salaries, insurances, expenses for pension fund, and costs of tickets, staying at a hotel and meals if employee travels.

### **2.5.2 Warehouse Expenses**

If a company desires to construct a warehouse, all construction, air conditioning, setting up technology for inventory accuracy and handling infrastructure costs are included. Also, inspection and repair have to be done continuously. A company pays rent if it uses a warehouse that does not belong to it.

### **2.5.3 Transportation**

Transportation expenses include vehicle costs, fuel for vehicles, sheltering and meal expenses of drivers. Shipment insurance can be added to this subtopic.

#### 2.5.4 Software Costs

At the office, computers require software documentation and data storage. Also, Transportation Management Software (TMS) is needed for accurately arranging transportation (tracking, fuel costing, routing and mapping, and communications). Moreover, Warehouse Management Software (WMS) is needed to run the warehouse efficiently (receiving, put-away, restocking, inventory management, order processing, allocation and picking, shipping and cycle counting).

#### 2.5.5 Reverse logistics Costs

Some goods get old, inspire the date of good use, or misdelivered; those goods have to be collected and, sometimes, even stored at warehouses. In some cases, empty boxes and pallets, also, have to be gathered. Activities mentioned above will lead to extra costs.

#### 2.5.6 Other Expenses

There are always unforeseen expenses. Bribery is a good example for unforeseen expenses. Mostly, at less developed countries, at custom clearance or checkpoints one may have to pay for maintaining the duty. Another example is costs born due to not being able to serve a customer at a desired level.

### 2.6 Performance of Logistics Management

The well known cliché “*If you can’t measure it, you can’t manage it*” points out the importance of the measurement of logistical performance. Performance is measured in order to find out how efficient the work is done. **Bowersox and Closs (1996)** state that performance is measured for “*monitoring*”, “*controlling*” and “*directing*” LM activities. The important point is to use right measures; wrong measures lead to wrong results or to results that make no sense.

Several logistics performance measures were suggested in literature. **Fawcett and Cooper (1998)** presented 5 traditional logistics measures:

- asset management

- cost
- customer service
- productivity
- quality

Those parameters were applied to basic LM activities separately and, of course, separate results were obtained.

On the other hand, **Griffis et al. (2004)** presented a list of consensus established logistics performance measures. They are:

- Average line item fill rate
- Average backorder fill time
- Complete order fill rate
- Days order late
- Inventory turnover ratio
- Logistics costs per unit
- Missed sales due to stockouts
- On-time delivery percentage
- Order cycle time variability
- Percent error pick rate
- Weeks of supply

Moreover, a research held by **Van Der Vorst et al. (1998)** showed that minimizing uncertainties lead to important performance increase; when uncertainties are eliminated, problems become more manageable. Furthermore, **Fawcett and Cooper (1998)** offered data collection by surveying and use benchmarking, as during surveying real-world issues and their effect on performance are included. **Bowersox and Closs (1996)**, also, advice benchmarking as a tool for performance measurement.

## 2.7 Quality of Logistics Management

American Society for Quality defines quality as *“the characteristics of a product or service that bear on its ability to satisfy stated or implied needs”* (<http://www.asq.org/glossary/q.html>). When it is used for LM, it means to provide logistics service at desired levels. Quality management of the logistics is crucial

because it affects logistics performance and customer satisfaction (**Anderson et al., 1998**). That's why; quality has to be inspected carefully.

**Bowersox and Closs (1996)** stated that total quality management (TQM) and reengineering give good results if used for quality management. Also, balanced score card and benchmarking are other useful tools.

### **3. INTERNATIONAL LOGISTICS AND INTERNATIONAL TRADE**

In this chapter, consists of information about types of international transportation, what an intermodal transportation is, its advantages and disadvantages, international trade and facilities, INCOTERMS and trade unions.

#### **3.1 International Transportation**

International transportation is moving people or goods from one country to another. There are five types of the international transportation: rail, sea, air, road, and pipeline (Stock and Lambert, 2001).

##### **3.1.1 Rail**

A typical railroad consists of two parallel steel with a certain gauge, distance between steels. People or goods are transported on trains. This type of transportation is cheaper than air or land transportation but has some disadvantages:

- Trains move according a timetable schedule, that is, one is dependant on timetable of trains, cannot identify time transportation himself.
- Railroads are not flexible, that is, transportation is realized on certain directions and ways. Other types of transportation will be needed to move people or goods to the final destination.
- Some countries use different gauges, that's why, bogies of the train have to changed or transported people or goods have to be moved to another train (Mamadiiev, 2005).

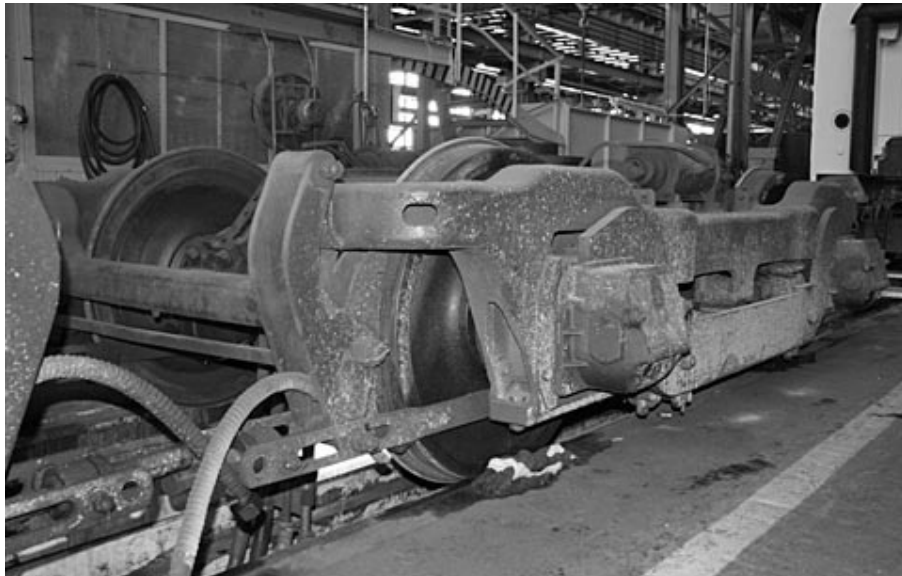


**Figure 3.1:** Bogies

### **3.1.2 Water**

Water transportation includes moving people or goods by ocean, sea, and river. It is the cheapest way of transportation, and the most suitable for consolidated transportation between countries but has limitations:

- Water transportation is not available everywhere. Unfortunately, no water transportation can be realized to landlocked countries.
- Vessels or ships may not always be available. Timing problem.

### **3.1.3 Air**

Air transportation is the fastest type of transportation but the most expensive. As planes cannot land everywhere, other types of transportation are required to complete moving: from airports to final destinations. Delays may appear as a result of bad weather conditions. Only high-value products are advised to be transported.

### **3.1.4 Road**

It is the type of transportation realized on the land road, and is the most convenient type of transportation for short distances. Also, it completes transportation via air, water, or rail. Moreover, it is accepted as the most flexible type of transportation.

### 3.1.5 Pipeline

Pipeline transportation is very limited type of transportation because of two reasons: not everything can be transported and not available everywhere, that is, not flexible. Pipelines allow transportation of only natural gas, crude oil, petroleum products, water, chemicals, and slurry products. Furthermore, pipelines have certain roads. On the other hand, there are many advantages:

- Computer based control and monitoring lead to high rate of on time delivery.
- Damage and losses are very low.
- Very low affect of weather conditions.
- Very low human dependence.

### 3.2 Intermodal Transportation

Actually, types of transportation are modes. As seen from previous topic, different modes have different advantage. In order to benefit from advantages of different modes, or to have the fastest transportation, two or more modes are used together (Mamadiev, 2005).

#### 3.2.1 What is Intermodal?

United Nations (UN) Convention on International Multimodal Transport of Goods defines international multimodal transport as

*"the carriage of goods by at least two different modes of transport on the basis of a multimodal transport contract from a place in one country at which the goods are taken in charge by the multimodal transport operator to a place designated for delivery in a different country"*

(<http://stats.oecd.org/glossary/detail.asp?ID=4303>)

Randinelli and Berry (2000) state that intermodal transportation will play an important role in future logistics, and define it as

*“... a process of transporting freight ‘by means of a system of interconnected networks, involving various combinations of modes of transportation, in which all the component parts are seamlessly linked and efficiently coordinated”.*

In simpler words, intermodal transportation is shipping goods from one point to another in a same unit, using 2 or more modes, without handling goods. Mentioned unit is mostly a container, that’s why, intermodal transportation is almost equivalent to containerization.

One of the most important milestones of the intermodal transportation’s development was transportation deregulation in the United States of America (USA). A law that prohibited carriers of one mode to carry in another mode was cancelled. The other important milestone was invention of container and their standardization.

There has to be an integration to maintain intermodal transportation:

- Technological integration: Suitable handling technology must be present where units are handled,
- Organizational integration: Shipping plan has to coincide with information flow,
- Pricing policy integration: Price consensus between different modes must be established,
- Legal integration: Integration of regulations on contract types, insurance and responsibility.

### **3.2.2 Advantages of Intermodal Transportation**

Advantages of intermodal transportation can be listed as follows:

- Standard transportation unit: Loading, transportation, unloading and lifting a standard unit is much easy.
- Flexibility of use: almost everything, from raw material to final product, can be transported. There exist special containers even for liquids.

- Lower cost: Due to rapid load, unload, and consolidated transportation, lower cost occurs.
- Fast: Lower number of unload and faster unload. Containerization decreases unloading time by 35%, approximately.
- Warehousing: Less risk against bad weather conditions and shocks. Containers are warehouses, themselves.
- Security: As units are not opened except beginning and end points, the risk of loss is less.

### **3.2.3 Disadvantages of Intermodal Transportation**

Beside advantages, there are some disadvantages of intermodal transportation. They can be listed as follows:

- Space: Occupies a lot of space when discharged (unloaded). For example, to discharge a container ship of 25,000 tons, a space, container park, of 12 hectares is required.
- High infrastructure costs: Unfortunately, infrastructure of intermodal transportation is high. Suitable handling technology, connection between modes and information technologies for tracing are parts of costly infrastructure.
- Neat location: Units to be unloaded first, must be located on the top.
- Complex LM: Costly information technology is required for managing the complex system.
- Equal time for load/unload: As the loads are not uniformly distributed on the earth, sometimes, empty containers are carried. Unfortunately, the same time is spent for loading/unloading empty and nonempty containers.
- Contraband trade: As units are opened only at the beginning and end points, this type of transportation is convenient for contraband trade. Weapons, narcotics, and even human can be transported in units.

### **3.3 International Trade and Facilities**

There are common documents for companies who wish to commence an international trade (business). Also, there exist some issues for encouraging and making international trade easier, favorable. Above mentioned documentation and issues will be discussed in this section.

#### **3.3.1 Documentation (Customs)**

Most common documents in international logistics are:

- Bill of Lading: Document for shipping and a claim for ownership of goods,
- Letter of Credit: A guarantee provided by a bank that it will pay the seller when required documents are presented,
- Bank Draft: A means of payment for an import-export transaction,
- Commercial Invoice: Document written by the exporter to precisely describe goods and terms of sale,
- Insurance Certificate: Explains type of coverage, the insurer, and insured exporter,
- Certificate of Origin: Shows where goods were manufactured (**Bowersox and Closs, 1996**).

#### **3.3.2 Free Zone**

Special locations where goods can be stored without paying customs expenses but manufacturing or transport to other countries are allowed. They are within national borders, geographically, but free of taxation. Free zones are established for increasing national investment, speeding up foreign direct investment and technology transfer, providing continuous cheap raw materials from other countries, and benefiting from foreign finance. Also, it is easier to employ a foreigner. All functions and limitations of free zones are determined by government (**Serbest Bölgeler Kanunu, 1995**).

#### **3.3.3 Bonded Warehouse**

A private or public warehouse approved by the government, where goods liable to duty are kept until the duty upon them has been paid. While the goods are being

waited in the bonded warehouse, the owner may proceed various processes necessary to fit them for the market, such as the repacking and mixing of tea, the racking, vating, mixing and bottling of wines and spirits, the roasting of coffee, the manufacture of certain kinds of tobacco, &c., and certain specific allowances are made in respect of waste arising from such processes or from leakage, evaporation and the like.

### **3.3.4 Freight Village**

Freight villages have an important place in LM. Europlatforms, an organization established by European countries, defines freight village and explains its functions as follows:

*“A freight village is a defined area within which all activities relating to transport, logistics and the distribution of goods, both for national and international transit, are carried out by various operators. These operators can either be owners or tenants of buildings and facilities (warehouses, break-bulk centers, storage areas, offices, car parks, etc...) which have been built there. Also, in order to comply with free competition rules, a freight village must allow access to all companies involved in the activities set out above. A freight village must also be equipped with all the public facilities to carry out the above mentioned operations. If possible, it should also include public services for the staff and equipment of the users. In order to encourage intermodal transport for the handling of goods, a freight village must preferably be served by a multiplicity of transport modes (road, rail, deep sea, inland waterway, air). Finally, it is imperative that a freight village be run by a single body, either public or private” (<http://www.freight-village.com/What%20a%20FV.html>).*

### **3.3.5 Insurance**

Insurance comes across at every step of processes, and has a crucial importance. Transported goods, transporter, and vehicles used while transporting need to be insured. Depending on contract signed, seller or buyer is responsible for insurance of goods.

### **3.3.6 Payment Terms**

An experienced exporting firm extends credit cautiously. It evaluates new customers with care and continuously monitors older accounts. Such a firm may wisely decide to decline a customer's request for open account credit if the risk is too great and propose instead payment on delivery terms through a documentary sight draft or irrevocable confirmed letter of credit or even payment in advance. On the other hand, for a fully creditworthy customer, the experienced exporter may decide to allow a month or two to pay, perhaps even on open account (**Semoes, 2006**).

Other good credit practices include being aware of any unfavorable changes in your customers' payment patterns, refraining from going beyond normal commercial terms, and consulting with your international banker on how to cope with unusual circumstances or in difficult markets. It is always advisable to check a buyer's credit (even if safest payment methods are employed). Also, banks are sometimes able to provide credit reports on foreign companies, either through their own foreign branches or through a correspondent bank.

As being paid in full and on time is of the utmost concern to exporters, the level of risk in extending credit is a major consideration. There are several ways in which you can receive payment when selling your products abroad, depending on how trustworthy you consider the buyer to be. Typically with domestic sales, if the buyer has good credit, sales are made on open account; if not, cash in advance is required. For export sales, these ways are not the only common methods. Listed in order from most secure for the exporter to the least secure, the basic methods of payment are:

Cash in advance;

Documentary letter of credit;

Documentary collection or draft;

Open account; and other payment mechanisms, such as consignment sales.

#### **3.3.6.1 Cash in Advance**

Receiving payment by cash in advance of the shipment might seem ideal. In this situation, the exporter is relieved of collection problems and has immediate use of the money. A wire transfer is commonly used and has the advantage of being almost

immediate. Payment by check, may result in a collection delay of up to six weeks. Therefore, this method may defeat the original intention of receiving payment before shipment.

Many exporters accept credit cards in payment for exports of consumer and other products, generally of a low dollar value, sold directly to the end user. Domestic and international rules governing credit card transactions sometimes differ, so merchants should contact their credit card processor for more specific information. International credit card transactions are typically done by telephone or fax. Due to the nature of these methods, exporters should be aware of fraud. Merchants should determine the validity of transactions and obtain the proper authorizations.

For the buyer, however, advance payment tends to create cash flow problems, as well as increase risks. Furthermore, cash in advance is not common in most of the world. Buyers are often concerned that the goods may not be sent if payment is made in advance. Exporters that insist on this method of payment as their sole method of doing business may find themselves losing out to competitors who offer more flexible payment terms.

#### **3.3.6.2 Documentary Letters of Credit and Documentary Drafts**

Documentary letters of credit or documentary drafts are often used to protect the interests of both buyer and seller. These two methods require that payment be made based on the presentation of documents conveying the title and that specific steps have been taken. Letters of credit and drafts can be paid immediately or at a later date. Drafts that are paid upon presentation are called sight drafts. Drafts that are to be paid at a later date, often after the buyer receives the goods, are called time drafts or date drafts.

Since payment by these two methods is made on the basis of documents, all terms of payment should be clearly specified in order to avoid confusion and delay. For example, "net 30 days" should be specified as "30 days from acceptance." Likewise, the currency of payment should be specified as "US\$30,000." International bankers can offer other suggestions.

Banks charge fees - based mainly on a percentage of the amount of payment - for handling letters of credit and smaller amounts for handling drafts. If fees charged by both the foreign and local banks are to be applied to the buyer's account, this should be explicitly stated in all quotations and in the letter of credit.

The exporter usually expects the buyer to pay the charges for the letter of credit, but some buyers may not agree to this added cost. In such cases, the exporter must either absorb the costs of the letter of credit or risk losing that potential sale. Letters of credit for smaller amounts can be somewhat expensive since fees can be high relative to the sale.

### **3.3.6.3 Letters of Credit**

A letter of credit adds a bank's promise to pay the exporter to that of the foreign buyer provided that the exporter has complied with all the terms and conditions of the letter of credit. The foreign buyer applies for issuance of a letter of credit from the buyer's bank to the exporter's bank and therefore is called the applicant; the exporter is called the beneficiary.

Payment under a documentary letter of credit is based on documents, not on the terms of sale or the physical condition of the goods. The letter of credit specifies the documents that are required to be presented by the exporter, such as an ocean bill of lading (original and several copies), consular invoice, draft, and an insurance policy. The letter of credit also contains an expiration date. Before payment, the bank responsible for making payment, verifies that all document conform to the letter of credit requirements. If not, the discrepancy must be resolved before payment can be made and before the expiration date.

A letter of credit issued by a foreign bank is sometimes confirmed by a local bank. This confirmation means that the local bank (the confirming bank), adds its promise to pay to that of the foreign bank (the issuing bank). If a letters of credit is not confirmed, it is advised through a local bank and thus called an advised letter of credit. exporters may wish to confirm letters of credit issued by foreign banks if they are unfamiliar with the foreign banks or concerned about the political or economic risk associated with the country in which the bank is located. An Export Assistance

Center or international banker can assist exporters in evaluating the risks to determine what might be appropriate for specific export transactions.

A letter of credit may either be irrevocable and thus, unable to be changed unless both parties agree; or revocable where either party may unilaterally make changes. A revocable letter of credit is inadvisable as it carries many risks for the exporter.

A change made to a letter of credit after it has been issued is called an amendment. Banks also charge fees for this service. It should be specified in the amendment if the exporter or the buyer will pay these charges. Every effort should be made to get the letter of credit right the first time since these changes can be time-consuming and expensive.

To expedite the receipt of funds, wire transfers may be used. Exporters should consult with their international bankers about bank charges for such services.

A Typical Letter of Credit Transaction.

Here are the typical steps of an irrevocable letter of credit that has been confirmed by a U.S. bank:

- After the exporter and buyer agree on the terms of a sale, the buyer arranges for its bank to open a letter of credit that specifies the documents needed for payment. The buyer determines which documents will be required.
- The buyer's bank issues, or opens, its irrevocable letter of credit includes all instructions to the seller relating to the shipment.
- The buyer's bank sends its irrevocable letter of credit to a U.S. bank and requests confirmation. The exporter may request that a particular U.S. bank be the confirming bank, or the foreign bank may select a U.S. correspondent bank.
- The U.S. bank prepares a letter of confirmation to forward to the exporter along with the irrevocable letter of credit.
- The exporter reviews carefully all conditions in the letter of credit. The exporter's freight forwarder is contacted to make sure that the shipping date can be met. If the exporter cannot comply with one or more of the conditions, the customer is alerted at once.

- The exporter arranges with the freight forwarder to deliver the goods to the appropriate port or airport.
- When the goods are loaded, the freight forwarder completes the necessary documentation.
- The exporter (or the freight forwarder) presents the documents, evidencing full compliance with the letter of credit terms, to the U.S. bank.
- The bank reviews the documents. If they are in order, the documents are sent to the buyer's bank for review and then transmitted to the buyer.
- The buyer (or the buyer's agent) uses the documents to claim the goods.
- A draft, which accompanies the letter of credit, is paid by the buyer's bank at the time specified or, if a time draft, may be discounted to the exporter's bank at an earlier date.

#### Example of a Confirmed Irrevocable Letter of Credit.

The example of a confirmed irrevocable letter of credit in illustrates the various parts of a typical letter of credit. In this sample, the letter of credit was forwarded to the exporter, The Walton Building Supply Company (A), by the confirming bank, Megabank Corporation (B), as a result of a letter of credit being issued by the Third Hong Kong Bank, Hong Kong (C), for the account of the importer, HHB Hong Kong (D). The date of issue was March 8, 1997 (E), and the exporter must submit the proper documents (e.g., a commercial invoice in one original and three copies) (F) by June 23, 1997 (G) in order for a sight draft (H) to be honored.

#### Tips on Using a Letter of Credit.

- When preparing quotations for prospective customers, exporters should keep in mind that banks pay only the amount specified in the letter of credit - even if higher charges for shipping, insurance, or other factors are incurred and documented.
- Upon receiving a letter of credit, the exporter should carefully compare the letter's terms with the terms of the exporter's pro forma quotation. This step is extremely important, since the terms must be precisely met or the letter of credit may be invalid and the exporter may not be paid. If meeting the terms of the letter of credit is impossible or if any of the information is incorrect or

even misspelled, the exporter should contact the customer immediately and ask for an amendment to the letter of credit.

- The exporter must provide documentation showing that the goods were shipped by the date specified in the letter of credit or the exporter may not be paid. Exporters should check with their freight forwarders to make sure that no unusual conditions may arise that would delay shipment.
- Documents must be presented by the date specified for the letter of credit to be paid. Exporters should verify with their international bankers that there will be sufficient time to present the letter of credit for payment.
- Exporters may request that the letter of credit specify that partial shipments and transshipment will be allowed. Specifying what will be allowed can prevent unforeseen last minute problems.

#### **3.3.6.4 Documentary Drafts**

A draft, sometimes also called a bill of exchange, is analogous to a foreign buyer's check. Like checks used in domestic commerce, drafts carry the risk that they will be dishonored. However, in international commerce, title does not transfer to the buyer until he pays the draft, or at least engages a legal undertaking that the draft will be paid when due.

##### **a. Sight Drafts.**

A sight draft is used when the exporter wishes to retain title to the shipment until it reaches its destination and payment is made. Before the shipment can be released to the buyer, the original ocean bill of lading (the document that evidences title) must be properly endorsed by the buyer and surrendered to the carrier. It is important to note that air waybills of lading, on the other hand, do not need to be presented in order for the buyer to claim the goods. Hence, risk increases when a sight draft is being used with an air shipment.

In actual practice, the ocean bill of lading is endorsed by the exporter and sent via the exporter's bank to the buyer's bank. It is accompanied by the sight draft, invoices, and other supporting documents that are specified by either the buyer or the buyer's

country (e.g., packing lists, consular invoices, insurance certificates). The foreign bank notifies the buyer when it has received these documents. As soon as the draft is paid, the foreign bank turns over the bill of lading thereby enabling the buyer to obtain the shipment.

There is still some risk when a sight draft is used to control transferring the title of a shipment. The buyer's ability or willingness to pay might change from the time the goods are shipped until the time the drafts are presented for payment; there is no bank promise to pay standing behind the buyer's obligation. Additionally, the policies of the importing country could also change. If the buyer cannot or will not pay for and claim the goods, returning or disposing of the products becomes the problem of the exporter.

#### b. Time Drafts and Date Drafts.

A time draft is used when the exporter extends credit to the buyer. The draft states that payment is due by a specific time after the buyer accepts the time draft and receives the goods (e.g., 30 days after acceptance). By signing and writing "accepted" on the draft, the buyer is formally obligated to pay within the stated time.

When this is done the time draft is then called a trade acceptance. It can be kept by the exporter until maturity or sold to a bank at a discount for immediate payment.

A date draft differs slightly from a time draft in that it specifies a date on which payment is due, rather than a time period after the draft is accepted. When either a sight draft or time draft is used, a buyer can delay payment by delaying acceptance of the draft. A date draft can prevent this delay in payment though it still must be accepted.

When a bank accepts a draft, it becomes an obligation of the bank and thus, a negotiable investment known as a banker's acceptance. A banker's acceptance can also be sold to a bank at a discount for immediate payment.

#### c. Open Account.

In a foreign transaction, an open account can be a convenient method of payment if the buyer is well established, has a long and favorable payment record, or has been

thoroughly checked for creditworthiness. With an open account, the exporter simply bills the customer, who is expected to pay under agreed terms at a future date. Some of the largest firms abroad make purchases only on open account.

However, there are risks to open account sales. The absence of documents and banking channels might make it difficult to pursue the legal enforcement of claims. The exporter might also have to pursue collection abroad, which can be difficult and costly. Another problem is that receivables may be harder to finance, since drafts or other evidence of indebtedness are unavailable. There are several ways to reduce credit risk, through such means as export credit insurance and factoring

Exporters contemplating a sale on open account terms should thoroughly examine the political, economic, and commercial risks. They should also consult with their bankers if financing will be needed for the transaction before issuing a pro forma invoice to a buyer.

#### **3.3.6.5 Other Payment Mechanisms**

##### **a. Consignment sales.**

International consignment sales follow the same basic procedures as in the United States. The goods are shipped to a foreign distributor who sells them on behalf of the exporter. The exporter retains title to the goods until they are sold, at which point payment is sent to the exporter. The exporter has the greatest risk and least control over the goods with this method. Additionally, receiving payment may take quite a while.

It is wise to consider risk insurance with international consignment sales. The contract should clarify who is responsible for property risk insurance that will cover the merchandise until it is sold and payment is received. In addition, it may be necessary to conduct a credit check on the foreign distributor.

##### **b. Countertrade.**

International countertrade is a trade practice whereby one party accepts goods, services, or other instruments of trade in partial or whole payment for its products. This type of trade fulfills financial, marketing, or public policy objectives of the

trading parties. For example, a firm might trade by bartering because it or its trading partner lacks foreign exchange.

Many exporters consider countertrade a necessary cost of doing business in markets where exports would otherwise not be sold. One consideration for smaller firms is that this type of trade may cause cash flow problems. Therefore, many smaller exporters do not consider this an option as they wish to do business in U.S. dollars.

There are several types of countertrade, including counterpurchase and barter. Counterpurchase is quite common. In this situation, exporters agree to purchase a quantity of goods from a country in exchange for that country's purchase of the exporter's product. These goods are typically unrelated but have an equivalent value.

Another form of this practice is contractually linked, parallel trade transactions that each involves a separate financial settlement. For example, a countertrade contract may provide that the exporter will be paid in a convertible currency as long as the exporter (or another entity designated by the exporter) agrees to purchase a related quantity of goods from the importing country.

Barter arrangements in international commerce are not as common, because the parties' needs for the goods of the other seldom coincide and because valuation of the goods may be problematic. This type of countertrade occurs without money exchanging hands as merchandise is traded directly for other merchandise or services. Barter might occur by swapping (one good for another) or by switching (using a chain of buyers and sellers in different markets to barter).

Exporters can take advantage of countertrade opportunities by trading through an intermediary with countertrade expertise, such as an international broker, an international bank, or an export management company. One drawback to this type of exporting is that there are often higher transaction costs and greater risks than with other kinds of export transactions.

### **3.3.6.6 Foreign Currency**

A buyer and a seller who are in different countries rarely use the same currency. Payment is usually made in either the buyer's or the seller's currency or in a third mutually agreed-upon currency.

One of the risks associated with foreign trade is the uncertainty of the future exchange rates. The relative value between the two currencies could change between the time the deal is concluded and the time payment is received. If the exporter is not properly protected, a devaluation or depreciation of the foreign currency could cause the exporter to lose money. For example, if the buyer has agreed to pay 500,000 Euros for a shipment and the Euro is valued at \$1.22, the seller would expect to receive US\$610,000. If the Euros later decreased in value to be worth \$1.10, payment under the new rate would be only US\$550,000, a loss of US\$60,000 for the seller. On the other hand, if the foreign currency increases in value the exporter would get a windfall in extra profits. Nonetheless, most exporters are not interested in speculating on foreign exchange fluctuations and prefer to avoid risks.

One of the simplest ways for an exporter to avoid this type of risk is to quote prices and require payment in U.S. dollars. Then the burden of exchanging currencies and risk are placed on the buyer. Exporters should also be aware if there are problems with currency convertibility. Not all currencies are freely or quickly converted into U.S. dollars. Fortunately, the U.S. dollar is widely accepted as an international trading currency, and firms can often secure payment in dollars.

If the buyer asks to make payment in a foreign currency, the exporter should consult an international banker before negotiating the sales contract. Banks can offer advice on the foreign exchange risks that exist with a particular currency. Some international banks can also help hedge against such a risk, by agreeing to purchase the foreign currency at a fixed price in dollars, regardless of the currencies value at the time the customer pays. Banks will normally charge a fee or discount the transaction for this service. If this mechanism is used, the bank's fee should be included in the price quotation.

### **3.3.7 Payment Problems**

In international trade, problems involving bad debts are more easily avoided than rectified after they occur. Credit checks and the other methods that have been discussed in this chapter can limit the risks. Nonetheless, just as in a company's domestic business, exporters occasionally encounter problems with buyers who default on their payment. When these problems occur in international trade, obtaining payment can be both difficult and expensive. Even when the exporter has insurance to cover commercial credit risks, a default by a buyer still requires the time, effort, and cost of the exporter to collect a payment. The exporter must exercise normal business prudence in exporting and exhaust all reasonable means of obtaining payment before an insurance claim is honored. Even then there is often a significant delay before the insurance payment is made.

The simplest (and least costly) solution to a payment problem is to contact and negotiate with the customer. With patience, understanding, and flexibility, an exporter can often resolve conflicts to the satisfaction of both sides.

This point is especially true when a simple misunderstanding or technical problem is to blame and there is no question of bad faith. Even though the exporter may be required to compromise on certain points - perhaps even on the price of the committed goods - the company may save a valuable customer and profit in the long run.

However, if negotiations fail and the sum involved is large enough to warrant the effort, a company should obtain the assistance and advice of its bank, legal counsel, and other qualified experts. Since arbitration is often faster and less costly, this step is preferable to legal action if both parties can agree to take their dispute to an arbitration agency. The International Chamber of Commerce handles the majority of international arbitration and is usually acceptable to foreign companies because it is not affiliated with any single country.

### **3.4 INCOTERMS**

INCOTERMS (International Commercial Terms) are standardized terms for making international business. They were developed by International Chamber of Commerce (ICC), and were last revised in 2000. Buyers and sellers have to specify which revision was used; otherwise, INCOTERMS may not be valid. There exist 4 groups of INCOTERMS: E, F, C, and D. In the group E, seller has the minimum responsibility, and the buyer has the maximum responsibility. Seller's responsibilities increase and buyer's responsibilities decrease as INCOTERMS approach from E to D. The unique source for INCOTERMS is ICC, as it holds all rights of it ([www.icc.org](http://www.icc.org)).

EXW - Ex Works: Title and risk pass to buyer including payment of all transportation and insurance cost from the seller's door.

FCA - Free Carrier: Title and risk pass to buyer including transportation and insurance cost when the seller delivers goods cleared for export to the carrier. Seller is obligated to load the goods on the Buyer's collecting vehicle; it is the Buyer's obligation to receive the Seller's arriving vehicle unloaded.

FAS - Free Alongside Ship: Title and risk pass to buyer including payment of all transportation and insurance cost once delivered alongside ship by the seller. The export clearance obligation rests with the seller.

FOB - Free On Board: Free on board and risks pass to buyer including payment of all transportation and insurance cost once delivered on board the ship by the seller.

CFR - Cost and Freight: Title, risk and insurance cost pass to buyer when delivered on board the ship by seller who pays the transportation cost to the destination port.

CIF - Cost, Insurance and Freight: Title and risk pass to buyer when delivered on board the ship by seller who pays transportation and insurance cost to destination port.

CPT - Carriage Paid To: Title, risk and insurance cost pass to buyer when delivered to carrier by seller who pays transportation cost to destination.

CIP - Carriage and Insurance Paid To: Title and risk pass to buyer when delivered to carrier by seller who pays transportation and insurance cost to destination.

DAF - Delivered at Frontier: Title, risk and responsibility for import clearance pass to buyer when delivered to named border point by seller.

DES - Delivered Ex Ship: Title, risk, responsibility for vessel discharge and import clearance pass to buyer when seller delivers goods on board the ship to destination port.

DEQ - Delivered Ex Quay (Duty Paid): Title and risk pass to buyer when delivered on board the ship at the destination point by the seller who delivers goods on dock at destination point cleared for import.

DDU - Delivered Duty Unpaid: Title, risk and responsibility of import clearance pass to buyer when seller delivers goods to named destination point. Buyer is obligated for import clearance. Seller fulfills his obligation when goods have been made available at the named place in the country of importation.

DDP - Delivered Duty Paid: Title and risk pass to buyer when seller delivers goods to named destination point cleared for import.

### **3.5 Trade Unions**

Countries sign regional integration agreements in order to reduce obstacles for doing business between member countries. Other factor that pushes countries to sign this kind of agreements is liberalization of trade and investment (**World Bank, 2000**).

Most of developed and developing countries are members of more than one agreement because they already know that it is only beneficial for every country. One country may too much raw material but lack in human resources; on the other hand, the second country may have required human resources and technology for processing raw materials.

Trade unions empower countries. Very good 2 examples are European Community (established in 1992) and the North American Free Trade Agreement (NAFTA, established in 1990). Especially, first one has a significant role in international trade and international logistics. Below, list of big trade unions are given.

### **3.5.1 Industrial and Developing Economies**

- *European Union (EU)*: formerly European Economic Community (EEC) and European Community, 1957: Belgium, France, the Federal Republic of Germany, Italy, Luxembourg, the Netherlands; 1973: Denmark, Ireland, United Kingdom; 1981: Greece; 1986: Portugal, Spain; 1995: Austria, Finland, Sweden.
- *European Economic Area*: 1994: EU, Iceland, Liechtenstein, Norway.
- *Euro-Mediterranean Economic Area (Euro-Maghreb)*: Bilateral agreements, 1995: EU and Tunisia; 1996: EU and Morocco.
- *EU bilateral agreements with Eastern Europe*: 1994: EC and Hungary, Poland; 1995: European Community and Bulgaria, Romania, Estonia, Latvia, Lithuania, Czech Republic, Slovak Republic, Slovenia.
- *Canada-U.S. Free Trade Area*: 1988: Canada, United States.
- *North American Free Trade Area (NAFTA)*: 1994: Canada, Mexico, United States.
- *Asia Pacific Economic Cooperation (APEC)*: 1989: Australia, Brunei Darussalam, Canada, Indonesia, Japan, Malaysia, New Zealand, Philippines, the Republic of Korea, Singapore, Thailand, United States; 1991: China, Hong Kong (China), Taiwan (China); 1993: Mexico, Papua New Guinea; 1994: Chile; 1998: Peru, Russia, Vietnam.

### **3.5.2 Latin America and the Caribbean**

- *Andean Pact*: 1969: revived in 1991, Bolivia, Colombia, Ecuador, Peru, Venezuela.

- *Central American Common Market (CACM)*: 1960: revived in 1993, El Salvador, Guatemala, Honduras, Nicaragua; 1962: Costa Rica.
- *Southern Cone Common Market (Mercado Común del Sur—MERCOSUR)*: 1991: Argentina, Brazil, Paraguay, Uruguay.
- *Group of Three*: 1995: Colombia, Mexico, Venezuela.
- *Latin American Integration Association (LAIA)*: formerly Latin American Free Trade Area, 1960: revived 1980, Mexico, Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay, Venezuela.
- *Caribbean Community and Common Market (CARICOM)*: 1973: Antigua and Barbuda, Barbados, Jamaica, St. Kitts and Nevis, Trinidad and Tobago; 1974: Belize, Dominica, Grenada, Montserrat, St. Lucia, St. Vincent and the Grenadines; 1983: The Bahamas (part of the Caribbean Community but not of the Common Market).

### **3.5.3 Sub-Saharan Africa:**

- *Cross-Border Initiative*: 1992: Burundi, Comoros, Kenya, Madagascar, Malawi, Mauritius, Namibia, Rwanda, Seychelles, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe.
- *East African Cooperation*: 1967: formerly East African Community, broke up in 1977 and recently revived, Kenya, Tanzania, Uganda.
- *Economic and Monetary Community of Central Africa*: 1994: formerly Union Douanière et Economique de l'Afrique Centrale, 1966: Cameroon, Central African Republic, Chad, Congo, Gabon; 1989: Equatorial Guinea.
- *Economic Community of West African States (ECOWAS)*: 1975: Benin, Burkina Faso, Cape Verde, Côte d'Ivoire, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Nigeria, Senegal, Sierra Leone, Togo.
- *Common Market for Eastern and Southern Africa*: 1993: Angola, Burundi, Comoros, Djibouti, Egypt, Ethiopia, Kenya, Lesotho, Malawi, Mauritius,

Mozambique, Rwanda, Somalia, Sudan, Swaziland, Tanzania, Uganda, Zambia, Zimbabwe.

- *Indian Ocean Commission: 1984:* Comoros, Madagascar, Mauritius, Seychelles.
- *Southern African Development Community (SADC): 1980:* formerly known as the Southern African Development Coordination Conference, Angola, Botswana, Lesotho, Malawi, Mozambique, Swaziland, Tanzania, Zambia, Zimbabwe; 1990: Namibia; 1994: South Africa; 1995: Mauritius; 1998: Democratic Republic of the Congo, Seychelles.
- *Economic Community of West Africa: 1973:* revived in 1994 as West African Economic and Monetary Unit, Benin, Burkino Faso, Côte d'Ivoire, Mali, Mauritania, Niger, Senegal.
- *West African Economic and Monetary Union: 1994:* Benin, Burkina Faso, Côte d'Ivoire, Mali, Niger, Senegal, Togo, 1997: Guinea-Bissau.
- *Southern African Customs Union (SACU): 1910:* Botswana, Lesotho, Namibia, South Africa, Swaziland.
- *Economic Community of the Countries of the Great Lakes: 1976:* Burundi, Rwanda, Democratic Republic of the Congo.

#### **3.5.4 Middle East and Asia:**

- *Association of Southeast Asian Nations (ASEAN): 1967:* ASEAN Free Trade Area was created in 1992, Indonesia, Malaysia, Philippines, Singapore, Thailand; 1984: Brunei Darussalam; 1995: Vietnam; 1997: Myanmar, Lao People's Democratic Republic; 1999: Cambodia.
- *Gulf Cooperation Council (GCC): 1981:* Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, the United Arab Emirates.
- *South Asian Association for Regional Cooperation: 1985:* Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan, Sri Lanka.

## **4. LOGISTICS MANAGEMENT OF SUPPLY TO OIL COMPANIES**

### **4.1 Definitions**

#### **4.1.1 National Currency (NC)**

National Currency is the currency that a state uses in its borders (Semoes, 2006).

#### **4.1.2 Central Tenders Committee (CTC)**

The Central Tenders Committee reviews and approves all procurement of value in excess of NC. 5,000,000/-.

#### **4.1.3 State Legal Department**

State Legal Department is the Department of Legal Advice and Legislation of the Council of Ministers, which reviews all documents related to procurement of material with estimated value in excess of NC.5,000,000/-.

#### **4.1.4 Petroleum Corporation Higher Tenders Committee (PCHTC)**

Petroleum Corporation- Higher Tenders Committee reviews and approves all procurement in excess of NC. 1,000,000/-.

#### **4.1.5 Oil Company - Tenders Committee (OCTC)**

Oil Company - Tenders Committee convenes twice a week to review and endorse submissions, from Purchasing Teams for procurements in excess of NC.30,000/-. Also reviews and approves adjustment orders with variation of more than 5% for purchase orders in excess of NC. 30,000/-.

#### Functions of Oil Company Tenders Committee:

- Ensure sound implementation of Oil Company's Policies and Procedures for Contracts and Purchasing, as applicable to issue and award tenders and Agreements (including those exempted from Petroleum Corporation Higher Tenders Committee and/or Central Tenders Committee), Approval of Purchase Order Amendments and Adjustment Orders and other related issues.
- Monitor and ensure that the technical and commercial evaluation of tenders is adequate and is in the best interest of the Company.
- Review and, if in agreement, endorse the Controlling Team's recommendations for issue of tenders including approval of bidders' list, estimated cost, method of tendering, requirements of contractor's manpower and the like.
- Review, and if in agreement, approve confiscating of bid bonds
- Arbitrate on any complaints received from any tenderers/suppliers related to Tenders, Request for Quotations or Purchase Orders.
- Handle any other issues related to tendering as requested by C&MD.

#### **4.1.6 Oil Company Tenders Committee Secretary**

Appointed by Oil Company Tenders Committee to execute functions as delegated.

#### **4.1.7 Bids Opening Committee**

The Bids Opening Committee is delegated by Oil Company Tenders Committee and shall convene once weekly to open bids received in sealed envelopes, for Requests For Quotations (RFQ) with estimates between NC1,000/- and NC. 5,000,000/-. Record the bids in the Schedule of Bids and forward them to Team Leader concerned for necessary action.

The Bids Opening Committee comprises of the following members:

|                                |                   |
|--------------------------------|-------------------|
| Team Leader Warehouse          | - Chairman        |
| Team Leader Contracts Services | - Deputy Chairman |
| Financial Group Representative | - Member          |

|                                  |          |
|----------------------------------|----------|
| Purchasing Teams' Representative | - Member |
| Contract Team's Representative   | - Member |

#### **4.1.8 Passport**

Passport is the computerized material management system used by the Company. Passport assists in processing and monitoring all aspects of the material cycle in the Company.

#### **4.1.9 Catalogue ID**

A number automatically generated by the Passport, which identifies a particular material.

#### **4.1.10 AAA message**

AAA stands for Action/Awareness/Alert. This is a message that appears in Passport indicating that a specific action is required with regards to the procurement cycle.

#### **4.1.11 Re-Order Notice**

A notice that is generated by Passport indicating that the quantity in Stores for a store stock item has fallen below a specified limit (Re-Order Point) and may require replenishment action.

#### **4.1.12 Need Date**

The date, the material is required to be received by Oil Company.

#### **4.1.13 Controlling Team**

Team administrating a project and initiating Material Request (MR) for the same. This team is also responsible for the technical evaluations of offers received, as applicable.

#### **4.1.14 Stores Stock Items**

Items of material stocked for normal maintenance of equipment / facility. These items are regularly replenished to ensure continuous availability.

#### **4.1.15 Direct Charge Material**

Materials required for specific job and not subject to replenishment. The cost of which is charged to the concerned Team at the time of withdrawal from the Stores.

#### **4.1.16 Surplus**

Materials considered to have no immediate use for Oil Company and categorized separately.

#### **4.1.17 Executive Delegation of Authority**

The Executive Delegation of Authority is level of authority approved by the Company Board of Directors and issued by the Chairman and Managing Director, to commit and incur expenditure on behalf of the company.

#### **4.1.18 Financial Approval**

Approval obtained by the controlling Team from Cost and Management Accounting Team to ensure the availability of funds, prior to the procurement of Direct Charge Material for projects.

#### **4.1.19 Vendor**

Company/Establishment/Manufacturer participating in Request for Quotations.

#### **4.1.20 Supplier**

A Vendor who has been awarded a Purchase Order for supply of material.

#### **4.1.21 Material Requests**

Material Requests is generated in Passport, by the Controlling Team where the material requirement is specified.

#### **4.1.22 Purchase Requisitions**

Purchase Requisitions are generated by Passport for further procurement action.

#### **4.1.23 Request For Quotation**

Document issued to the vendors requesting them to quote their best prices, delivery, against the specified material and the conditions for the supply. Request For Quotation and subsequent Purchase Orders shall be governed by relevant Terms & Conditions included in the Request For Quotations.

#### **4.1.24 Purchase Order**

Document authorizing the supplier to supply the items listed therein. Purchase Order shall generally be issued to the successful vendor meeting the specification, terms and conditions of the relevant Request for Quotation.

#### **4.1.25 Purchase Order Revision**

A revised Purchase Order issued to the supplier to record any changes to quantity, price, description, supplier's address, payment terms, etc.

#### **4.1.26 Cash Purchases**

These are items valued as per delegation of authority procured from the local market. These items are neither stores stock items nor items which are covered by Supply Agreement. Teams may procure such items directly without the normal documentation and without involving Purchasing Teams.

#### **4.1.27 Repair Purchase Order**

A Purchase Order to cover activity and cost related to repairing an equipment/material.

#### **4.1.28 Competitive Procurement**

Competitive Procurement is to obtain quotations from a number of potential vendors.

#### **4.1.29 Single Source Procurement**

Single Source Procurement arises when the Controlling Team nominates a specific source/manufacturer for the material, justifying this requirement on financial or compatibility grounds. Purchasing Teams shall vet justifications for single source procurement prior to procurement action.

#### **4.1.30 Emergency/Major Incident Procurement**

Emergency Procurements is defined as procurements required immediately when a major catastrophe has occurred, seriously effecting the Company's operations, i.e. blowouts, major oil spillage, structural failure and major damage to installations. Such procurements are intended to cover the initial requirements at the onset of the catastrophe, and shall require the prior approval of the Chairman and Managing Director. Once the situations are contained further procurement action would be classified as "Vital Procurement".

#### **4.1.31 Vital Procurement**

Vital procurement process is to cover Health, Safety & Environment related items and other material where the time scale involved in the normal procurement procedures would cause expense or loss to the Company or would impair its operating efficiency. Vital procurement, with appropriate authorization, entails a fast track process circumventing normal tendering process.

#### **4.1.32 Supply Agreement (Blanket Purchase Order)**

Blanket Purchase Orders are long-term agreements with suppliers/manufacturers to provide specific material or materials at agreed prices, over a specified period of time, with a not to exceed value stipulated in the Agreement. Blanket Purchase Orders can either be for supply as and when required or for consigned (Imprest) items or any other form.

#### **4.1.33 Schedule of Tenders/Bids**

A schedule prepared by Central Tenders Committee or Bids Opening Committee, after the receipt of Bids. This schedule shall outline the names of vendors who have participated, and the amount of each bid.

#### **4.1.34 Commercial Affairs Internal Purchasing Manual**

Manual which states in detail the procurement processes to be followed by Purchasing Teams; who shall be responsible for meeting the requirements of the user by procuring the right material with the right quantity at the right time and right price.

#### **4.1.35 Vendors Evaluation Committee**

Committee evaluates the manufacturers for inclusion in the approved list of manufacturers for a particular commodity.

|                                       |                   |
|---------------------------------------|-------------------|
| <b>Team Leader Purchasing (II)</b>    | <b>- Chairman</b> |
| Team Leader Insp. & Corr. (N&W)       | - Member          |
| Team Leader Projects Control.         | - Member          |
| Team Leader Drilling & Workover Svcs. | - Member          |
| Team Leader Accounts Payable          | - Member          |
| Team Leader Maintenance (SK)          | - Member          |
| Team Leader Maintenance (WK)          | - Member          |

## **4.2 Material Requests & Termination**

### **4.2.1 Material Requests**

The controlling Team takes a stock decision based on structural methodology and Company stocking policy. There are two distinct stock decision processes namely;

- The initial decision to stock and how much when a new plant or equipment is completed or commissioned while taking into account of what is already stocked.
- An ongoing assessment of stock requirements for an existing plant and equipment by taking into account the rate of consumption.

Steps to be followed:

- a. The Controlling Team identifies their requirements of materials whether Stores Stock or Direct Charge Material.
- b. The Controlling Team raises separate Material Request (MR) in Passport for Stock Items and Direct Charge Items.
- c. The Material Request indicates MR Priority and material need date is directly related to MR priority. Material request created with new Cat.Ids or where procurement becomes necessary, the Need Date should be sufficient for procurement action considering Administrative and Vendor Lead Time. In general Administrative Lead Time required for preparation, issuance and evaluation of Request For Quotation (RFQ) and award of Purchase Order (PO) is as follows:-
  - c.1 With estimates up to NC 30,000/ - 10 weeks.
  - c.2 With estimates from NC 30,000 to NC 5,000,000/ - 18 weeks.
  - c.3 With estimates above NC 5,000,000/ - 26 weeks.
- d. The Material Request also includes the following information:
  - d.1 Accounting details.

- d.2 Delivery requirements – to be advised as Notes.
- d.3 Project number/Work Order if applicable.
- d.4 Justification for single source, if applicable.
- d.5 Detailed technical specifications.
- d.6 Estimated price – basis of estimations such as manufacturers spares list, budgetary quotations.
- e. Prior to initiating a new item, the Controlling Team ensures that a similar item/Cat ID is not available in stock. A search of the inventory may be carried by using any of the parameters available in MMMS, particularly the following
  - e.1 Category name / type.
  - e.2 Description
  - e.3 Manufacturer, Part No. / Model No.
- f. Controlling Team obtains financial approvals for Direct Charge Materials (items for a project) by routing the Material Requests through Cost and Management Accounting Team.
- g. Controlling Team provides a realistic price estimate of the Direct Charge Materials to be procured. When the actual award price exceeds the original approved price, the Controlling Team obtains Cost and Management Accounting Team's re-validation in order to proceed with further procurement action.
- h. On receipt of Material Request, Purchasing Teams process the same in adequate manner, to meet the Controlling Team's & the Company's requirement.

#### **4.2.2 Termination**

The listed steps are followed for termination:

- a. Whenever a Material Request is to be terminated, the Controlling Team sets the status to cancel or complete. Additionally, Controlling Team:
  - reviews the overdue material request with work Order/project and set status as complete or cancel from Passport periodically.
  - reserves the right to cancel all Material requests for Direct charge items and Purchasing Team shall review the Non Work Order and non project overdue material request with stock item and set Status as complete or cancel from Passport periodically.
- b. If the request is still in Re-order notice stage, Passport adjusts quantities. If Purchase Requisition is generated, a AAA message of Material Request Cancellation/Termination is forwarded to Purchasing Teams for review and appropriate action.
- c. On receipt of Material Termination Request, Purchasing Teams cancels the Request For Quotations/Purchase Order, where applicable or negotiate with the supplier for any cancellation charges to be incurred.
- d. Where cancellation is possible, Passport System processes the Material Termination Request. Purchasing Teams reverts any reserved items to free stock.
- e. Material which cannot be cancelled from Purchase Order can be transferred, upon receipt, to surplus account under advise to Stores Operation Team.

#### **4.3 Competitive Procurement**

##### **4.3.1 Processing Of Request For Quotation (RFQ)**

Purchasing Teams reviews the items on Purchase Requisition backlog for item description, quantity and need date. For cost-effectiveness similar items are grouped together in a single Request for Quotation (RFQ).

Selection of potential vendors for participation in Request for Quotation (RFQ) is based on the following criteria:

- Vendor is registered with Oil Company for the current year.
- From the Product List, depicting vendors for the required commodity. Due consideration should be given for maintaining invitation by rotation, where number of listed vendors exceeds the invitees categorized under the commodity.
- Vendors with good performance and experience.
- The number of vendors invited to participate shall be as detailed in the Commercial Affairs Internal Purchasing Manual.
- For procurements below NC5,000/-, requests from other interested and registered vendors may be considered after issuance of the Request For Quotation.
- For procurements with estimate between NC5,000/- and NC5,000,000/-, the Request For Quotation is advertised to facilitate registered vendor's participation.
- For procurements with estimate higher than NC5,000,000/-, Central Tenders Committee issues the Request For Quotation to facilitate the registered vendor's participation.

#### **4.3.2 Approvals Prior To Issue Of Request For Quotations**

##### **4.3.2.1 Approvals**

Prior to issue of the competitive Request For Quotation, approvals are obtained, as per Executive Delegation of Authority.

##### **4.3.2.2 Oil Company Tenders Committee**

Oil Company Tenders Committee's approval is obtained for all Request For Quotations where the estimated value is greater than NC30,000/-.

##### **4.3.2.3 Petroleum Corporation Higher Tenders Committee:**

Petroleum Corporation Higher Tenders Committee's approval is obtained for all Request For Quotations where the estimated value is greater than NC1,000,000/-.

#### **4.3.2.4 Central Tenders Committee (CTC):**

Central Tenders Committee's approval has to be obtained for all Request For Quotations where the estimated value is above NC5,000,000/-. Procurements of materials in excess of NC5,000,000/- for the projects stated under **Emergency/Major Incident** and **Vital Procurement** are exempted from CTC approvals (Only PCHTC approval is sufficient).

#### **4.3.2.5 State Legal department:**

Where the estimated value of the Request For Quotation is greater than NC5,000,000/-, the documents shall have to be reviewed by the State Legal department.

### **4.3.3 Issue Of Request For Quotation**

#### **4.3.3.1 Procurements Below NC5,000,000/-**

Purchasing Teams issue the Request For Quotation to vendors, requesting them to collect and submit their quotations as follows;

Requests For Quotations with estimate of NC.1,000/- and below. The selected vendors are invited by fax / e-mail to collect the Request For Quotation. Vendors may submit their bids by hand, fax or e-mail, by the stipulated closing date.

Requests For Quotations with estimate from NC. 1,001/- to NC. 5,000/-. The selected vendors are invited by fax / e-mail to collect the Request For Quotation. Vendors have to submit their bids, by the closing date, through sealed envelopes to be deposited in the tender box at a designated location in OCTC Secretary's office.

Request For Quotations with an estimated value above NC5,000. Subsequent to approvals as per Executive Delegation of Authority or Oil Company Tenders Committee (for estimates above NC30,000/-), Purchasing Teams requests Oil Company Tenders Committee's (OCTC) Secretary to place an advertisement detailing Request For Quotation requirements, issuing/closing date.

If the estimated value is greater than NC5,000/-, the following conditions has to be included in the Request For Quotation

- the vendor shall include with its offer a 2.5% bid bond or as specified.
- in case of an award, the vendor shall be required to submit 10% deposit or as specified, performance bond in a form of a Letter of Guarantee.

Purchasing Teams shall forward sufficient sets of the Request For Quotation documents, one day prior to issuing date, to Oil Company Tenders Committee's (OCTC) Secretary for sale to the vendors. Vendors shall submit their bids, by the closing date, through sealed envelopes to be deposited in the tender box located in a designated area.

#### **4.3.3.2 Procurements Above NC5,000,000/-**

Purchasing Teams arranges for forwarding sufficient sets of the Request For Quotation documents one week prior to issuing date, to Central Tenders Committee for issuance.

The Central Tenders Committee on receipt of the copies of the Request For Quotation and the Advertisement Form from Oil Company, advertises and issues Request for Quotation documents to vendors.

#### **4.3.4. Opening of Bids**

Purchasing Teams receives and open offers for Request For Quotation with an estimate less than NC1,000/- and all Single Source offers. Bids Opening Committee opens the Tender box for the sealed bids for Request For Quotations, issued by Purchasing Teams, with an estimate value above NC1,000/-. All the received bids are listed on the "Schedule of Bids". Late bids are marked as "Received Late" and are not considered.

The Central Tenders Committee opens all Bids that were received by Central Tenders Committee Tender box, and records them in the "Schedule of Tenders" Form. The Central Tenders Committee forwards all bids to the Company (Purchasing Teams) for evaluation. If the estimated value is greater than NC5,000/-, the received

bids must include a 2.5% bid bond or as specified. Bids received without the stipulated bid bond are disqualified.

#### **4.3.5 Evaluation of Bids**

Purchasing Teams review the “schedule of Bids” and rank the bids according to price. Then, they evaluate commercially all received bids and may disqualify bids, if necessary information, such as all required prices or required documents, has not been provided.

Purchasing Teams carry out Technical Evaluation for all Store Stock items and for Direct Charge items with estimates below NC 5,000/-. Whereas Technical Evaluation of Direct Charge items with estimates over NC 5,000/- are sole responsibility of Controlling Teams. Unless otherwise stated, Controlling Teams delegate such an activity to Purchasing Team based on mutual agreement.

Where the Controlling Team carries out the technical evaluation, it will be responsible for reviewing the technical information provided by the vendor. Purchasing Teams obtain additional information/clarification from the vendor, if required. Controlling Team forwards award recommendation to Purchasing Teams for further action. Controlling Team’s award recommendations for values between NC5,000/- and NC30,000/- can be endorsed by the concerned Manager.

Due to the length of time involved in the evaluation, Purchasing Teams may request the vendor(s) to extend the validity of their prices, as and when required. Approval has to be obtained from Oil Company Tenders Committee for price validity extension for Request For Quotations with estimates exceeding NC30,000/-. After obtaining Oil Company Tenders Committee’s (OCTC) approval, Central Tenders Committee is requested to obtain validity extension for Tenders issued through them.

#### **4.3.6 Award Of Purchase Order**

Upon completion of the commercial and technical evaluation of Request For Quotation, Purchasing Teams prepares award recommendation. Obtain approvals through appropriate committees and as per the Executive Delegation of Authority. If the recommended bid for award is greater than the estimated amount, and if the bid is for direct charge items, then financial approval for the additional cost is sought by

Controlling Team. In the event Team Leader Purchasing is unable to agree with the Controlling Team's recommendation for awards below NC30,000/-, the case together with Team Leader Purchasing's remarks will be referred by Team Leader Purchasing to OC Tenders Committee for their ruling, copied to Group Manager concerned.

When the award is above NC30,000/-, the recommendation is forwarded to the Oil Company Tenders Committee for their approval/ruling. When the award value is above NC1,000,000/-, the recommendation is forwarded to Petroleum Corporation Higher Tenders Committee for their approval. In case the award value is less than NC1,000,000/-, where the initial estimate was over to NC1,000,000/-, the award recommendation is notified to Petroleum Corporation Higher Tenders Committee.

All award recommendations above NC5,000,000/- are forwarded to the Central Tenders Committee for approval. If in agreement, the Central Tenders Committee informs the Company through a letter addressed to Chairman & Managing Director. Purchasing Teams notifies the successful vendor that he has been awarded the Purchase Order, if they issued the Request For Quotations.

Where the Central Tenders Committee issued the Request For Quotations, they inform the successful vendor that he has been awarded the Tender and forward a copy of the notification letter to Oil Company. Upon receipt of approval/notification from the concerned Committee (for awards above NC5,000/-), Purchasing Team invites the successful vendor to submit the required documents, including performance bond in a form of a Letter of Guarantee from a local bank, as specified in the Tender. Subsequent to receipt/verification of all required documents, Purchasing Teams generates Purchase Order and arrange for the supplier and the delegated authority in Oil Company to sign the Purchase Order.

In case, Third Party Inspection is required, Purchasing Teams nominate a Third Party Inspection Agency, after signing of the Purchase Order, and forward to them all the required information. Third Party Inspection nomination is notified to the supplier accordingly.

After signing of the Purchase Order the original 10% Guarantee (or as specified) is forwarded to Accounts Payable Team for follow up of the performance bond. If required, Purchasing Teams or Controlling teams will request Accounts Payable

Team to obtain extensions of letters of guarantee from the supplier. If the variation between the estimate & award is more than 10% for award value above NC100,000, Purchasing Teams monitor and arrange for a quarterly report for Chairman & Managing Director's information. Purchasing Teams ensure that vendors submit Declaration Form in accordance with Laws relating to the declaration of commission with State contracts for offers above NC100,000.

## **5. APPLICATION**

### **5.1 General Information**

MTS AG is a Swiss company which was established in 1995, in Zurich, Switzerland. The company focuses on technical and economical issues in the Energy & Process and Oil & Gas industries: modernizing, improving, upgrading, optimizing, supplying, consulting and project financing. It has offices in the United States of America, Germany, United Arab Emirates, Oman and Singapore. An office in Turkey is going to be opened soon.

Switzerland    Project Management

Process development, for manufacturing

Design of components

QA

Project financing

Power plant optimization solutions, mainly software & engineering

Project development

Germany:      Casting of blades incl. R&D

Coating of blades, gas turbine blades

Repair of blades and gas turbine parts

Repair of steam turbine parts

R&D of turbine blade manufacture

Oman:

Turbine blades

Compressor blades

Repairs services

Spare parts sourcing

Repair of compressors for oil/gas industry

Repair of steam turbines

Overhaul services

Coating of blades and combustion liners

Dubai:

Project management

Project financing

Supplying goods for oil&gas industry

USA (three locations, New York, Houston, Los Angeles)

Optimization solutions,

Services for power industry

Spare parts sourcing

Design of parts for US markets

The goal of this thesis is to organize a logistics management system of supplying goods to GCC countries.

## **5.2 Goods**

Goods to be supplied can be grouped in 3 groups: turbomachinery parts, pipes, and chemicals.

Turbomachinery parts are manufactured in Switzerland and Germany. Followings are main parts of turbomachinery:

- Hot gas casing
- Lower cone
- Frontsegment
- Innersegment
- Outersegment
- Outer swirler
- Centering rings
- Tile carrier
- U-tube
- Combustion chamber
- Blades

Pipes are supplied from Ukraine and include steel pipes like

- Line pipe
- Casing pipe
- Tubing pipe

Chemicals are produced in Turkey and consist of

- Additives
- Demulsifiers
- Cleaners
- Inhibitors (scale inhibitors, corrosion inhibitor, bactericide)

### **5.3 Packing of Goods**

Turbomachinery parts are wrapped individually in a plastic or paper foil and then put in a 3-layer cardboard box with enough filling material to guarantee:

- parts are not damaging each other,
- parts cannot move,
- parts are not damaged during transport.

One type of parts is put per box in order not to mix parts. Box content (part type and quantity) marked on box. Then, boxes are put in a larger 3-layer cardboard box or a wooden box, which is mounted on a transport pallet in order to facilitate handling. Foam is used as a filling material if required. Whether a cardboard or a wooden box is chosen depends on their price and the destination country. (For some countries, like USA, this is only allowed if the wood has been fumigated). The boxes are usually the size of a pallet, i.e. 80x120 cm and approximately 80cm high. Alternatively, smaller boxes can be used, i.e. of size 80 x 60 cm and have 4 of these boxes in a pallet. Wrapping band and a wrapping plastic foil are used to hold the boxes together. Transport documents in a transparent plastic folder, fixed on top of the box. The boxes are then ready to go into a container. Important point is to pack same project's parts together in a cardboard box or wooden box.

Pipes have to be both ends fitted with steel/pressed steel thread protectors. Also, mill's standard anti-rust coating is a must. Pipes can be carried in groups like in the Figure 5.1.



**Figure 5.1:** Grouping pipes

Another alternative is using wooden pipe bunks. With help of bunks, it is possible to join many pipes, and give a shape of a container. This geometry is easier for handling and more suitable for intermodal transportation. Figure 5.2 and Figure 5.3 are illustrations of using wooden pipe bunks. Important point is to group pipes of the same project together.

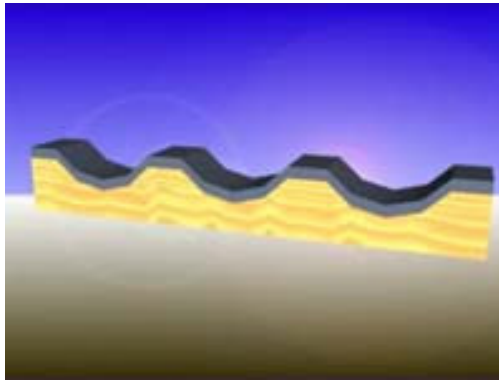


**Figure 5.2:** A wooden pipe bunk

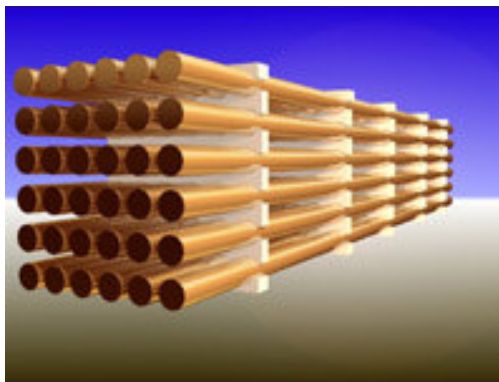


**Figure 5.3:** Use of wooden pipe bunks

Chemicals are stored and transported in tank containers to Dubai. In Dubai chemicals are poured into 30kg and 60kg plastic drums. A tank container, presented in the Figure 5.4, is easier to handle and transport than a simple tank. There exist container tanks up to 25.000 litres.



**Figure 5.4:** A tank container

Active RFID is attached on every turbomachinery part, every pipe and every tank container in order to:

- reduce labor costs
- reduce errors
- minimize inventory inaccuracies
- minimize the difference between inventory record and physical inventory

## **5.4 Inbound Logistics of Goods**

### **5.4.1 From Europe to Dubai**

Transportation of turbomachinery parts from Homrechtikon (Switzerland) and Bayreuth (Germany) will be realized by vehicles, in a container. Containers are consolidated at a rented warehouse, at Trieste port, Italy. From Trieste port, containers are moved to a ship and delivered to Dubai port, where the company has a free zone company and a warehouse. Alternatively, containers could be transported to Trieste port by railroad but the number of handling would be higher, as containers have to be transported on vehicles before reaching the train station. Also, distances between Switzerland and Italy, and Germany and Italy are not far. Moreover, Trieste port is one of the oldest in Europe and has good infrastructure. There is a rivalry between Italian and Slovenian ports, so service and price of Italian ports are more reasonable than that of France.

### **5.4.2 From Ukraine to Dubai**

Pipes from Dnipropetrovs'k (Ukraine) will be transported on railroad until Odessa port, passing from Kirovohrad. From Odessa port to Dubai, pipes will be transported on a ship. Alternatively, pipes could be delivered to Odessa port through the river Dnipro (Dnepr) but mill's administration decided to deliver pipes only by rail to a negotiated point. Transportation on vehicles would face take a lot of borders, consequently, more problems, and loss of time.



**Figure 5.5:** From Ukraine to Dubai

### 5.4.3 From Turkey to Dubai

Chemicals will be produced at the Chemical Industrial Zone close to Istanbul, as laws do not let produce chemicals elsewhere. Zone has very good infrastructure but not enough space for packing chemicals in small units. That's why; they are delivered to Dubai and packed in smaller units. Chemicals will be transferred from production site to Dilovası port on vehicles, then, transferred to a ship and delivered to Dubai. Alternatively, chemicals could be transferred on railroad. From production site to Haydarpasa train station and from there to Bandar Abbas port (Iran), passing through Ankara and Tehran, from Bandar Abbas port to Dubai on a ship. Number of handling is increasing is that route is chosen. Also, political situation in Iran might effect on deliveries in the future.

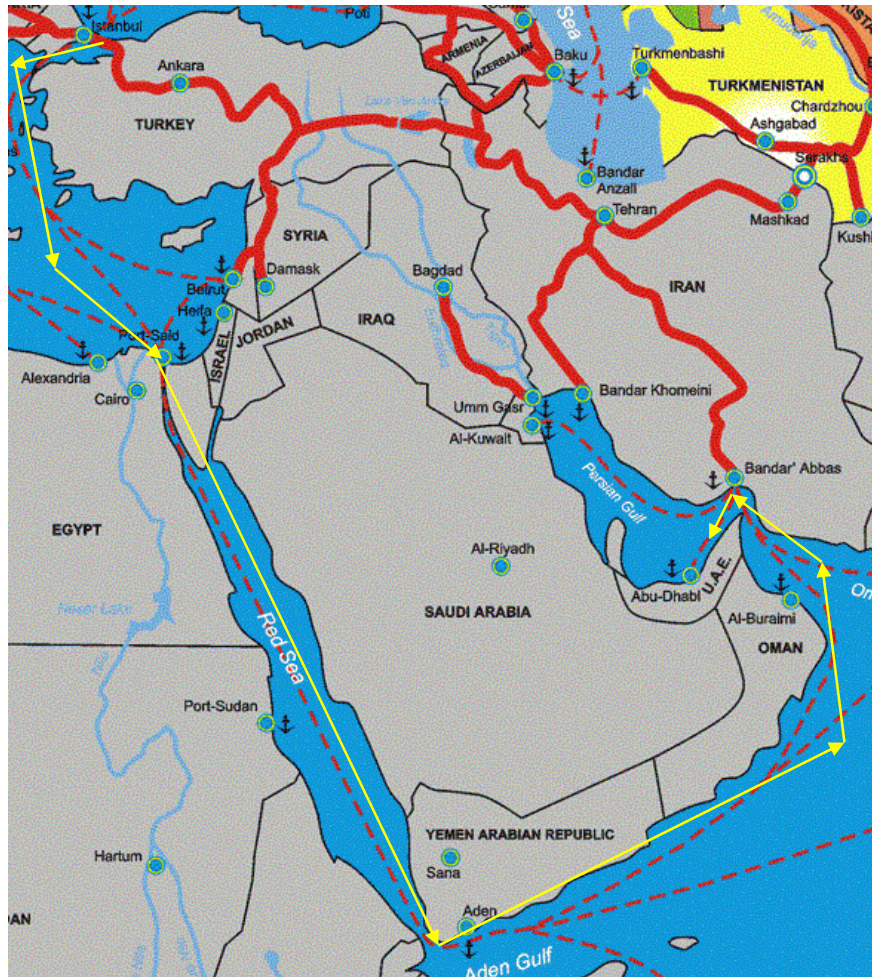


**Figure 5.6:** From Turkey to Dubai

## 5.5. Human Resources

Organization chart of the supply chain is given in the Figure 5.7. Responsibilities of the people will be different depending on its level.

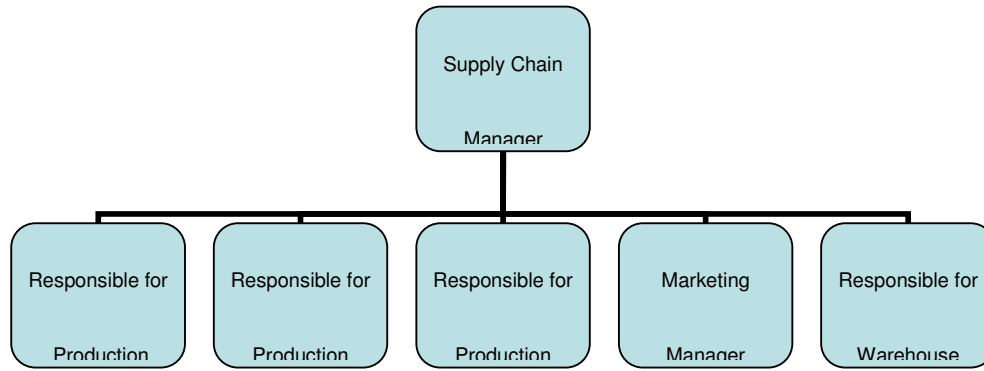


**Figure 5.7:** Organization Chart of the Supply Chain

**Supply Chain Manager, Dubai (SCM-DBX):** He is responsible for the proper work of the supply chain. He controls inventory, flow of inventory, delivery of inventory from sub-level suppliers to customers, and payments. Also, communicates with customers in order to learn their level of satisfaction, if required, organizes reverse logistics of inappropriate goods. Also, he manages the warehouse, inventory and re-packing facilities in Dubai. Moreover, he monitors all activities within the supply chain via ERP program.

**Responsible for Production, Switzerland (RP-CH):** He is responsible for manufacturing and neatly packing of turbomachinery parts. Also, he informs RW-IT when container is ready to be picked up; enters data about inventory and transportation onto ERP, and informs RW-IT and SCM-DBX via e-mail.

**Responsible for Production, Germany (RP-DE):** He is responsible for manufacturing and neatly packing of turbomachinery parts. Also, he informs RW-IT when container is ready to be picked up; enters data about inventory and transportation onto ERP, and informs RW-IT and SCM-DBX via e-mail.

**Responsible for Warehouse, Italy (RW-IT):** He is responsible for organization of transportation of containers from Switzerland and Germany to Italy, and warehousing of goods. Also, he informs RP-CH and RP-DE when containers arrive in Trieste; enters data about inventory and transportation onto ERP. Moreover, when containers are loaded onto a ship, he informs SCM-DBX via e-mail.

**Responsible for Production, Turkey (RP-TR):** He is responsible for production and transportation of chemicals from production site to Dilovası port. Also, he informs SCM-DBX via e-mail when chemicals are loaded onto a ship.

**Marketing Manager, Ukraine (MM-UA):** He is responsible for entering inventory and transportation information onto ERP. Also, he has to organize a good atmosphere during 3<sup>rd</sup> party quality control. In addition, when pipes are loaded onto a ship, he informs SCM-DBX via e-mail.

## **5.6 IT, Warehousing, Handling and Inventory Management**

All parts of the supply chain will be joined at an ERP program. Program will help to manage inventory, see warehouse status and trace goods. Active RFID will aid to keep records more accurately. Projects do not stop even in winter in GCC because temperature is about 15-20 degree Celsius, so supplying goods will repeat all the year.

### **5.6.1 From Europe to Dubai**

Turbomachinery parts from Switzerland and Germany will be supplied monthly; 4 containers per country will be delivered to Trieste port. A part of a warehouse will be rented close to Trieste port. Warehouse will have a crane that will be able to lift the container. Occupied volume will be as much as of 8\*40 foot container. This makes, approximately,  $8 * 77.10\text{m}^3 = 616.80\text{m}^3$ . WMS will be used to trace inventory. Signals from active RFID will be collected and transferred to WMS program.

### **5.6.2 From Ukraine to Dubai**

For Ukraine, planned to benefit from pipe mill's warehouse but it has to be connected to ERP program. Proposed to deliver 1,000,000.00 meters of pipe annually, frequency of delivery will be once in two months. 166,666.00 meters of pipe will be delivered at once. Pipes are usually 15 meters long, that is, the number of pipes will be  $166,666.00/15.00=11,111.00$ . If average weight of pipe per meter is 57.14 kg/m, approximate weight of pipes will be  $166,666.00\text{m} * 57.14\text{kg/m} = 9,523,333.00\text{kg}$ , approximately 9,523.00 tones.

If average outer diameter of pipes is approximately 25.00cm (0.25m), then required volume for pipes will be  $0.25 * 0.25 * 15 * 11,111.00 = 10,416.56 \text{ m}^3$ . This volume is not much for the pipe mill.

### **5.6.3 From Turkey to Dubai**

Tank containers will be supplied once in a week, in a 20` tank container. 7 tank containers will be transported at each time.

### **5.6.4 In Dubai**

MTS ME FZCO, Dubai will be the centre, heart of all operations. There has to be 10,000.00m<sup>2</sup> of closed area for both warehousing and re-packing chemicals. The company will locate at the free zone. Dubai Free Zone has the following advantages compared to non-Free Zone:

- Possible to establish a 100% foreign company. (U.A.E. citizen partner is a must in non-Free Zone area),
- Exemption from all import duties,
- 100% repatriation of capital and profits,
- Freedom from corporate taxation,
- Inexpensive energy,
- Simple and efficient recruitment procedures making available competitive skilled and experienced workspace,
- High level support from Free Zone Authority.

Warehouse and re-packing site is illustrated in the Figure 5.8. Left side of the warehouse is for turbomachinery parts and pipes; right side is for chemicals.

(1) and (2) are RFID reader gates, connected to ERP. Information read from the RFID gates is transferred to ERP database, and SCM-DBX can trace which goods arrive in/departure from Dubai warehouse. In case of departure of wrong goods, SCM-DBX can notice and make goods return.

(3) is a place for Office, meeting room, restroom, and leisure time. C-1 is a crane for loading and unloading pipes and turbomachinery parts. Crane will look like in the Figure 5.9. After unloading, crane loads goods of reverse logistics on vehicles. (4) is

a place for pipes. Pipes are located according to projects they will be supplied to. (5) is a place for damaged pipes and empty containers. (6) is the place for turbomachinery parts. Pallets are discharged from containers and located according to projects. (7) is a space for damaged turbomachinery and empty containers. Pallets are handled with help of forklift.

C-2 is a crane for loading and unloading tank containers. (8) is a space for tank containers with chemicals, whereas (9) is a place for empty tank containers. (10) is a room where re-packing is realized, and labels and RFID chips are attached. At the outlet of the room there will be a RFID reader for inventory management. (11) is a place for empty plastic drums that are used for re-packing. (12) is a space where re-packed plastic drums are palletized. (13) is a place where palletized re-packed plastic drums are located. Locating procedure will be according to the projects via forklift. (14) is a place for reverse logistics of chemicals.

3 people will work on the left side: loading and unloading of pipes and turbomachinery parts, arranging them according to projects. At least one of them must know how to use a forklift, and at least one of them must know how to operate the crane. For the right side, 5 people will be enough. One of them must be a chemist. One must know how to operate a forklift.

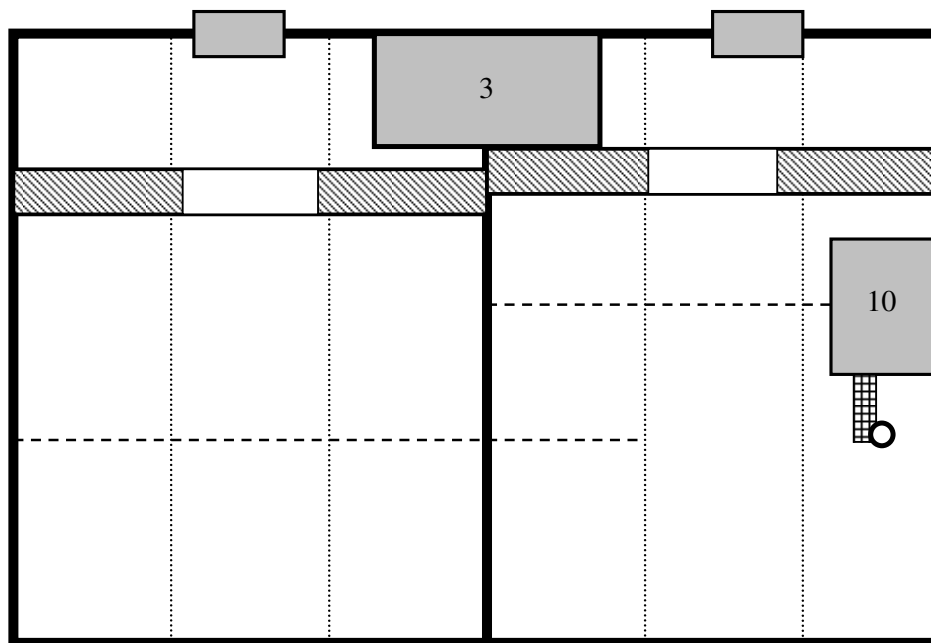


**Figure 5.8:** Plan of the warehouse and re-packing site.



**Figure 5.9:** Crane

### 5.7. From Dubai to GCC

Deliveries from Dubai to GCC countries will be monthly. Deliveries to Kuwait will be by sea, as there is a warehouse of the oil company at the Kuwait port. Supply to other GCC countries will be by vehicles, as there is no rail network between GCC countries. When goods are delivered, responsible of the oil company signs, and informs SCM-DBX about receipt.



**Figure 5.10:** Supplying GCC Countries

### **5.8. Reverse Logistics**

The same routes will be used for reverse logistics. Oil companies send damaged, unsuitable goods back to Dubai on the vehicles that delivered goods. Those goods are kept at the warehouse in Dubai. Pipes and turbomachinery parts are sent back to their origin. Chemicals are sent to chemical disposal in Dubai.

## **6 RESULTS AND CONCLUSIONS**

### **6.1 Results**

Financial projection is calculated for 5 years, using Financial Projections Model v6.8.3, developed by Frank Moyes and Stephen Lawrence, Deming Center for Entrepreneurship, Leeds School of Business, University of Colorado.

Funding Projection, Income Statement, Balance Sheet, Cash Flow Statement, Break-Even Analysis, Property and Equipment, overall Summary of financial projection, and Valuation Calculation are presented on Tables 6.1, 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, and 6.8, respectively.

**Table 6.1: Funding Projection**

**MTS**

**Funding Projections**

**Years 1 to 5**

**(\$)**

|                                         | <u>Begin</u> | <u>Year 1</u> | <u>Year 2</u> | <u>Year 3</u> | <u>Year 4</u> | <u>Year 5</u> |
|-----------------------------------------|--------------|---------------|---------------|---------------|---------------|---------------|
| <b>Beginning Cash</b>                   | 5 000 000    |               |               |               |               |               |
| <b>Equity</b>                           |              |               |               |               |               |               |
| Common                                  | 100 000      | 250 000       | 500 000       | 500 000       | 500 000       | 500 000       |
| Increase / (Decrease) Previous Period   |              | 150 000       | 250 000       | 0             | 0             | 0             |
| Preferred                               |              |               |               |               |               |               |
| A Round                                 | 100 000      | 250 000       | 500 000       | 500 000       | 500 000       | 500 000       |
| B Round                                 |              |               | 0             | 500 000       | 500 000       | 500 000       |
| Total Preferred                         | 100 000      | 250 000       | 500 000       | 1 000 000     | 1 000 000     | 1 000 000     |
| Increase / (Decrease) Previous Period   |              | 150 000       | 250 000       | 500 000       | 0             | 0             |
| Total Equity                            | 200 000      | 500 000       | 1 000 000     | 1 500 000     | 1 500 000     | 1 500 000     |
| <b>Debt</b>                             |              |               |               |               |               |               |
| <b>Short Term Debt</b>                  |              |               |               |               | 0             |               |
| Increase / (Decrease) Previous Period   |              | 0             | 0             | 0             | 0             | 0             |
| <b>Long Term Debt</b>                   |              |               |               |               |               |               |
| Current Portion                         |              |               | 100 000       | 100 000       | 100 000       | 100 000       |
| Long Term Portion                       |              |               | 400 000       | 300 000       | 200 000       | 100 000       |
| Total Long Term Debt                    |              | 0             | 500 000       | 400 000       | 300 000       | 200 000       |
| Increase / (Decrease) Previous Period   |              |               |               |               |               |               |
| Current Portion                         |              | 0             | 100 000       | 0             | 0             | 0             |
| Long Term Portion                       |              | 0             | 400 000       | -100 000      | -100 000      | -100 000      |
| Total Long Term Debt                    |              | 0             | 500 000       | -100 000      | -100 000      | -100 000      |
| <b>Total Equity &amp; Debt</b>          | 200 000      | 500 000       | 1 500 000     | 1 900 000     | 1 800 000     | 1 700 000     |
| <b>Interest</b>                         |              |               |               |               |               |               |
| <b>Interest Rate</b>                    |              |               |               |               |               |               |
| Short Term Debt                         |              | 9,0%          | 9,0%          | 9,0%          | 9,0%          | 9,0%          |
| Long Term Debt                          |              | 12,0%         | 12,0%         | 12,0%         | 12,0%         | 12,0%         |
| <b>Interest Expense</b>                 |              |               |               |               |               |               |
| Short Term Debt                         |              | 0             | 0             | 0             | 0             | 0             |
| Long Term Debt                          |              | 0             | 60 000        | 48 000        | 36 000        | 24 000        |
| Total Interest                          |              | 0             | 60 000        | 48 000        | 36 000        | 24 000        |
| <b>Interest Income</b>                  |              |               |               |               |               |               |
| Interest Rate                           |              | 4,0%          | 4,0%          | 4,0%          | 4,0%          | 4,0%          |
| Interest Income                         |              | 0             | 0             | 0             | 0             | 10 000        |
| <b>Retained Earnings</b>                |              |               |               |               |               |               |
| Net Income                              | 5 038 875    | 19 095 354    | 39 314 076    | 48 245 598    | 57 675 707    |               |
| <b>Dividends</b>                        | 0            | 0             | 750 000       | 1 500 000     | 2 500 000     |               |
| Increase / (Decrease) Retained Earnings | 5 038 875    | 19 095 354    | 38 564 076    | 46 745 598    | 55 175 707    |               |
| Beginning Retained Earnings             | 0            | 5 038 875     | 24 134 229    | 62 698 305    | 109 443 903   |               |
| Ending Retained Earnings                | 5 038 875    | 24 134 229    | 62 698 305    | 109 443 903   | 164 619 610   |               |

**Table 6.2: Income Statement**

**Income Statement**  
**Years 1 to 5**  
**(\$)**

|                                             | <u>Year 1</u> | <u>Year 2</u> | <u>Year 3</u> | <u>Year 4</u> | <u>Year 5</u> |
|---------------------------------------------|---------------|---------------|---------------|---------------|---------------|
| <b>NET REVENUES</b>                         | 8 799 000     | 29 900 000    | 59 800 000    | 73 300 000    | 87 350 000    |
| <b>COST OF REVENUE</b>                      | 1 132 163     | 2 602 407     | 4 427 771     | 5 386 136     | 6 335 850     |
| % of Revenues                               | 12,9%         | 8,7%          | 7,4%          | 7,3%          | 7,3%          |
| <b>GROSS PROFIT</b>                         | 7 666 837     | 27 297 593    | 55 372 229    | 67 913 864    | 81 014 150    |
| % of Revenues                               | 87,1%         | 91,3%         | 92,6%         | 92,7%         | 92,7%         |
| <b>OPERATING EXPENSES</b>                   |               |               |               |               |               |
| Sales & Marketing                           | 596 940       | 1 960 750     | 3 800 750     | 4 633 750     | 5 476 750     |
| Research & Development                      | 294 980       | 853 500       | 1 478 000     | 1 874 500     | 2 167 000     |
| General and Administration                  | 206 323       | 554 150       | 902 883       | 1 062 617     | 1 261 767     |
| Total Operating Expenses                    | 1 098 243     | 3 368 400     | 6 181 633     | 7 570 867     | 8 905 517     |
| % of Revenues                               | 12%           | 11%           | 10%           | 10%           | 10%           |
| <b>EARNINGS FROM OPERATIONS</b>             | 6 568 594     | 23 929 193    | 49 190 595    | 60 342 998    | 72 108 633    |
| <b>EXTRAORDINARY INCOME / (EXPENSE)</b>     | -270 000      | 0             | 0             | 0             | 0             |
| <b>EARNINGS BEFORE INTEREST &amp; TAXES</b> | 6 298 594     | 23 929 193    | 49 190 595    | 60 342 998    | 72 108 633    |
| <b>INTEREST INCOME / (EXPENSE)</b>          | 0             | -60 000       | -48 000       | -36 000       | -14 000       |
| <b>NET EARNINGS BEFORE TAXES</b>            | 6 298 594     | 23 869 193    | 49 142 595    | 60 306 998    | 72 094 633    |
| <b>TAXES</b>                                | -1 259 719    | -4 773 839    | -9 828 519    | -12 061 400   | -14 418 927   |
| <b>NET EARNINGS</b>                         | 5 038 875     | 19 095 354    | 39 314 076    | 48 245 598    | 57 675 707    |
| % of Revenues                               | 57,3%         | 63,9%         | 65,7%         | 65,8%         | 66,0%         |

**Table 6.3: Balance Sheet**

**Balance Sheet**  
**Years 1 to 5**  
**(\$)**

|                                               | <u>Begin</u> | <u>Year 1</u> | <u>Year 2</u> | <u>Year 3</u> | <u>Year 4</u> | <u>Year 5</u> |
|-----------------------------------------------|--------------|---------------|---------------|---------------|---------------|---------------|
| <b>ASSETS</b>                                 |              |               |               |               |               |               |
| <b>CURRENT ASSETS</b>                         |              |               |               |               |               |               |
| Cash                                          | 5 000 000    | 6 861 390     | 23 413 139    | 64 008 543    | 109 322 094   | 163 041 467   |
| Accounts Receivable                           |              | 1 314 571     | 3 573 648     | 913 000       | 1 577 000     | 2 656 000     |
| Inventories                                   |              | 1 314 571     | 3 573 648     | 737 000       | 1 273 000     | 2 144 000     |
| Other Current Assets                          |              | 158 382       | 430 560       | 110 000       | 190 000       | 320 000       |
| Total Current Assets                          | 5 000 000    | 9 648 913     | 30 990 995    | 65 768 543    | 112 362 094   | 168 161 467   |
| <b>PROPERTY &amp; EQUIPMENT</b>               | 0            | 2 218 524     | 3 619 667     | 4 696 762     | 5 524 810     | 6 062 143     |
| <b>TOTAL ASSETS</b>                           | 5 000 000    | 11 867 437    | 34 610 661    | 70 465 305    | 117 886 903   | 174 223 610   |
| <b>LIABILITIES &amp; SHAREHOLDERS' EQUITY</b> |              |               |               |               |               |               |
| <b>CURRENT LIABILITIES</b>                    |              |               |               |               |               |               |
| Short Term Debt                               | 0            | 0             | 0             | 0             | 0             | 0             |
| Accounts Payable & Accrued Expen              |              | 1 370 180     | 3 745 872     | 957 000       | 1 653 000     | 2 784 000     |
| Other Current Liab                            |              | 158 382       | 430 560       | 110 000       | 190 000       | 320 000       |
| Current portion of long term debt             | 0            | 0             | 100 000       | 100 000       | 100 000       | 100 000       |
| Total Current Liabilities                     | 0            | 1 528 562     | 4 276 432     | 1 167 000     | 1 943 000     | 3 204 000     |
| <b>LONG TERM DEBT (less current portion)</b>  | 0            | 0             | 400 000       | 300 000       | 200 000       | 100 000       |
| <b>STOCKHOLDERS' EQUITY</b>                   |              |               |               |               |               |               |
| CommonStock                                   | 100 000      | 250 000       | 500 000       | 500 000       | 500 000       | 500 000       |
| Preferred Stock                               | 100 000      | 250 000       | 500 000       | 1 000 000     | 1 000 000     | 1 000 000     |
| Retained Earnings                             |              | 5 038 875     | 24 134 229    | 62 698 305    | 109 443 903   | 164 619 610   |
| Total Equity                                  | 200 000      | 5 538 875     | 25 134 229    | 64 198 305    | 110 943 903   | 166 119 610   |
| <b>TOTAL LIABILITIES &amp; EQUITY</b>         | 200 000      | 7 067 437     | 29 810 661    | 65 665 305    | 113 086 903   | 169 423 610   |

**Table 6.4: Cash Flow Statement****Cash Flow Statement****Years 1 to 5****(\$)**

|                                                  | <u>Year 1</u>    | <u>Year 2</u>     | <u>Year 3</u>     | <u>Year 4</u>     | <u>Year 5</u>      |
|--------------------------------------------------|------------------|-------------------|-------------------|-------------------|--------------------|
| <b>OPERATING ACTIVITIES</b>                      |                  |                   |                   |                   |                    |
| Net Earnings                                     | 5 038 875        | 19 095 354        | 39 314 076        | 48 245 598        | 57 675 707         |
| Depreciation                                     | 391 476          | 698 857           | 997 905           | 1 271 952         | 1 562 667          |
| Working Capital Changes                          |                  |                   |                   |                   |                    |
| (Increase)/Decrease Accounts Receivable          | -1 314 571       | -2 259 077        | 2 660 648         | -664 000          | -1 079 000         |
| (Increase)/Decrease Inventories                  | -1 314 571       | -2 259 077        | 2 836 648         | -536 000          | -871 000           |
| (Increase)/Decrease Other Current Assets         | -158 382         | -272 178          | 320 560           | -80 000           | -130 000           |
| Increase/(Decrease) Accts Pay & Accrd Expenses   | 1 370 180        | 2 375 692         | -2 788 872        | 696 000           | 1 131 000          |
| Increase/(Decrease) Other Current Liab           | 158 382          | 272 178           | -320 560          | 80 000            | 130 000            |
| Net Cash Provided/(Used) by Operating Activities | 4 171 390        | 17 651 748        | 43 020 405        | 49 013 550        | 58 419 373         |
| <b>INVESTING ACTIVITIES</b>                      |                  |                   |                   |                   |                    |
| Property & Equipment                             | -2 610 000       | -2 100 000        | -2 075 000        | -2 100 000        | -2 100 000         |
| Other                                            |                  |                   |                   |                   |                    |
| Net Cash Used in Investing Activities            | -2 610 000       | -2 100 000        | -2 075 000        | -2 100 000        | -2 100 000         |
| <b>FINANCING ACTIVITIES</b>                      |                  |                   |                   |                   |                    |
| Increase/(Decrease) Short Term Debt              | 0                | 0                 | 0                 | 0                 | 0                  |
| Increase/(Decrease) Curr. Portion LTD            | 0                | 100 000           | 0                 | 0                 | 0                  |
| Increase/(Decrease) Long Term Debt               | 0                | 400 000           | -100 000          | -100 000          | -100 000           |
| Increase/(Decrease) Common Stock                 | 150 000          | 250 000           | 0                 | 0                 | 0                  |
| Increase/(Decrease) Preferred Stock              | 150 000          | 250 000           | 500 000           | 0                 | 0                  |
| Dividends Declared                               | 0                | 0                 | -750 000          | -1 500 000        | -2 500 000         |
| Net Cash Provided / (Used) by Financing          | 300 000          | 1 000 000         | -350 000          | -1 600 000        | -2 600 000         |
| <b>INCREASE/(DECREASE) IN CASH</b>               | <b>1 861 390</b> | <b>16 551 748</b> | <b>40 595 405</b> | <b>45 313 550</b> | <b>53 719 373</b>  |
| <b>CASH AT BEGINNING OF YEAR</b>                 | 5 000 000        | 6 861 390         | 23 413 139        | 64 008 543        | 109 322 094        |
| <b>CASH AT END OF YEAR</b>                       | <b>5 000 000</b> | <b>6 861 390</b>  | <b>23 413 139</b> | <b>64 008 543</b> | <b>109 322 094</b> |

**Table 6.5: Break-Even Analysis****Break-Even Analysis****Years 1 to 5****(\$)**

|                                     | <u>Year 1</u> | <u>Year 2</u> | <u>Year 3</u> | <u>Year 4</u> | <u>Year 5</u> |
|-------------------------------------|---------------|---------------|---------------|---------------|---------------|
| <b>Revenue</b>                      | 8 799 000     | 29 900 000    | 59 800 000    | 73 300 000    | 87 350 000    |
| <b>Cost of Revenue</b>              |               |               |               |               |               |
| Variable                            | 503 520       | 1 608 300     | 3 125 700     | 3 776 100     | 4 417 850     |
| Fixed                               | 628 643       | 994 107       | 1 302 071     | 1 610 036     | 1 918 000     |
| Total                               | 1 132 163     | 2 602 407     | 4 427 771     | 5 386 136     | 6 335 850     |
| <b>Operating Expenses</b>           |               |               |               |               |               |
| Variable                            | 791 910       | 2 691 000     | 5 382 000     | 6 597 000     | 7 861 500     |
| Fixed                               | 306 333       | 677 400       | 799 633       | 973 867       | 1 044 017     |
| Total                               | 1 098 243     | 3 368 400     | 6 181 633     | 7 570 867     | 8 905 517     |
| <b>Total Costs &amp; Expenses</b>   |               |               |               |               |               |
| Variable                            | 1 295 430     | 4 299 300     | 8 507 700     | 10 373 100    | 12 279 350    |
| Fixed                               | 934 976       | 1 671 507     | 2 101 705     | 2 583 902     | 2 962 017     |
| Total                               | 2 230 406     | 5 970 807     | 10 609 405    | 12 957 002    | 15 241 367    |
| <b>Variable Costs/Revenue Ratio</b> | 0,15          | 0,14          | 0,14          | 0,14          | 0,14          |
| <b>Break-Even Point Revenues</b>    | 1 096 392     | 1 952 215     | 2 450 308     | 3 009 842     | 3 446 515     |

**Table 6.6: Property and Equipment**

**Property and Equipment  
Years 1 to 5  
(\$)**

|                                                                                                                     | <u>Year 0</u>           | <u>Year 1</u> | <u>Year 2</u> | <u>Year 3</u> | <u>Year 4</u> | <u>Year 5</u> |
|---------------------------------------------------------------------------------------------------------------------|-------------------------|---------------|---------------|---------------|---------------|---------------|
| <b>Net Revenues</b>                                                                                                 | <b>Purchased Assets</b> |               |               |               |               |               |
|                                                                                                                     | 8 799 000               | 29 900 000    | 59 800 000    | 73 300 000    | 87 350 000    |               |
| <b>Capital Expenditures</b>                                                                                         |                         |               |               |               |               |               |
| Computers, Software & Office Equipment                                                                              | 100 000                 | 50 000        | 25 000        | 50 000        | 50 000        |               |
| Plant & Equipment                                                                                                   | 2 500 000               | 2 000 000     | 2 000 000     | 2 000 000     | 2 000 000     |               |
| Other                                                                                                               | 10 000                  | 50 000        | 50 000        | 50 000        | 50 000        |               |
| <i>Total Capital Expenditures</i>                                                                                   | 0                       | 2 610 000     | 2 100 000     | 2 075 000     | 2 100 000     | 2 100 000     |
| % of Revenue                                                                                                        |                         | 29,7%         | 7,0%          | 3,5%          | 2,9%          | 2,4%          |
| <b>Depreciation Computers, Software &amp; Office Equipment (allocated to General &amp; Administrative Expenses)</b> |                         |               |               |               |               |               |
| Depreciation Rate: Years                                                                                            | 1                       | 3             | 3             | 3             | 3             | 3             |
| Year 0                                                                                                              |                         | 0             | 0             | 0             | 0             | 0             |
| Year 1                                                                                                              |                         | 33 333        | 33 333        | 33 333        | 0             | 0             |
| Year 2                                                                                                              |                         |               | 16 667        | 16 667        | 16 667        | 0             |
| Year 3                                                                                                              |                         |               |               | 8 333         | 8 333         | 8 333         |
| Year 4                                                                                                              |                         |               |               |               | 16 667        | 16 667        |
| Year 5                                                                                                              |                         |               |               |               |               | 16 667        |
| <i>Total Depreciation</i>                                                                                           |                         | 33 333        | 50 000        | 58 333        | 41 667        | 41 667        |
| <b>Depreciation on Plant and Equipment (allocated to Cost of Revenue)</b>                                           |                         |               |               |               |               |               |
| Depreciation Rate: Years                                                                                            | 1                       | 7             | 7             | 7             | 7             | 7             |
| Year 0                                                                                                              |                         | 0             | 0             | 0             | 0             | 0             |
| Year 1                                                                                                              |                         | 357 143       | 357 143       | 357 143       | 357 143       | 357 143       |
| Year 2                                                                                                              |                         |               | 285 714       | 285 714       | 285 714       | 285 714       |
| Year 3                                                                                                              |                         |               |               | 285 714       | 285 714       | 285 714       |
| Year 4                                                                                                              |                         |               |               |               | 285 714       | 285 714       |
| Year 5                                                                                                              |                         |               |               |               |               | 285 714       |
| <i>Total Depreciation</i>                                                                                           |                         | 357 143       | 642 857       | 928 571       | 1 214 286     | 1 500 000     |
| <b>Depreciation Other (allocated to Cost of Revenue)</b>                                                            |                         |               |               |               |               |               |
| Depreciation Rate: Years                                                                                            | 1                       | 10            | 10            | 10            | 10            | 10            |
| Year 0                                                                                                              |                         | 0             | 0             | 0             | 0             | 0             |
| Year 1                                                                                                              |                         | 1 000         | 1 000         | 1 000         | 1 000         | 1 000         |
| Year 2                                                                                                              |                         |               | 5 000         | 5 000         | 5 000         | 5 000         |
| Year 3                                                                                                              |                         |               |               | 5 000         | 5 000         | 5 000         |
| Year 4                                                                                                              |                         |               |               |               | 5 000         | 5 000         |
| Year 5                                                                                                              |                         |               |               |               |               | 5 000         |
| <i>Total Depreciation</i>                                                                                           |                         | 1 000         | 6 000         | 11 000        | 16 000        | 21 000        |
| <b>Total Depreciation</b>                                                                                           |                         | 391 476       | 698 857       | 997 905       | 1 271 952     | 1 562 667     |
| % of Revenue                                                                                                        |                         | 4,4%          | 2,3%          | 1,7%          | 1,7%          | 1,8%          |
| <b>Property &amp; Equipment</b>                                                                                     |                         |               |               |               |               |               |
| Gross Asset Value                                                                                                   | 0                       | 2 610 000     | 4 710 000     | 6 785 000     | 8 885 000     | 10 985 000    |
| Accumulated Depreciation                                                                                            |                         | 391 476       | 1 090 333     | 2 088 238     | 3 360 190     | 4 922 857     |
| <i>Net Property and Equipment</i>                                                                                   | 0                       | 2 218 524     | 3 619 667     | 4 696 762     | 5 524 810     | 6 062 143     |
| % of Revenue                                                                                                        |                         | 25,2%         | 12,1%         | 7,9%          | 7,5%          | 6,9%          |

**Table 6.7: Summary**

**Summary  
Years 1 to 5**

|                                      | <u>Year 1</u> | <u>Year 2</u> | <u>Year 3</u> | <u>Year 4</u> | <u>Year 5</u> |
|--------------------------------------|---------------|---------------|---------------|---------------|---------------|
| <b>Summary Financials (\$)</b>       |               |               |               |               |               |
| Revenue                              | 8 799 000     | 29 900 000    | 59 800 000    | 73 300 000    | 87 350 000    |
| Gross Profit                         | 7 666 837     | 27 297 593    | 55 372 229    | 67 913 864    | 81 014 150    |
| EBIT                                 | 6 298 594     | 23 929 193    | 49 190 595    | 60 342 998    | 72 108 633    |
| EBITDA                               | 6 690 070     | 24 628 050    | 50 188 500    | 61 614 950    | 73 671 300    |
| Net Earnings                         | 5 038 875     | 19 095 354    | 39 314 076    | 48 245 598    | 57 675 707    |
| Net Cash from Operating Activities   | 4 171 390     | 17 651 748    | 43 020 405    | 49 013 550    | 58 419 373    |
| Capital Expenditures                 | 2 610 000     | 2 100 000     | 2 075 000     | 2 100 000     | 2 100 000     |
| Interest Income/(Expense)            | 0             | -60 000       | -48 000       | -36 000       | -14 000       |
| Dividends                            | 0             | 0             | 750 000       | 1 500 000     | 2 500 000     |
| Cash                                 | 6 861 390     | 23 413 139    | 64 008 543    | 109 322 094   | 163 041 467   |
| Total Equity                         | 5 288 875     | 24 634 229    | 63 198 305    | 109 943 903   | 165 119 610   |
| Total Debt                           | 0             | 500 000       | 400 000       | 300 000       | 200 000       |
| <b>Growth</b>                        |               |               |               |               |               |
| Revenue Growth Rate - CAGR:          |               | 240%          | 100%          | 23%           | 19%           |
| Net Earnings Growth Rate - CAGR:     |               | 279,0%        | 105,9%        | 22,7%         | 19,5%         |
| <b>Ratios</b>                        |               |               |               |               |               |
| Current Ratio                        | 6,3           | 7,2           | 56,4          | 57,8          | 52,5          |
| Debt to Capital (LT Debt + Equity)   | 0,0           | 0,0           | 0,0           | 0,0           | 0,0           |
| <b>Profitability</b>                 |               |               |               |               |               |
| Gross Profit %                       | 87,1%         | 91,3%         | 92,6%         | 92,7%         | 92,7%         |
| Operating Expenses %                 | 12,5%         | 11,3%         | 10,3%         | 10,3%         | 10,2%         |
| Net Earnings %                       | 57,3%         | 63,9%         | 65,7%         | 65,8%         | 66,0%         |
| <b>Returns</b>                       |               |               |               |               |               |
| Return on Assets                     | 42,5%         | 55,2%         | 55,8%         | 40,9%         | 33,1%         |
| Return on Equity                     | 91,0%         | 76,0%         | 61,2%         | 43,5%         | 34,7%         |
| Return on Capital (LT Debt + Equity) | 91,0%         | 74,5%         | 60,9%         | 43,4%         | 34,7%         |

**Table 6.8: Valuation Calculation**

**Valuation**  
**Venture Capital Method**  
**Years 1 to 5**

|                                 |             |             |                |                  |                 |              |            |            |            |
|---------------------------------|-------------|-------------|----------------|------------------|-----------------|--------------|------------|------------|------------|
| Assumptions:                    |             | REF         |                |                  |                 |              |            |            |            |
| Investor required IRR           | 40%         | A           |                |                  |                 |              |            |            |            |
| P/E ratio at IPO or acquisition | 10          | B           |                |                  |                 |              |            |            |            |
| Initial investment              | \$5 000 000 | C           |                | FV(A,C)          |                 | G/F          | IRR(D,G)   |            |            |
|                                 | REF         | D           | E              | F                | G               | H            | I          | J          | K          |
|                                 |             |             |                | Market           | Required Future | Investor's   | Investor's | Investor's | Investor's |
| Valuation Calculation           | Year        | Net Income  | Capitalization | Value (Investor) | Share           | Return       | ROI        | IRR        |            |
|                                 | Calculation | Income Stmt | B * E          | FV(F,D)          | C / G           | F * H        | I / C      | IRR(I,C,D) |            |
| Liquidity Event in Year 1       | 1           | 5 038 875   | \$50 388 749   | \$7 000 000      | 13,9%           | \$7 000 000  | 140%       | 40%        |            |
| Liquidity Event in Year 2       | 2           | 19 095 354  | \$190 953 543  | \$9 800 000      | 5,1%            | \$9 800 000  | 196%       | 40%        |            |
| Liquidity Event in Year 3       | 3           | 39 314 076  | \$393 140 762  | \$13 720 000     | 3,5%            | \$13 720 000 | 274%       | 40%        |            |
| Liquidity Event in Year 4       | 4           | 48 245 598  | \$482 455 981  | \$19 208 000     | 4,0%            | \$19 208 000 | 384%       | 40%        |            |
| Liquidity Event in Year 5       | 5           | 57 675 707  | \$576 757 067  | \$26 891 200     | 4,7%            | \$26 891 200 | 538%       | 40%        |            |

| Negotiation Workspace |                  |                   |                |                |
|-----------------------|------------------|-------------------|----------------|----------------|
| Year                  | Investor's Share | Investor's Return | Investor's ROI | Investor's IRR |
| 1                     | 25,0%            | \$12 597 187      | 252%           | 152%           |
| 2                     | 25,0%            | \$47 738 386      | 955%           | 209%           |
| 3                     | 25,0%            | \$98 285 190      | 1966%          | 170%           |
| 4                     | 25,0%            | \$120 613 995     | 2412%          | 122%           |
| 5                     | 25,0%            | \$144 189 267     | 2884%          | 96%            |

## 6.2 Conclusions

Tenders in GCC countries are low price or fast delivery based. According to designed system, goods can be supplied approximately in 20 days. Ukrainian pipes are cheaper than others due to lower labor and operational costs. In addition, fast delivery makes them advantageous in tenders. Russian pipes are also cheap but they are delivered, approximately, in 25 days. Producing chemicals in Turkey will also result in low costs because costs of labor and raw materials are lower than in countries where rival companies are located. These countries are USA, France and Holland. All those factors make the business feasible.

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