APPLICATION OF ISO 9000 AND OHSAS 18000 TO A MINING COMPANY, A CASE STUDY

A THESIS SUBMITTED TO
THE GRADUATE SCHOOL OF NATURAL AND APPLIED SCIENCES
OF
THE MIDDLE EAST TECHNICAL UNIVERSITY

BY

MESUT AKANER

IN THE PARTIAL FULLFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF
MASTER OF SCIENCE
IN
THE DEPARTMENT OF MINING ENGINEERING

SEPTEMBER 2003

Approval of The Graduate School of Natural and Applied Sciences of The Middle East Technical University

_____

Prof. Dr. Canan ÖZGEN
Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Science.

_____

Prof. Dr. Tevfik GÜYAGÜLER
Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

_____

Prof. Dr. Tevfik GÜYAGÜLER
Supervisor

Examining Committee Members

Prof. Dr. Tevfik GÜYAGÜLER _____

Prof. Dr. Naci BÖLÜKBAŞI _____

Prof. Dr. Cahit HIÇYILMAZ _____

Doç. Dr. Erhan TERCAN _____

Rıdvan BOZKURT _____

ABSTRACT

APPLICATION OF ISO 9000 AND OHSAS 18000 TO A MINING COMPANY, A CASE STUDY

Akaner, Mesut
M. Sc., Department of Mining Engineering
Supervisor: Prof Dr. Tevfik Güyagüler

September 2003, 215 pages

ISO 9000 Quality Management Standards Series aims to improve the products and services regarding customer satisfaction. The main purpose is to increase quality. On the other hand, having a special importance to mining, OHSAS 18000 Occupational Health and Safety Assessment System Series aims to provide safer, more tranquil and more healthy working environment to the labors. Both of these management systems are continuously improved and increase their importance in the world.

This study evaluates ISO 9000 and OHSAS 18000 series in a comparative and criticizing scope and complementariness of the standards to each other is examined. Existing conditions in our country are determined in mining perspective and some comments are given to improve existing condition. Literatural information is given about both of the series in the study and these information is supported by some case studies. Case studies covers not only, a leading company in Turkey namely

MANGAN Marble & Granite Inc. but also some other companies and establishments. Studies show that there are some problems observed in the implementation of both series. The main problem is commitment of the top management. Other problems are documentation and training of the personnel. These problems are more serious in small scale mining companies and quarries. Although existance of these problems is highly possible in the mining companies applying ISO 9000 and OHSAS 18000 series are very beneficial regarding the increase in the quality of products and therefore it's advantages and in providing a healthy and safe working environment and become a necessity.

Keywords : ISO9000, OHSAS 18000, Mining.

ÖZ

BİR MADEN İŞLETMESİNDE ISO 9000 VE OHSAS 18000 UYGULAMASI, ÖRNEK BİR UYGULAMA

Akaner, Mesut
Yüksek Lisans, Maden Mühendisliği Bölümü
Tez Yöneticisi : Prof Dr. Tevfik Güyagüler

Eylül 2003, 215 sayfa

ISO 9000 Kalite Yönetim Standardları Serisi ürünlerin veya verilen hizmetlerin müşteri memnuniyetini esas alacak şekilde geliştirilmesi ve iyileştirilmesini amaçlar. Asıl amacı kalitenin arttırılmasıdır. Diğer yandan madencilik için özellikle önem taşımakla birlikte OHSAS 18000 Mesleki Sağlık ve Güvenlik Yönetimi Standardları Serisi işletmelerde işgörenlere daha sağlıklı, daha emniyetli ve daha huzurlu bir çalışma ortamı sağlamayı amaçlar. Her iki yönetim sistemi sürekli geliştirilen ve iyileştirilen ve dünyada önemi giderek artan standardlardır.

Bu çalışma ISO 9000 Serisi ve OHSAS 18000 serisi standardların madencilik açısından getirilerini, uygulanabilirliğini ve uygulama esnasında karşılaşılan güçlükleri incelemeyi amaçlar. Bu çalışmada ISO 9000 ve OHSAS 18000 eleştirel bir bakış açısıyla karşılaştırılmış ve bu iki standardın birbirini tamamlayıcı yönleri

incelenmiştir. Ülkemizdeki mevcut durum genel olarak ve madencilik açısından ele alınmış ve mevcut durumun iyileştirmesi için öneriler getirilmiştir. Çalışma içerisinde her iki seri için literatür bilgileri verilmekte ve bu bilgiler örnek uygulamalarla desteklenmektedir. Yapılan uygulamalar ülkemizin önde gelen mermercilik firmalarından biri olan MANGAN yanısıra pek çok diğer kurum ve kuruluşu da kapsamaktadır. Bu çalışmalar her iki serininde uygulanmasında bir takım sorunların ortaya çıktığını göstermiştir. En önemli sorun üst yönetiminin gerekli desteği sağlamamasıdır. Diğer problemler ise dokümantasyon ve personelin eğitimidir. Bu problemler küçük ölçekli madencilik işletmelerinde ve ocaklarda daha önemli bir hal almaktadır. Her ne kadar bu problemlerin ISO 9000 ve OHSAS 18000 serisi uygulayan madencilik firmalarında görülmesi muhtemelse de bu standardlar ürün kalitesindeki artışın getirileri ve sağlıklı ve güvenli bir çalışma ortamı sağlanması göz önüne alındığında oldukça yararlıdır ve bir zorunluluk halini almıştır.

Anahtar kelimeler : ISO9000, OHSAS 18000, Madencilik.

To my Parents :

Ayşe & Erdal AKANER

ACKNOWLEDGEMENTS

First of all, I wish to express my deepest gratitude to Prof. Dr. Tevfik Güyagüler , my advisor, for his guidance, kindness, warm understanding, encouragement and academic support throughout my studies. I would also like to my appreciation and gratitude to Prof. Dr. Neş'e Çelebi for her vision, determination, support and merry laughs.

I would like to express my gratitude to the instructors, friends and people at the Mining Engineering Department. And especially to Özge for being a part of me. Lastly I would like to express my special thanks and gratitude to my parents and my sister for everything which can not be explained with words.

TABLE OF CONTENTS

LIST OF TABLES

TABLE

LIST OF FIGURES

FIGURE

CHAPTER 1

INTRODUCTION

The ISO 9000 series defines the basic principles of the quality management system which is used by the manufacturers, distributors, suppliers, service providers and customers. It serves generally accepted procedures and criteria which can be applied to any type and size of company. ISO 9000 can be considered as a reference for verifying the quality improvement tools and methods are applied. In other words, it is management system of the company and a sign of ability to provide satisfaction in the goods and services.

ISO 9000 series had included four main parts giving the detailed information about design, development, production, installation, etc. ISO 9001, ISO 9002, and ISO 9003 can be certified to a company in the previous versions. On the other hand, ISO 9004 standard was used as a guide. Ray Tricker ,a writer, says that "Registering the ISO series, firms have not only improved their own particular quality management organization, they have also proved that they are capable of efficiently and competitively satisfying a customer's requirements."

ISO 9001, ISO 9002 and ISO 9003 were detailed guides for external contractual quality management . These quality management systems could be used in a contract to specify a product based quality system requirements. ISO 9004 is a guide for defining the rules for development and application of the quality management system.

In recent years the study of associating ISO 9001, ISO 9002 and ISO 9003 had been carried on. In this regard the companies taking the ISO 9000 certification after year 2000 has been apply to the related part of ISO 9001-2000 revision.

The aim of the study is to examine the benefits, difficulties and applicability of ISO 9000 and OHSAS 18000 Series of Standards in mining. The study evaluates these series in a comparative scope. The application given in the thesis aims to increase the quality of products and to provide safer work environment.

There have been a number of studies applied in the fields of occupational health and safety and quality management systems. The most important and the basic studies are carried out naturally by the committee of ISO. These studies cover both providing new standards and improvement of existing standards. Beside that lots of studies have been performed on academic and industrial basis. The most striking study is carried out by Kit-Fai-Pun and Kee Hui. This study discusses the factors affecting safety-quality integration in management systems. In this regard it covers both ISO 9000 and OHSAS 18000. Another remarkable study is namely "a critical examination of ISO 9000 certification to lead to a competitive advantage" prepared by Sime Curkovic. Although a large number of studies can be found on occupational health and safety most of them does not examine the standard in details. In this sense, studies of Independent Safety Consultants Association and DNV are really beneficial.

The second chapter of the thesis describes the terms quality and standardization. It gives the quality comprehension in Quality Management Systems, and quality activities in Turkey. This chapter covers the basics of Quality Management Systems.

Chapter three deals with the ISO 9000 Quality Management System Standards. It defines and examines the standards in the series. The chapter evaluates the implementation of ISO 9000 series in mining perspective. It gives hit points in the preparation and implementation stages of certification. It also focuses on the benefits

and application of statistical methods in preventive and corrective action and continuous improvement activities as a part of Quality Management System.

Chapter four gives information about the OHSAS 18000 Occupational Health and Safety Management System. It evaluates OHSAS 18000 in a comparative scope. It provides a guidance in the implementation of series.

Chapter five compares the application, benefits and difficulties of ISO 9000 Quality Management System Standards and OHSAS 18000 Occupational Health and Safety Management System in mining. It gives clues for the simultaneous implementation or transition of ISO 9000 and OHSAS 18000 series.

CHAPTER 2

QUALITY AND QUALITY MANAGEMENT SYSTEMS

2.1 Quality and Standardization

There are different definitions of quality made by leading authorities; such as, Juran describes the quality as fitness for use. Similarly, Crosby defines it as conformance to requirements. According to ISO 9000 quality system, quality is the totality of features and characteristics of a product or service that bear on its ability to satisfy stated or implied needs . Deming says that quality should be aimed at the needs of the consumer, present and future.

If all the definitions of the quality given above are evaluated all together, quality can be defined as reaching or exceeding the standards of the similar products or services to satisfy the needs and expectations of customers.

No one knows who invented the first set of standards. Their development, however, is a key to the emergence of the high technology age as we know it. Technological advancements and the development of standards have gone hand in hand (Johnson, 2000). Standards, basically, are the molds or patterns constituted for the aim of inspecting the convenience of the products or production systems. Eliminating the problems which prevent the development of free trade, providing the fluidity at the production systems, improving the health, security and environmental conditions are some of the points involved in the aim of construction of the standards.

Standardization is defined by International Standardization Organization as follows : "Standardization is a process to make into a rule and to apply these rules with the help and cooperation of all related sides to provide economical benefit related with an activity (İzmir Chamber of Trade, 1998).

The benefits of standardization are given by TSE as follows:
In manufacturer point of view; It:

1. Provides plans and programs for production,
2. Makes mass production with proper quality possible,
3. Reduces the defective products,
4. Increase efficiency,
5. Provide ease of storage,
6. Minimize stocks, and
7. Decrease costs.

In customer point of view; It :

1. Protects the life and property safety,
2. Provides ease of comparison and selection,
3. Facilitates order and purchasing activities,
4. Prevents deceiving in price and quality of products,
5. Ensures to get higher quality product with a lower price, and
6. Increases consumer consciousness.

In economical point of view; It :

1. Encourages quality and eliminate the extravagance of poor quality,
2. Leads the Industry to quality objectives,
3. Helps to balance supply and demand,
4. Eliminates misunderstandings and disagreements,
5. Encourages side industry branches,
6. Removes low quality products from the market,
7. Provides competitive advantage in exporting, and
8. Improves competition (T.S.E., 1994).

Although environmental topics are not covered above, standardization consciousness has been developed to prevent disturbing the environment in recent years.

Minimizing the effects of products to the nature is a concept to be dwelled on in European Union (İzmir Chamber of Trade, 1998).

2.1.1 Quality comprehension in Turkey

In parallel to the rest of the world quality activities has started with inspection and procure of quality in Turkey. After that quality control and assurance systems have been developed. Introduction of ISO 9000 has ignited big firms to get the international standards. However; ISO 9000 certificates given by Turkish Institute of Standards are not accepted by some countries. Therefore; some companies making exports have started to get quality certificates from foreign quality certification institutions in recent years. On the other hand, small and middle scale firms are generally content with TSE certificates.

The reason for high demand of quality certificates is the common comprehension among the customers. This comprehension can be summarized, as “standardization is a mark of high quality”.

There is no governmental policy for the quality activities. However; some private sector organizations such as, TÜSİAD, give quality prizes to encourage the Turkish firms (Kuş, 1999).

2.1.2 Total quality management in Turkish mining

Development of Total Quality Management (TQM) in Turkey has started with implementation of quality circles in early 80's. In those days applications were very limited. However; by 1989 twenty three big companies started to apply TQM. These studies were carried out by the foreign firms. In early years of 90's with increase in foreign trade, some big companies have cooperated with foreign companies. They recognized that quality circles are only one step of TQM and this should be

supported with other implementations. Therefore; Turkish companies have taken Japanese management systems as models. At the beginning, desired results could not be obtained. Since, TQM implementations should be modified according to the characteristics of the application area. However, these applications are very important regarding the recognition of TQM by Turkish firms.

In cooperating with the American and Japanese companies, Turkish firms have started to develop their own quality management philosophies. As examples of these firms, Brisa (corporation of Lassa and Bridgestone) and corporation of Netaş and TEİ can be given. At the beginning of the applications, Turkish quality professionals worked under the supervision of foreign specialists, but after a period of time, they used their own strategies. In the following years, TQM applications are fairly adopted and Turkish firms won some international prizes (Kuş, 1999).

In the globalized world the competition gets harder and harder. Under such a condition the companies with insufficient competitive power are convicted to vanish. Quality and efficiency are the main keys of competition. In companies applying TQM approach, as a tool of a management system that aims zero defect and continuous improvement of management and production, has become an obligation. As in the case of other industries the interest to TQM has been increasing rapidly. In the near future, especially in the big companies, TQM will be widely seen.

A research made by TÜSİAD and KALDER in 2000 shows that in TQM implemented companies' market share, productivity, and quality have increased. These companies are also more resistant to the economic crises in Turkey. These factors have a great importance in mining. Because of their nature, ore bodies have variations. These variations increase the importance of empirical information in both extraction and processing stages. Therefore; TQM applications have greater benefits with respect to the other industries. Since mining is more based on human factor. On the other hand, the quality certificates given by both Turkish Institute of Standards and foreign quality institutions increase the reliability and respect to the Turkish firms.

Although TQM provides important benefits it also brings some major difficulties. Lack of preparations and training in TQM applications cause failures in most cases. For examples, lack of quality cost analysis in preparation stage prevents the realistic feasibility studies. The main reason for the lack of quality cost analysis in mining applications is the difficulties in categorizing quality costs in the available accounting system. Unfortunately, economics of quality is not very well known by the mining industry. Therefore; it is commonly believed that the production of high quality products causes financial and manufacturing problems and cannot be economical. On the other hand, Turkish mining companies have not gained the place that they deserve in the world market. For example high quality marble products can be exported at lower prices than their identical produced in other countries. So, for some ores and stones low quality but low cost production is preferred. To increase the competitive power of Turkish mining in the international market, firstly international quality standards should be reached or exceeded.

Beside the lack of preparation and quality cost analysis, in implementation of TQM certain difficulties are seen. The most important of all is the insufficient commitment of top management and their resistance to lean management system. This is especially the problem of big companies in which a high level of hierarchy is present. The other problem with the managers is the competition among the departments. This competition prevents the information share between the departments. As the hierarchy is at the minimum in some small-scale mining companies; such as, marble processing plants coal mines etc. This problem does not exist in these companies.

There are a number of other factors preventing the success of TQM and these factors are also valid for the mining industry. However; these difficulties should not discourage the companies. As the implementation of quality based systems has become an obligation for the survival of the companies, all the companies in any size should prepare themselves to apply Total Quality Management approach as soon as possible.

2.1.3 Standardization studies in Turkey

Modern quality activities have started with the declaration of Republic in Turkey and developed in parallel to the improvements in the World. The most important step in Turkish quality development is the establishment of Turkish Institute of Standards (TSE) in 1964. Turkish Institute of Standards has been assigned with preparation of standards, testing and documentation.

In spite of sufficient experience and institution structure, no significant improvement in the quality activities has been seen. The reason behind this is the lack of quality infrastructure. As a part of United Nations Development Plan Quality Control System First Stage Project went into effect by Turkish Institute of Standards in 1977. Although, the first stage of project was carried out by Governmental Planning Institution (DPT), the second stage, which went into effect in 1987, was applied by Turkish Institute of Standards. In this regard, World Bank assigned one 100 million dollars to Technology Improvement Project. This project includes the establishment of systems for standards, quality experiment and metrology. It also aimed to increase these opportunities and sufficiency of the Institutions working on these systems. In this project, Turkish Institute of Standards undertook the establishment of standards, experiment and quality systems. In this scope, Turkish Institute of Standards has used 42.5 million dollars of the fund (TSE , 1994).

2.1.4 Studies of TSE mining preparation group

In the determination of the activities of Mining Preparation Group of TSE interviews with the members are used. TSE is one of the founders of International Organization for Standardization and has authority in the preparation of ISO standards. Mining Preparation Group has prohibited the export of raw materials. Beside, they have abolished the obligatory standards. Mining firms are free to get TSE certificate for their products regarding the factors like; additional costs, increase in market share etc. On the other hand, firms especially exporting ones can get help from the acredidated establishments like TSE etc. In the studies of Mining preparation group

national benefits and advantages of producers are considered. As the ores are the limited resources, the exportation of them is limited by the production standards. Only the processed ores are permitted to expert. In the determination of the standards, quality and adaptability of the products of our country to the standards are taken into consideration. If an imported product is not appropriate to the TSE standards it is not allowed to be imported.

In conclusion, mining preparation group provides the usage of the resources effectively and guarantee for the appropriate of the products and services to the standards by regarding human health and benefits of the country (TSE, 2003).

2.1.5 TSE-ISO relationship

The International Organization for Standardization (ISO) is a worldwide federation of national standards bodies from 143 countries, which was established in 1947. The mission of the ISO is to facilitate the international exchange of goods and services, and to develop co-operation in the spheres of intellectual, scientific, technological and economic activity. TSE became a member body of ISO in 1955.

ISO is the largest organization dealing with standardization and publishing standards in every field, except for electricity, electronics and electromechanics, which are falling under the domain of the International Electro technical Commission (IEC).

TSE is a member of the ISO Policy Development Committees- namely CASCO (Committee on Conformity Assessment), DEVCO (Committee on Developing Country Matters), COPOLCO (Committee on Consumer Matters) and REMCO (Committee on Reference Materials/Committee on General Standardization Principles).

Standards development activities within ISO are conducted by technical committees. The Turkish Standards Institution participates in the development of international standards by having membership in the technical committees dealing with matters that bear significance for Turkish industry. Standards drafted by ISO technical

committees are sent to TSE standards development groups, TSE laboratories and other related units for comments or information. Such draft standards are also forwarded to the Chambers of Commerce and Industry, the leading public and private organizations, universities, industry and professional associations for comments. Comments on these documents received from external organizations along with TSE's views are considered and combined to represent a common viewpoint of the country for submission to the related ISO technical committees. Announcements on ISO technical committee meetings are made to ensure the participation of the related organizations and industry representatives. TSE makes any arrangements for participation in these meetings and provides the needed documentation.

TSE served in the ISO Council which is composed of 18 elected members for the terms 1963-1965, 1969-1971, 1974-1976, 1986-1991 and 1998-1999.

TSE also had membership in ISO Technical Management Board for the term 1995-1996, a body responsible for monitoring the activities of the ISO technical committees (http://www.tse.org.tr, 2003).

2.2 Quality Management Systems

Historically, quality management has moved through four stages; inspection, quality control, quality assurance, and total quality management. Each has built on the previous stage and at least up to quality assurance has largely incorporated the preceding technique into an enlarged discipline (Jackson, Ashton, 1996). Increasingly more European and US companies are being asked by business partners to implement formal quality assurance systems. As a result, a large number of industrial and service companies and government and health care institutions worldwide are implementing quality assurance system (Vloeberghs and Bellens, 1996). QMS (Quality Management System) standards are a set of controls for specified activities or actions. The standards list activities, processes or transformations that represent risk to organizations (Russel, 2003). The aim of a

quality system is to ensure that the facility's product or service, generally referred to as output, meets the customer's quality requirements. The quality system incorporates both quality assurance and quality control (Randall, 2000).

2.2.1 Principles of quality management systems

The eight quality management principles are defined in ISO 9000:2000, Quality management systems Fundamentals and vocabulary, and in ISO 9004:2000, Quality management systems Guidelines for performance improvements.

Principle 1 Customer focus

Organizations depend on their customers and therefore should understand current and future customer needs, should meet customer requirements and strive to exceed customer expectations.

Key benefits:

- Increased revenue and market share obtained through flexible and fast responses to market opportunities.
- Increased effectiveness in the use of the organization's resources to enhance customer satisfaction.
- Improved customer loyalty leading to repeat business.

Applying the principle of customer focus typically leads to:

- Researching and understanding customer needs and expectations.
- Ensuring that the objectives of the organization are linked to customer needs and expectations.
- Communicating customer needs and expectations throughout the organization.
- Measuring customer satisfaction and acting on the results.
- Systematically managing customer relationships.
- Ensuring a balanced approach between satisfying customers and other interested parties (such as owners, employees, suppliers, financiers, local communities and society as a whole).

Principle 2 Leadership

Leaders establish unity of purpose and direction of the organization. They should create and maintain the internal environment in which people can become fully involved in achieving the organization's objectives.

Key benefits:

- People will understand and be motivated towards the organization's goals and objectives.
- Activities are evaluated, aligned and implemented in a unified way.
- Miscommunication between levels of an organization will be minimized.

Applying the principle of leadership typically leads to:

- Considering the needs of all interested parties including customers, owners, employees, suppliers, financiers, local communities and society as a whole.
- Establishing a clear vision of the organization's future.
- Setting challenging goals and targets.
- Creating and sustaining shared values, fairness and ethical role models at all levels of the organization.
- Establishing trust and eliminating fear.
- Providing people with the required resources, training and freedom to act with responsibility and accountability.
- Inspiring, encouraging and recognizing people's contributions.

Principle 3 Involvement of people

People at all levels are the essence of an organization and their full involvement enables their abilities to be used for the organization's benefit.

Key benefits:

- Motivated, committed and involved people within the organization.
- Innovation and creativity in furthering the organization's objectives.
- People being accountable for their own performance.

Applying the principle of involvement of people typically leads to:

- People understanding the importance of their contribution and role in the organization.
- People identifying constraints to their performance.
- People accepting ownership of problems and their responsibility for solving them.
- People evaluating their performance against their personal goals and objectives.
- People actively seeking opportunities to enhance their competence, knowledge and experience.
- People freely sharing knowledge and experience.
- People openly discussing problems and issues.

Principle 4 Process approach

ISO 9001:2000, clause 3.4.1, defines a process as "a set of interrelated or interacting activities that transform inputs into outputs." The process approach is built on the belief that a desired result is achieved more efficiently when activities and related resources are managed as a process. This approach is built on four concepts: inputs, outputs, verification, and validation. These four ideas form a cohesive structure to ensure that the desired outcome results from the process applied.

If effectiveness and efficiency are not achieved, the process has failed and needs attention. This becomes apparent quickly in a development and manufacturing environment because the outputs of one process usually become the inputs for the next one. High-quality input at the start of a process will more than likely result in high-quality output at the end.

In a process-driven environment, staff members are trained to think in terms of how their work affects the quality of the processes that follow. This results in an ongoing push for high-quality input and output each time processes intersect, and benefits both internal and external customer needs.

To use the process approach, you need a clear understanding of what is needed to meet the requirements and the value of meeting them for both the company and the customer. You also must have a verification method that proves the process is indeed successful. Success is determined not only by achieving a predetermined result in a product or conforming to regulatory guidelines, but also by implementing a full quality management system that adds ongoing value.

The major point of the process approach is that the output of one process almost always affects another. If one creates a set of quality procedures using a limited point of view, it can result in an incomplete quality system that does not adequately control the interactions across an entire organization. This in turn results in unnecessary hurdles for staff members to cope with before they can complete their work. (Flemming, 2002) Key benefits of the process approach are given below:
Key benefits:

- Lower costs and shorter cycle times through effective use of resources.
- Improved, consistent and predictable results.
- Focused and prioritized improvement opportunities.

Applying the principle of process approach typically leads to:

- Systematically defining the activities necessary to obtain a desired result.
- Establishing clear responsibility and accountability for managing key activities.
- Analyzing and measuring of the capability of key activities.
- Identifying the interfaces of key activities within and between the functions of the organization.
- Focusing on the factors such as resources, methods, and materials that will improve key activities of the organization.
- Evaluating risks, consequences and impacts of activities on customers, suppliers and other interested parties.

Principle 5 System approach to management

Identifying, understanding and managing interrelated processes as a system contributes to the organization's effectiveness and efficiency in achieving its objectives.

Key benefits:

- Integration and alignment of the processes that will best achieve the desired results.
- Ability to focus effort on the key processes.
- Providing confidence to interested parties as to the consistency, effectiveness and efficiency of the organization.

Applying the principle of system approach to management typically leads to:

- Structuring a system to achieve the organization's objectives in the most effective and efficient way.
- Understanding the interdependencies between the processes of the system.
- Structured approaches that harmonize and integrate processes.
- Providing a better understanding of the roles and responsibilities necessary for achieving common objectives and thereby reducing cross-functional barriers.
- Understanding organizational capabilities and establishing resource constraints prior to action.
- Targeting and defining how specific activities within a system should operate.
- Continually improving the system through measurement and evaluation.

Principle 6 Continual improvement

Continual improvement of the organization's overall performance should be a permanent objective of the organization.

Key benefits:

- Performance advantage through improved organizational capabilities.
- Alignment of improvement activities at all levels to an organization's strategic intent.

Applying the principle of continual improvement typically leads to:

- Employing a consistent organization-wide approach to continual improvement of the organization's performance.
- Providing people with training in the methods and tools of continual improvement.
- Making continual improvement of products, processes and systems an objective for every individual in the organization.
- Establishing goals to guide, and measures to track, continual improvement.
- Recognizing and acknowledging improvements.

Principle 7 Factual approach to decision making

Effective decisions are based on the analysis of data and information.

Key benefits:

- Informed decisions.
- An increased ability to demonstrate the effectiveness of past decisions through reference to factual records.
- Increased ability to review, challenge and change opinions and decisions.

Applying the principle of factual approach to decision making typically leads to:

- Ensuring that data and information are sufficiently accurate and reliable.
- Making data accessible to those who need it.
- Analyzing data and information using valid methods.
- Making decisions and taking action based on factual analysis, balanced with experience and intuition.

Principle 8 Mutually beneficial supplier relationships

An organization and its suppliers are interdependent and a mutually beneficial relationship enhances the ability of both to create value

Key benefits:

- Increased ability to create value for both parties.

- Flexibility and speed of joint responses to changing market or customer needs and expectations.
- Optimization of costs and resources.

Applying the principles of mutually beneficial supplier relationships typically leads to:

- Establishing relationships that balance short-term gains with long-term considerations.
- Pooling of expertise and resources with partners.
- Identifying and selecting key suppliers.
- Clear and open communication.
- Sharing information and future plans.
- Establishing joint development and improvement activities.
- Inspiring, encouraging and recognizing improvements and achievements by suppliers.

2.2.2 Total quality management vs. quality management systems

Unlike the common opinion ISO 9000 series and Total Quality are not the same. Total quality is management and control activities based on the leadership of top management and based on the involvement of all employees and all departments from planning and development to sales and service. On the other hand, ISO 9000 deals with the development, improvement, and documentation of the quality system. The most detailed standard of ISO 9000, ISO 9001 is limited to design, development, production, installation and servicing. However, Total Quality Management deals with not only production and management but also human resources etc.. However we should not forget that the wider the content of the system the more difficulties faced in application. On the other hand, vision and studies for the determination of the strategies and targets required to realize the vision are synonymous to the quality policy and quality objectives in ISO 9000 Quality Management System.

Both TQM and ISO 9000 include continuous improvement and statistical methods. Customer focus has a primary importance in TQM. In quality improvement, personnel are thought rather than processes and procedures. In ISO 9000 the interaction between the customer and the firm is less interactive and product quality and firm objectives are given in the quality manual. The work related with customer relations is described and determined in procedures of quality management system. After 2000 revision of ISO series, the comprehension of ISO and TQM has come closer. As I have mentioned before, TQM and ISO are not totally interchangeable. However, they can easily be used together. In this regard, ISO registration (or implementation) can be considered as a step in the way of TQM. ISO helps to appropriation of systematic approach and development of quality culture in the organization. It provides the team approach and prevents the uncertainties among the personnel and lots of other things as given in the related section of the thesis.

As a result, it eliminates most of the difficulties seen in TQM implementation. In spite of some authorities, who think ISO 9000 implementation as unnecessary in mature TQM environment; ISO registration keeps the quality management system under control and confirms commitment to the customers. Therefore, increases the credit and reliability and provides competitive advantage. In some of the governmental auctions ISO 9000 series certificate has become a prerequisite. This shows that ISO 9000 is indispensable in today's business environment. So being at the beginning of the quality way, as Turkish miners we should not abstain and give required importance to ISO 9000 series implementation (Davis and Goetsch, 2000).

CHAPTER 3

ISO 9000 QUALITY MANAGEMENT SYSTEM SERIES

3.1 Definition and Comparison of ISO 9000 series standards

The International Organization for Standardization (ISO) is a Geneva based worldwide federation. It was founded in 1946 to remote the development of international standards and related activities to facilitate the exchange of goods and services worldwide. ISO is composed of national bodies (currently comprising more than ninety member countries) that normally work together in preparing international standards through Technical Committees. In 1979, ISO formed Technical Committee ISO / TC 176 on Quality Assurance to develop a single, generic series of quality system standards that could also be used for external quality assurance purposes. (Randall, 2000) The TC 176 has three subcommittees. The first subcommittee deals with the terminology; the second committee develops quality systems and the third committee is responsible for tools for implementation (Schomaker, 1996).

ISO 9000 is a series of quality management standards that were created by the International Organization for standardization. (Johnson, 2000) The origins of ISO 9000 lie in wartime and the defense industry. The problem of defects in ammunition and the need for reliability in equipment on which survival might depend, moved the focus to controlling how the work was done. Eventually this led to define standards for quality management to which defense contractors were expected to work. As the concept of quality management and quality systems become known, buyers in

non-defense industries started to demand that their own suppliers of technical products adopt quality systems (Jackson and Ashton, 1996).

The ISO 9000 series of International Quality Standards was first published in 1987. Five basic quality system documents were released. These five documents include three conformance models (ISO 9001, ISO 9002, ISO 9003) and two guides (ISO 9000 and ISO 1004) (Paradis, 1996).Unlike the old revisions, ISO 9000 2000 revision include only ISO 9000, 9001 and 9004 standards.

ISO 9000 standard is a guideline for quality management and quality management standards (Durand, Marquardt, Peach and Pyle, 1993). ISO 9001 Quality management system standard is a quality management model for design, development, production installation and servicing activities. It aims to increase the quality of products and services by continuously improving and controlling the processes and the quality system. Internal auditing, statistical methods and tools, customer satisfaction measurement reports, preventive and corrective action facilities are used to measure the quality of the products and services. Using these, nonconformities, defects, and problems in the processes are determined. ISO 9001 envisages the verification of the preventive and corrective action and documentation of the quality system performance. More detailed information about the ISO 9001 is given in the sections that describes the components of the system such as documentation, certification etc.

A case study on the application of ISO 9001 Quality Management System is given in Appendices on MANGAN Marble & Granite Inc.

ISO 9004:2000 is a valuable tool for improving an organization's effectiveness, efficiency and the quality of its products and services. It is a standalone document that should be used for improving organization performance. Quality management and business principles are deeply rooted in it, and there are clause-by-clause links to ISO 9001:2000 The biggest misconception about ISO 9004 is that it is used as an implementation guide for ISO 9001. Even though ISO 9004 may promote a better understanding of the intent of the ISO 9001, its aim is different.

ISO 9004 was written for top management to use. However, it is not written like a book or a procedure. Instead, it is a technical document top managers must study to know how to use it to improve organization performance, reduce costs, satisfy customers and improve competitiveness (Russel, 2003).

3.2 Aims & Benefits of ISO 9000 series

ISO 9000 is a starting place for quality efforts, because the standards ensure that a quality system is in place and is being followed. They provide the foundation for a total quality management program by concentrating on three fundamental aspects : implementing quality controls, documenting the effect product or service quality and ensuring that appropriate quality emphasis is established and followed by everyone in the organization (Strubing, 1996).

The aims of the ISO registration is given as follows according to a survey applied by Erkan Türe, a researcher of MESS, :

- Improve the documentation system
- Constitute a start point for TQM
- Constitute or improve exportation opportunities
- Satisfying customer expectations about ISO certification
- Minimizing customer audits
- Providing competitive power on the market
- Increasing the efficiency and controllability of the existing system
- Making the processes systematic
- Minimizing the errors and defects in the system (MESS, 1999)

The benefits of ISO 9000 can be given as follows :

- Positive management
- Management style change at all levels
- Process improvement
- Using the creative power of the work force
- Direct management link to improvement efforts

- Maintaining machines and people. (Scotto, 1996)
- Establishes a formal system (ISO 9000 as a framework)
- Establishes a consistent documentation method
- Provides a competitive advantage or helps meet customer's expectations
- Establishes a quality system where none previously existed
- Better understanding of processes and responsibilities
- Better understanding of TQM
- Promotes teamwork
- Improves communication
- Better response to problems (Weston, 1995)
- Providing a framework that ties efforts together
- Providing a vehicle for identifying best practices
- Providing a structure for sharing knowledge and learning the methods and techniques others have used to make improvements.
- Allowing employees to speak the same language regarding quality, which increases communication and organizational alignment toward common goals.
- Fostering teamwork across the company
- Improving the ability to measure improvements by documenting processes and results (Rich, 1997)
- Dramatic reductions in customer complaints, operating costs
- Fewer audits by customers that result in reduced inspection costs (Strubing, 1996)
- Improved efficiency of operations
- Optimized company structure and operational integrity
- Improved utilization of time and materials
- Clearly defined responsibilities and authorities
- Improved accountability of individuals, departments, and systems
- Improved communication and quality of information
- Formalized systems with consistent quality, punctual delivery and a framework for future quality improvement

- Fewer rejects; therefore, less repeated work and warranty costs
- Rectified errors at an earlier stage; therefore, less scrap
- Improved relationships with customers and suppliers
- Ability to tender for ISO 9000 contracts at home and abroad (Randall, 2000)
- Applicability to all products and / or service sector and to all size of organizations (Andaç, 2000)

3.3 Difficulties of ISO 9000 series

The difficulties of ISO 9000 can be given as follows :

- Understanding requirements of the standard
- Document control
- Cultural change or change in existing systems
- Time required
- Commitment of top management
- Resistance or bad attitude (Weston, 1995)
- Additional costs to support documentation control and internal audit groups to meet the standards (Scotto, 1996)
- ISO 9000 standards give no information about the cooperation of the organizations lower levels, and they fail to look at the leadership's characteristics (Vloeberghs, and Bellens, 1996).
- Standards do not presume to define what level of defects is acceptable (Strubing, 1996)
- Failing to involve all the personnel into the process
- Failing to examine whether a progress exists or not
- Unable to enforce deadlines
- Insufficient commitment of top management
- Insufficient time consumed for applying ISO 9000 systems
- Improper organizational structure
- Insisting on the application of the classical management systems
- Trying to apply rules of classical management systems

- Insufficient communication and data sharing
- Cost of documentation training, etc.
- Insufficient training
- Insufficient understanding of the quality policy and targets

3.4 ISO 9000 SERIES DOCUMENTATION STRUCTURE AND CRITICAL POINTS IN DOCUMENTATION

According to the standards document is a paper prepared and distributed under control that can give the answers to the questions what, when, where how and who. Documents are prepared by the firms according to the existing applications. On the other hand, data includes the standards, laws, specifications, technical drawings, etc. which are used or taken as a reference to carry out the activities (İzmir Chamber of Trade, 1998).

A good ISO 9000 documentation has two qualities; it is simple and easy to use (Russo, 1997). The best running documentation systems are organized very much like newspapers. Employees relay information on work procedures or make recommendations for change to their team leader- or directly if company is small- who then relay information to a central quality documentation office (Zuckerman,1999).

In the study of MANGAN ISO 9001 Quality Management System documentation describes the plan that involves all the functions such as sales, manufacturing, purchasing, training, and servicing. See appendices for the documentation prepared for the company.

Customers will benefit from the single source reference on company documentation and general procedures. This can be a major plus when a customer representative reviews company operations during an on site visit. The representative can quickly request the specific documents and procedural examples he or she needs to help qualify a potential supplier just from scanning the manual (Hamilton, 1995).

The documentation system required by ISO 9000 can be seen as having four or three distinct levels. In three level documentation structure top tier is quality manual and the subsequent tiers are the same with the four level structure.

The pyramid structure is apt because the documents in the upper layers are briefer and more general than those in the lower layer. Conversely those in the lower layer are likely to be used more frequently and practically than the documents at the apex of the pyramid, which are of symbolic importance (Jackson and Ashton, 1996).

In MANGAN Quality Management System three level documentation structure is used (See appdendix A.1 section 4.2 of the quality manual)

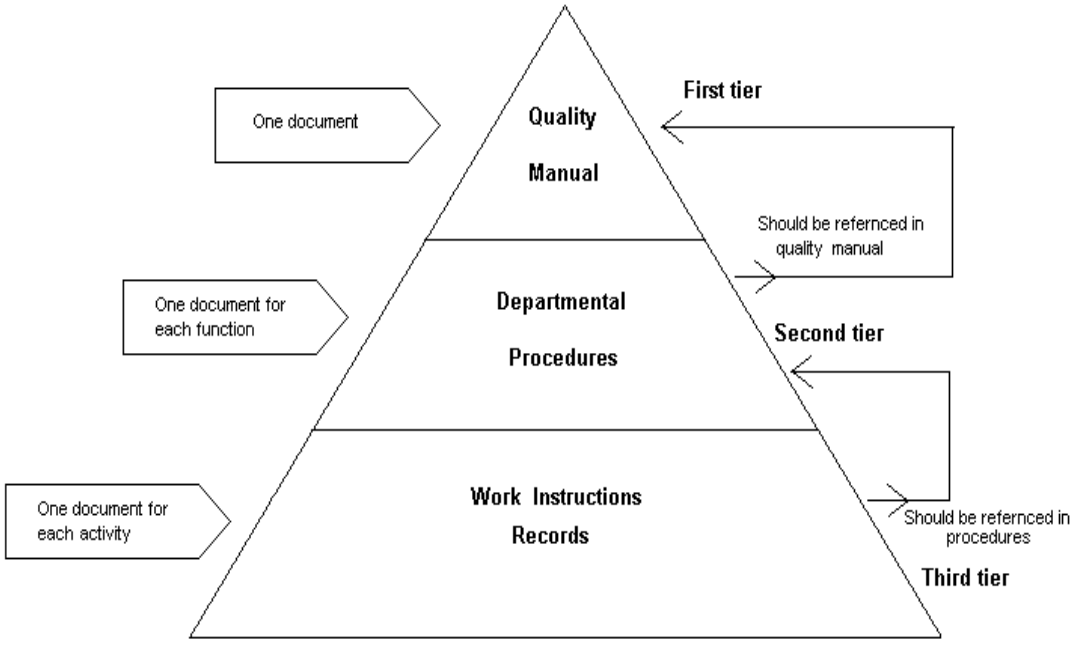
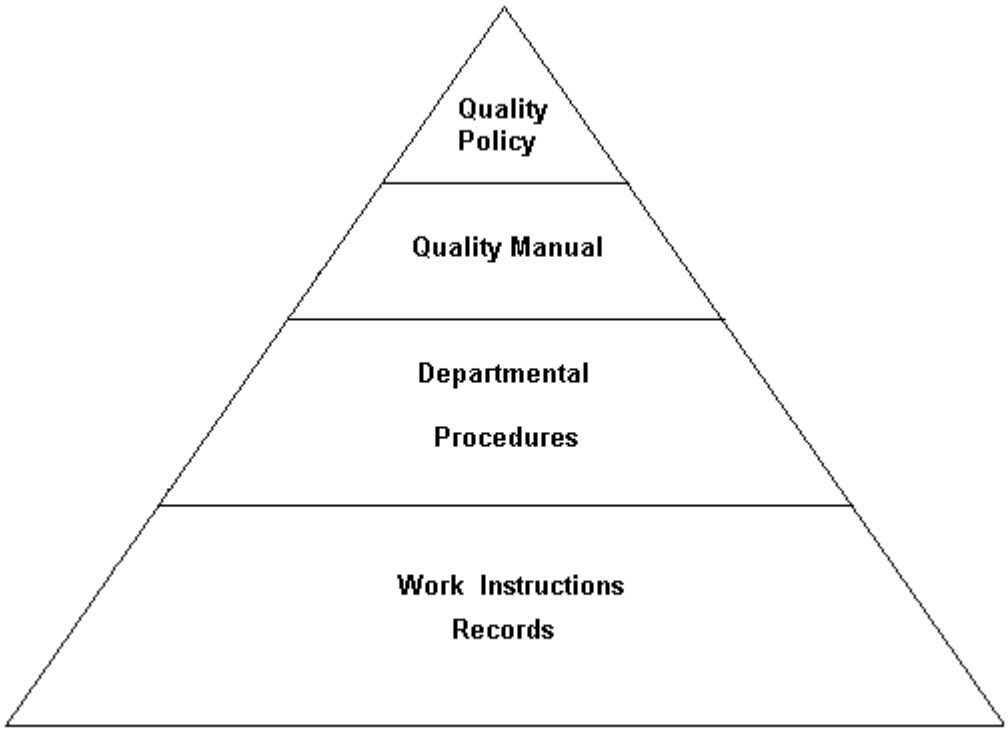


Figure 1: Three tiers documentation structure (Brumm, 1995)



Quality policy defines the company's quality objectives and its commitment to it and links this to customer needs and the wider goals of the business (Jackson and Ashton, 1996). Articulating the organization's quality policy is the first step in developing the quality system. It is important to have the quality policy defined and documented in order to ensure that the quality system is harmonized with the aims and policies of the organization. It is somewhat analogous to the corporate vision which acts as a beacon for guiding all activities within the organization (Goetsch and Davis, 1998).

Quality policy for MANGAN Marble & Granite Inc can be seen as an example. This policy covers what the approach of MANGAN to its customers, its' aims, objectives and commitment is.

The quality policy is to be included in the organization's quality manual. This manual is controlled to ensure that all members of the organization can refer to the latest quality policy (Schomaker, 1996). The quality policy should be a one-page or better yet one-paragraph statement of the company's approach to doing business. Overblown language and grandiose sediments hamper many quality policies. A simple and direct quality policy should include the following points:

- Our company provides good products and services to our customers.
- We adhere to the requirements of the ISO 9000 quality standards.
- Our company is a good place to work, and we value our employees.
- We are in business to make a profit (Russo, 1997).

A quality manual is a formal requirement of the ISO 9000 Series of Standards. Its key purpose is to state requirements and particularly for the benefit of assessors how the requirements of ISO 9000 are met in the company's own quality system and reference them to the other parts of the system (Jackson and Ashton, 1996). In other words, a quality manual is a communication tool. It provides a concise, adequately detailed description of quality procedures, policies and management hierarchy. A well written quality manual will benefit both the company's external customer's and internal departments.(Hamilton, 1995) A quality manual that addressed all the requirements of the ISO 9001:2000 Standard would also meet the requirements of ISO 9001:1994 (Kaganov, 2003).

The quality manual is a politically charged document. This is especially true for personnel who are not familiar with ISO 9000 and how it will affect the company and especially their individual jobs. Writing the quality manual first usually delays an ISO 9000 registration project by six months because a premature staff members try to protect their political flanks. As a result it should be written after preparing all other documents (Russo, 1997).

The quality manual of the case study MANGAN ISO 9001 Quality Management System is given in appendix A.1. In this application eight principles of ISO 9000: 2000 revision are taken into consideration. It gives information about MANGAN Quality Management System.

Procedures describe how to carry out quality related activities and, therefore, go beyond the broad statements contained in the quality manual. The quality manual extract expresses an intension to meet a requirement of the standard. The procedure, however, describes step by step what has to be done. Procedures are to be followed and, therefore, they must be capable of being understood by the staff who are to follow them. The ability of the staff to read and understand instructions will vary through an organization and it is recommended that procedures should be drafted with the least able reader in mind. Therefore, they should use the simplest language, short sentences and avoid dense blocks of text. Procedures should also be auditable. In other words there should be some evidence after the event that the procedure has been followed or not. The final principle is that procedures are mandatory. Any staff involved in the process covered by the procedure must follow that procedure (Jackson and Ashton, 1996).

In the case study applied to MANGAN Marble & Granite Inc, there are six procedures used obligatorily in ISO 9001 Quality Management System. These procedures are namely internal auditing, corrective action, preventive action, document control, quality records and nonconforming products.

Although quality planning is a requirement of ISO 9000, this process does not have to be recorded in documents labeled ‘quality plans’. Quality plans are, however, often an effective approach, including the following circumstances:

- Where the business involves very large and unique orders or projects.
- For a product or project which is substantially different to the normal range of activities.
- When developing a new product range.
- If making significant changes to the processes which will substantially affect the quality of the final product.

Quality plans may also form part of the contract with the customer- the customer requires a quality plan to be prepared for the order. This is likely to include arrangements for customer inspection and testing. However, this is only likely to be

required in the type of large scale businesses where quality plans would be appropriate in any case.

The purpose of quality plans is to show how the quality objectives and policy is to be applied in a particular case; for a large order, a new product or to changes in the processes. They therefore, relate a general quality system to particular circumstances (Jackson and Ashton, 1996).

Work instructions are detailed procedures that provide how to carry out specific operations, or tasks. In order that management can be sure that everything is being carried out under the strictest of controlled conditions. It is crucial that all work instructions referring to a manufacturing activity or service are clear, accurate and fully documented. Good working instructions avoid confusion, show exactly what work has to be done or what services are to be provided. They also delegate authority and responsibility. Without a written guide, differences in policies and procedures can easily arise and these variations can result in confusion and uncertainty.

As ISO 9000 reminds us, 'Instructions provide direction to various ISO 9000 levels of personnel. They also provide criteria for assessing the effectiveness of control and the quality of the material, ensure uniformity of understanding, performance and continuity when personnel changes occur. They provide the basis for control, evaluation and review' (Tricker, 2000). Work instructions of the machineries and processes applies in MANGAN are given in Appendix 3.

Quality records provide strong inferential evidence; this evidence should not be underestimated. If records are sloppy, it could be assumed that the processes and product are sloppy. If quality records are in disarray, maintained poorly, or difficult to retrieve, by implication, the quality system and product quality could be questioned. In most cases, the state of the records will reflect the state of quality system and product, because records reflect the level and depth of control and order that exist in the quality system. Records are also inferential in that if certain conditions are in place and information is recorded accurately about those conditions, the manufactured product has a certain quality level (Brumm, 1995). Beside records

quality forms have a great importance for the Quality Management Systems. The main forms used in ISO 9000 Series are as follows:

- Quality procedure, instruction and process definition form,
- Quality Manual form,
- Document distribution form,
- Change demand form,
- Revision trace form,
- Agenda announcement form,
- Managements review meeting record,
- Survey form for the determination of training needs,
- Yearly training program,
- Training demand form,
- Evoluation form for the efficiency of training,
- Training following card,
- Machinery / equipment maintenance and repair card,
- Product condition evaluation form,
- Customer feedback form,
- Customer complaints form,
- Material, equipment and service purchasing contract,
- Order form,
- Approved supplier list,
- Supplier performance card,
- Supplier acquaint form,
- Supplier evaluation control list,
- Supplier performance measurement criteria, and
- Yearly calibration calendar.

3.5 ISO – Statistical Methods Relationship

According to the ISO 9000 Standards, companies should prepare and continuously apply the statistical techniques for the determination of process sufficiency and product characteristics (İzmir Chamber of Trade, 1998). The inclusion of statistical techniques in ISO 9000 reflects that this is a well tool in quality management and quality improvement programs. The techniques enable quality levels to be measured and changes plotted and in manufacturing can take the form of Statistical Process Control. Statistical methods have also been a key methodology of a number of quality gurus and notably Edward Deming. However, quality systems need not to be complicated and devised by mathematicians. Quality tools which are also called Total Quality Control Tools can be applied to the quality management systems successfully because of its' ease of use and adaptability. In ISO 9000 System TQM tools and SPC methods are used in the preventive and corrective action facilities. Some case studies of these techniques to different mining applications are given in the following sections.

3.5.5 Case study for Pareto Chart

According to the Pareto principle in real world minority of causes lead to the majority of the problems. Pareto charts are specialized bar graphs that can be used to show the relative frequency of events such as bad products, repairs, defects, claims, failures and accidents (Ozeki, 1998).

In the case study accident statistics of mines between the dates of January and April 2001 are used. In these statistics fifty causes of accidents are classified into eleven groups. For each cause of accident number of people died and injured are given for different types of mining methods such as underground mining and surface mining. The total number of injuries and deaths is used in the application. When the Pareto diagram is drawn it is easily seen from the cumulative percentage values that about 90% of the accidents are caused by only three categories among eleven categories. These categories are in general, fall of grounds, transportation and mining. Cause

items belonging to each category can be seen in the related table. When looking at the statistics of deaths in mine accidents it is found by Pareto diagram that about 75% of the deaths are caused by categories of general, fall of grounds and transportation and mining. Therefore eliminating the categories, these three categories should be focused on. This prevents spending too much time for insignificant causes and loss of money for eliminating them. Preventing other than cause categories 1,3 and 4 will not give us satisfying results. Since only the prevention of root causes solves the problem. As a result, only these categories are taken into consideration at the rest of the research. The most important cause of accidents and injuries is the general category. So we draw two new Pareto Charts. Under general category the items manual handling of material, fall of material and slipping of falling have a contribution of 75% of accidents and 76% of injuries. On the other hand, Pareto Chart drawn for the fall of ground shows that gravity and rock burst is the reason for deaths seen under this category. As a result only five cause items among fifty items are eliminated. However this provides 40% reduction in deaths and 30% reduction in accidents.

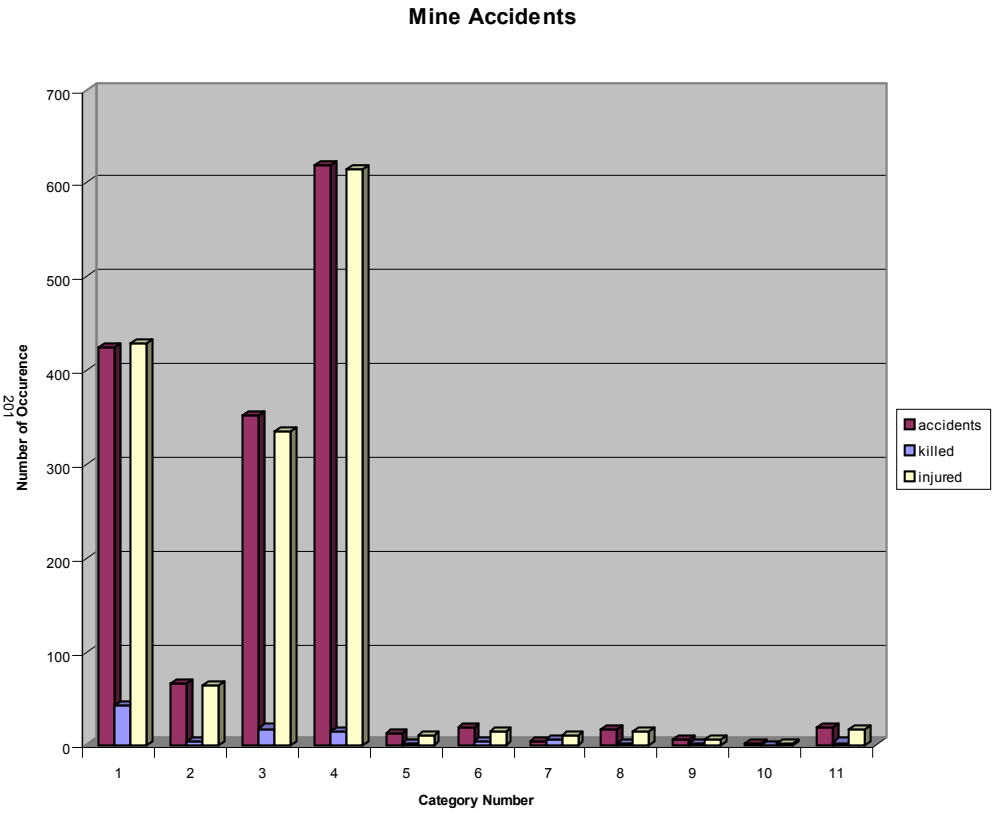


Figure 3 : Mine Accidents

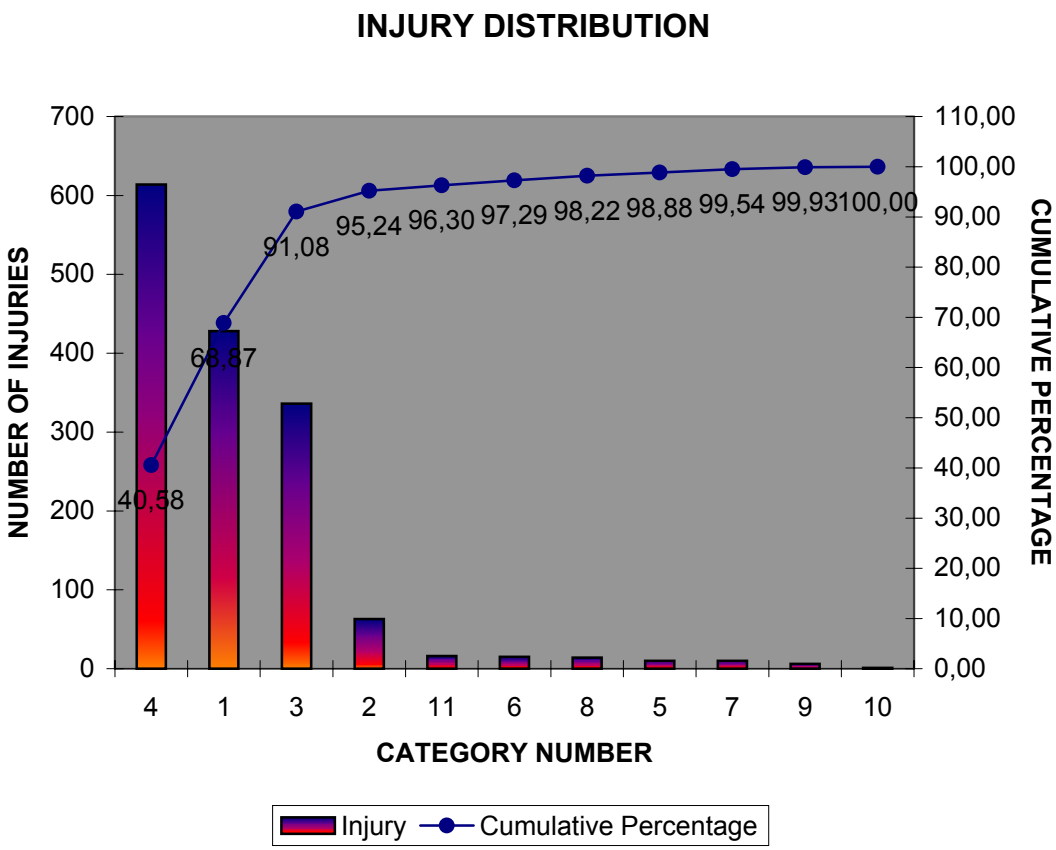


Figure 4 : Injury Distribution for Mine Accidents

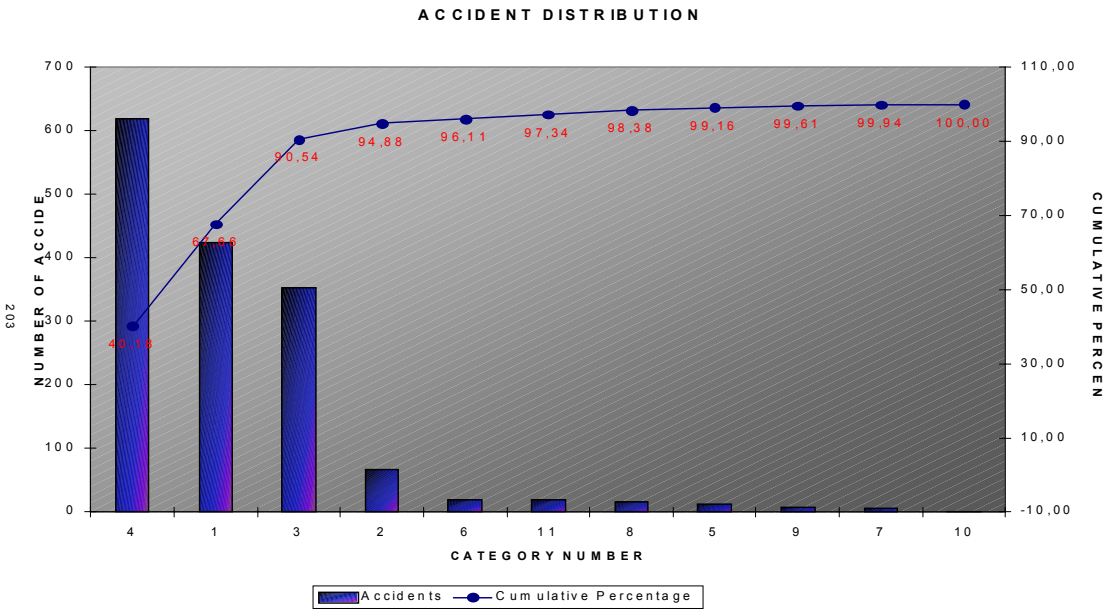


Figure 5 : Accident Distribution for Mines

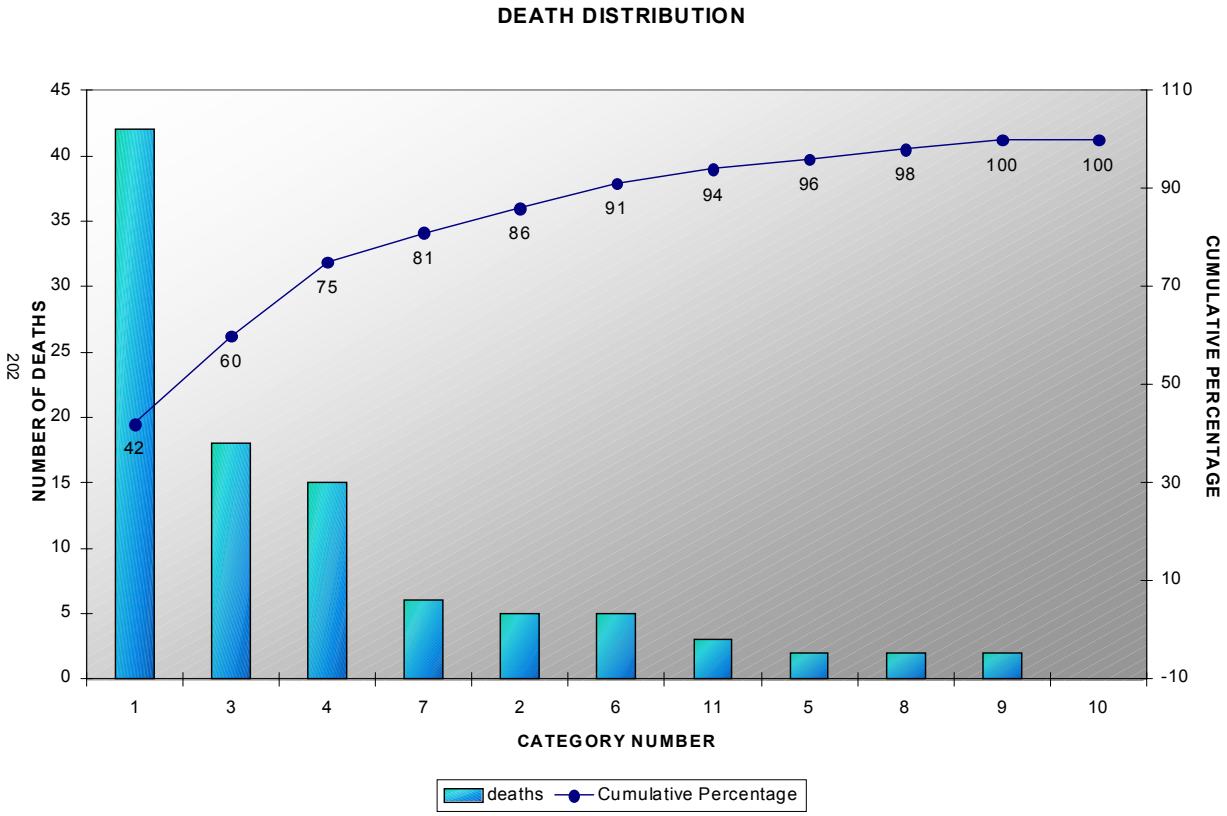


Figure 6 : Death Distribution for Mine Accidents

3.5.5 Case study for check sheet

This study is applied for M.A.Ş. (Magnesite İnc.) Washing and Sorting Plant. In the washing and sorting plant the product of Descos plant is treated and final products are obtained according to quality groups. This plant works 1 shift with a capacity of 860.48 tons per day. Production is done by applying physical characteristics. There are two sections in the plant namely washing and sorting sections. In washing section removal of slime is aimed by using washing drum and waster sprays locating in the vibrating screens. In the washing section there are lots of operations.

The efficiency of hand sorting depends on the belt speed, material size and size distribution (size uniformity). The belt speed determines the amount of material flowing through 1 m of the belt in a unit time. If this speed is selected too high, then the amount of material on a 1 m belt length reduces so the visibility of the material increases. However, the time for recognizing and the decision of the quality of the material is restricted. On the other hand, low belt speed causes accumulation of too much material on a unit length. Therefore, visibility decreases and can cause non-uniform productivity of workers.

Workers separate the material according to the quality groups. First, easily recognizable gangue is picked up by inexperienced workers. Then, lower quality ore types are selected by the more experienced workers. At the end of the conveyor belt, professional labors are placed. Their duty is to pick up the overlooked low quality and gangue material. There is one chute at the right hand side of each worker to send the picked up material to the bins. However, for the professional labors, two chutes are set at the sides. The best quality material pours to the other bins from belt conveyor directly.

The check sheet generated is the combination of different types of check sheets such as Defect Factor Sheet, Defective Item Check Sheet etc. This sheet tells us in which belt a disqualified (taken to the wrong quality group) product has which quality and also its size is shown by the symbols. This control is usually implemented at the end

of the belt where all the separation process is completed. However, it can be applied in different checkpoints and results can be compared.

This application provides the following benefits:

- Optimization of screen speed and movements
- Shows whether the water spraying is sufficient or not
- Helps to determine the deformations in the multi-deck screens
- Measures the performance of labors
- Helps to allocate the correct labor for the separation of the correct quality. Group product or gangue
- Increases product quality
- Provides quality control
- Measures efficiency
- Shows rate of defective items
- Provides the control of sizing equipments such as crushers

Sheet No :

WASHING & SORTING PLANT

PRODUCT CONTROL CHECK SHEET

Date :

Shift : Control Point : Inspector :

Time : Product Group : Inspection Period :

	SORTING BELT CONTROLLED	QUALITY GROUPS				
		A+	A	B+	B	GANGUE
FRACTIONS	- 125 + 110 mm					
	- 110 + 100 mm					
	- 100 + 90 mm					
	- 90 + 80 mm					
	- 80 + 70 mm					
	TOTAL					

SYMBOLS : ■ -125 + 110mm, □ -110 + 100mm, ● -100 + 90mm ○ -90 + 80mm ▲ -80 + 70mm

Figure 7.: Check Sheet for Washing and Sorting Plant

3.5.5 Case study for cause and effect diagram

In this study factors affecting the success of blasting is examined for a case study of insufficient blasting. In surface blasting there are lots of parameters influencing the fragmentation, vibration, air blast, formation of toe, unwanted gases etc.

Although the effects of parameters are empirical, they are clear in some tolerances. However, it is difficult to see the effect of each other. As in the case of TQM philosophy, in blasting design system approach should be applied. Therefore, the optimization of parameters separately does not give us the optimal solution. This shows us the importance of being aware of the relation between the parameters. As a result Cause and Effect Diagram is very beneficial in that sense. In the following page Cause and Effect Diagram for an insufficient blasting case is given.

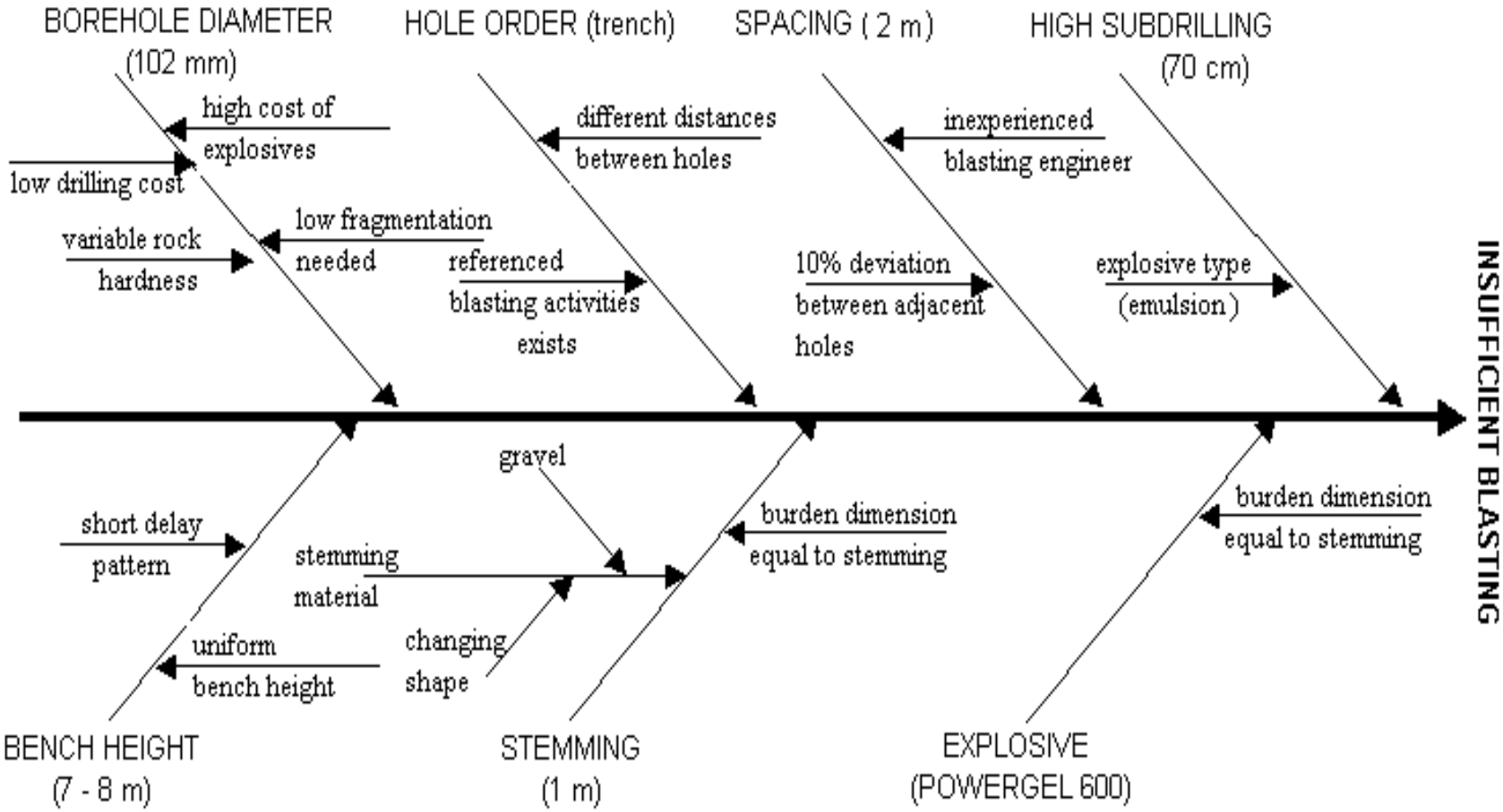


Figure 8 : Cause and Effect Diagram for Insufficient Blasting

3.5.5 Case study for histogram

A histogram or frequency distribution diagram is a graph that displays the distribution of data. It is constructed from data collected in a frequency table, which is a chart that divides the range of data into several equal sections to compare the frequency of occurrence in each section. The histogram drawn from the frequency table resembles a bar graph, composed of columns representing the frequency at which data appears in various sections of the range.

In the study sinter product of M.A.Ş.-Eskişehir Processing Plant Rotary Kiln is used. The quality group of the product examined is 1AV-D. Rotary kiln works 4 hours a day. Data is taken in six shifts (24/04, 04/08, 08/12, 12/16, 16/20, 20/24) in a day. Sampling period is in between 21.6.1998 and 16.7.1998. Between these dates only ten days' data has been given by the company. So there are totally 60 data available. To construct a histogram at least 50 and if possible 100 data items are required (Ozeki, 1998). Data is grouped according to the date. So 10 group with 6 units in each are provided. Then the maximum and minimum values of each group is found. Overall minimum and maximum among the group minimum and maximum values are also calculated. After that, number of sections is found by taking the square root of number of data and rounding it off to the nearest integer. In this case number of sections is found as 8. then the section width is found by subtracting overall minimum from overall maximum and dividing to the number of sections. In all of the calculations the founding is applied to the level of the integral multiple of the unit of measure (In case study it is 0.01). section width is found as 0.02. The boundary value of a section is specified to an accuracy of one half the smallest unit of measure. The first section has the minimum value as the low boundary. The high boundaries are calculated by adding the width of a section to the lower boundary. It should be tried to make the specified values as close to the boundary values as possible to make it easy to compare the actual values with specified values. The boundary values are calculated as 0.215 and 0.355 respectively. After finding boundary values median value of each section is calculated by taking the arithmetic mean of section limits. To find frequency, number of data belonging to sections is counted.

Lastly, histogram is drawn according to frequency values. As the type of histogram found is normal it can be said that process is stable.

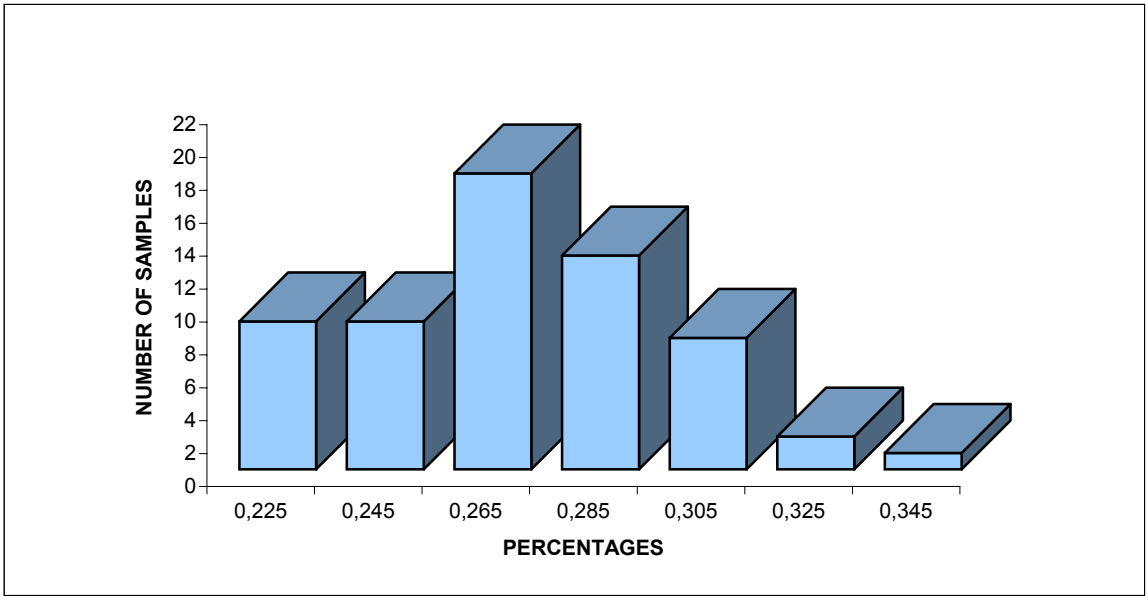


Figure 9 : Histogram for SiO_2

3.5.5 Case study for Scatter Diagram

If two types of data , x, and y, are related in that x increases or decreases with y, a correlation exists between them. A scatter diagram is a chart that expresses the relationship between two such data types (Asaka, 1998).

When the diagram is examined a positive correlation is seen. This means that when the volume of the block increases it's cutting time in ST (block cutter) increases. Although there seems to be one to one correlation between volume and cutting times, there are some volume values for which cuttimg times are different. When focusing on these data it is seen that the dimensions are different in some of them. Therefore it can beconcluded that the dimensions are the same in some of them. Therefore it can be concluded that cutting times both depend on the dimensions and volume. Looking

at the cutting speeds of vertical and horizontal disks it is seen that vertical speed is nearly four times the horizontal one. As a result block should be put on the table where the biggest dimension is length. This can be applied as a corrective action.

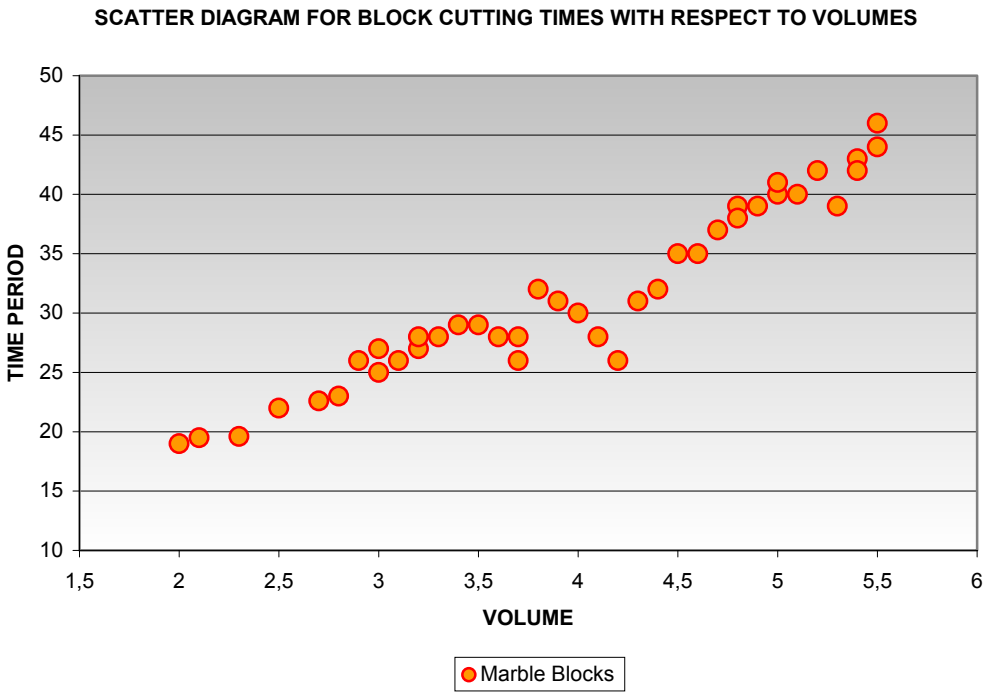


Figure 10 : Scatter Diagram for Block Cutting Time with Respect to Volumes

3.5.5 Case Study For Control Charts

A control chart is a type of line graph used to asses and maintain the stability of a process. A center line and upper and lower control limits are drawn on the graph. Data is collected over time and the values are plotted on the graph. The control limits serve as guides to the control state of the process, distiguishing random causes of variation from special causes that should be investigated. Control charts are also used to analsye the processes to understand the state of a process (Asaki,1998) .

This study examines the polishing speed of the marble polishing machine over time. Data and calculations rae given in the data table and charts are given below. Control

charts drawn show that process is in control since all the points are within control limits. Moreover, no pattern cycle or trend is observed. Variations in the data are because of common causes of variations. Therefore there is no problem (or special causes of variation) with the problem.

Table 1 : Data table for Control Chart

MEASURED VALUES																					
X1	**X2**	**X3**	**X4**	**X5**	**X6**	**X7**	**X8**	**X9**	**X10**	**X11**	**X12**	**X13**	**X14**	**X15**	**X16**	**X17**	**X18**	**X19**	**X20**	**SUM**	**MEAN.**	**RAN.**
1,00	1,11	1,13	1,15	1,11	0,99	1,10	1,08	1,06	1,03	0,94	0,95	0,99	1,00	1,00	1,10	1,06	1,03	1,04	0,98	20,85	1,04	0,21
1,04	1,05	1,03	1,03	1,00	1,10	1,02	0,93	0,95	0,97	0,99	0,98	0,99	1,00	1,07	0,99	1,04	1,10	1,08	1,00	20,36	1,02	0,17
1,00	1,00	0,99	1,02	1,02	1,10	1,00	0,97	0,99	1,09	0,99	1,00	1,01	1,01	1,02	1,02	1,00	1,10	1,02	1,00	20,35	1,02	0,13
1,02	1,10	1,00	1,03	1,02	1,00	0,99	0,96	0,95	0,99	1,09	1,10	1,05	1,07	1,11	1,10	1,08	1,03	1,05	1,02	20,76	1,04	0,16
1,00	1,00	1,02	1,04	1,05	1,06	1,03	1,00	1,02	1,10	0,99	0,96	0,97	0,95	0,95	0,96	0,98	0,99	0,99	1,00	20,06	1,00	0,15
																				TOTAL	5,12	0,82

n=10 R= 0,16 A2= 0,308 UCL = 1,02 + 0,308x0,16=1,07 (for X) LCL = 1,02 - 0,308x0,16=0,97 (for X)

UCL = 1,78 x 0,16=0,28 (for R) LCL = ignored (for R)

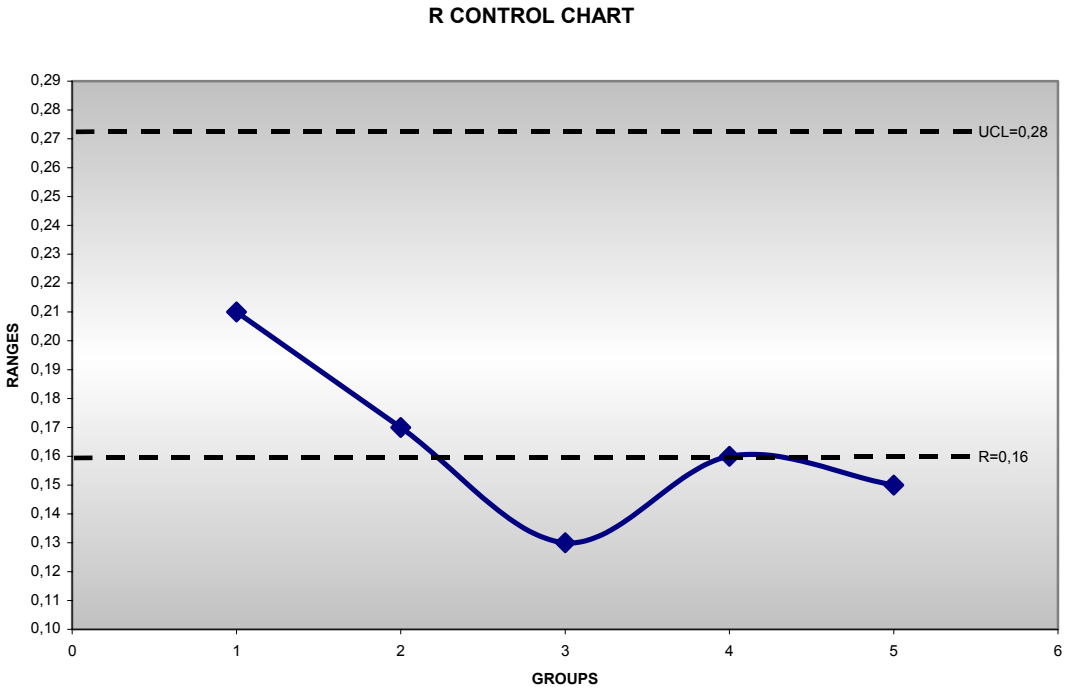


Figure 11 :R Control Chart

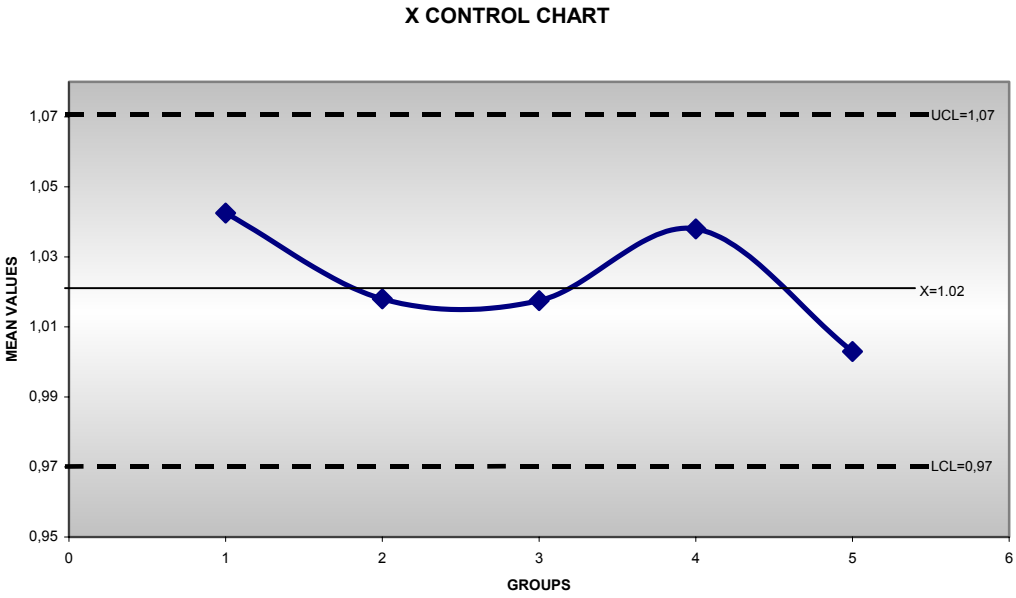


Figure 12 :X Control Chart

3.6 ISO 9000 Certification in Turkey

As the first step to certification, all the documentation of the quality management system is prepared. After completing the trainings and other requirements, company starts to apply quality system. During at least two months period of time quality management system is carried out and required records are kept. In this period, internal audits are done systematically and at least one management review meeting is made. If an improvement in the processes or product quality is seen then the company applies to the accredited company, such as TSE, for certification.

The first acredidated establishment of Turkey is Turkish Institute of Standardization. Beside TSE, there are lots of other foreign originated establishments working in Turkey. Selection of the acredidated firm is left to the company that will take the certificate. In this selection, customer expectations and registration costs have a great role. Especially firms occupying with exportation prefer to get certification by means of TSE firstly company should fill the application form. This form is submitted with the documents and records (permissions, licenses, quality manual, procedures, work instructions etc.) stated in the certification regulation booklet. These documents are examined by chief investigator and the missing points are informed to the company. After eliminating the deficiencies the company applies for the certification again. A date of investigation is determined at the subsequent month by TSE. A committee with at least two member is formed. Chief investigator presides the committee. In this committee there is one sector expert and one ISO expert. The sector experts are selected from the academic personnel of the universities. A report is prepared after the inspections in the company. This report is presented to the administrative committee. Major and minor unconformities are determined in the committee. If there exists only minor unconformities ISO 9000 certificate is given. However, If there are some major unconformities, ISO certificate is not given to the company. If a pursue inspection is decided the deficiencies should be eliminated within three months. Otherwise, a total inspection is required. An ISO certificate is valid for three years and certified company is audited once a year (TSE, 2003).

This process can be summarized as follows:

- Prepare all documentation
- Complete trainings
- Start to apply quality system
- Take quality records at least two months
- Make internal audits and management review meetings
- Provide an improvement in the processes or product quality
- Apply to a third party certification firm
- Eliminate unconformities if exits (TSE, 2003).

3.7 ISO 9000 Series in Turkish Mining & Marble Sector

Mining sector of Turkey should benefit from the precautions for the improvement of export and increasing production and investments. Although there exists rich marble reserves, it is not possible to pull the domestic and foreign investment to this sector under current conditions. Doing the advance in mining is only possible with making investments and exports appealing. There should be no doubt about the importance of increasing the contribution of mining on the national economy and providing stable development. All the governmental, private people and associations should support the laws that are required to revive mining sector. They should also provide a stable environment to carry out this ideal. All the people ought to believe in the success of climbing Turkish mining to the required level.

Marble sector has a steady augmentation in production, exportation and employment. To prevent law exchanges National Marble Policy should be determined. Turkish mining policy must be independent of any political parties, government, or ministry.

In marble trade of the world, countries which are the members of European Common Market Community have a high share regarding quantity and value. These countries perform the most of the world export. Nearly the whole of the resources of the community member countries have been utilized and presented to the world market and the remaining part of resources reserves have been diminishing and profitability

decreased. The institutions working on this portion will be in difficult situation in the near future. However, to keep their marble plants and markets they have been importing marble blocks and unprocessed marble plates. They process these products and export to the third world countries.

Although Turkey has the 30 % of the total world reserve , it has not sufficient production and exportation. Turkey should avoid being raw material resource instead; by using advanced technologies, making investments attractive and establishing high capacity plants it should increase it's market share in marble industry.

To have the deserved position in both mining and quarrying, our country has to conform to the dynamics of the day. Today's customers have a trend of giving priority and having more trust to the companies that are paying attention to the quality concept. In this sense, Certificating the quality improvement activities in a company ISO 9000 Quality Management Systems have been beyond the other quality related activities such as TQM. This situation has made the quality management systems indispensable to provide competitive power in both production and service sector. In Turkey both governmental establishments and private institutions have been directed to ISO 9000 Series. Foreign companies working in our country have led the mining firms to get registered to the ISO Standards. Studies has started in the cement production and spread out to all the other miming activities. In resent years ISO 9000 Series certification has become a indispensable part of the competition in Turkey. Although the activities about improving quality has started lately, the development of it is really considerable.

CHAPTER 4

OHSAS 18000 OCCUPATIONAL HEALTH AND SAFETY MANAGEMENT SYSTEMS

4.1 General Description of OHSAS 18000 Series

In recent years, the quality, health and safety requirements in many countries have been become more stringent. Pressures have led to the enacting of new safety legislation and safety standards. Many organizations in the America, Europe and Asia Pacific regions have adopted safety management practices to control hazards and risks better and to resolve workplace problems and accidents. These safety management practices may vary with the types of organization and the stages of organizational development. It is argued that safety management practices help organizations to manage health and safety risks, and comply with health and safety legislation (Pun and Hui, 2002).

In 1996, the British Standards Institution developed and published an occupational health and safety management system consensus standard (BS 8800). Based largely on the ISO 14001 Environmental Management Systems model, 8800 provided general guidance for developing a health and safety management system. Then, in 1999, the BSI expanded 8800 into OHSAS 18001. As a specification document, 18001 provides employers with requirements for their health and safety management systems against which a third-party registrar can assess and certify them (Seivold, 2002).

Occupational Health and Safety Assessment Series (OHSAS) 18001 provides the mechanism for occupational health and safety management, helps companies in the systematic inspection and measurement of the degree of their suitability, as well as trains employee to understand their role in the health & safety system and its improvement (Wen, Ching, and Hung).

The OHSAS 18000 series includes two different documents OHSAS 18001:1999, Occupational Health and Safety Management Systems: Specifications; and OHSAS 18002:2000, Occupational Health and Safety Management Systems: Guidelines for the implementation of OHSAS18001 (ANSI, 2003).

OHSAS 18001:1999, Occupational Health and Safety Management Systems: Specifications is a document prepared for the registration activities. It can be considered as an application of OHSAS 18002.

OHSAS 18002 is a much more detailed document than OHSAS 18001 (54 pages compared with 15). However, it follows exactly the same structure as OHSAS 18001 and uses the same numbering for clauses and sub-clauses.

Within each sub-clause, the same format is used as follows.

- OHSAS 18001 requirements. This is a reprint of the relevant material from OHSAS 18001.
- Intent. This is a general statement of what the OHSAS 18001 requirement is intended to achieve.
- Typical inputs. This is a list of the inputs required for the process, or processes, needed to satisfy those OHSAS 18001 requirements which are the subject of the sub-clause under consideration.
- Process. This is a description of what organisations have to do in order to meet the OHSAS requirements. In many sub-clauses there are a number of processes reflecting the complexity of particular OHSAS requirements.

Typical outputs. This is a list of the expected outputs from the process or processes under consideration.

OHSAS 18002 states that it imposes no requirements which are additional to those imposed by OHSAS 18001 (http://www.isca.org.uk).

4.2 Aims Benefits and Difficulties (Characteristics) of OHSAS 18000 Series

The benefits of implementing a systematic and effective OH&S management system include the following:

- Reducing the number of personnel injuries through prevention and control of workplace hazards
- Reducing the risk of major accidents
- Ensuring a well-qualified and enthusiastic workforce by fulfillment of the increasing expectations of your employees
- Reducing the loss of materials caused by accidents and in production interruptions
- Reducing cost of insurance as well as reducing costs due to absence of employees
- Serving the possibility for an integrated management system including quality, environment and health and safety
- Ensuring that appropriate legislation is addressed and acted upon (http://www.dnvcert.com)
- Meeting the increasing importance of OH&S for public image
- provides employers with requirements for their health and safety management systems against which a third-party registrar can assess and certify them.
- Represents the direction things are headed.
- Helps safety and health programs go global (Seivold, 2002).

Difficulties of OHSAS 18000 series can be given as follows:

- Lack of commitment of top management (Seivold, 2002).
- Understanding requirements of the standard.
- Document control.
- Resistance of labors to apply safety regulations.

4.3 OHSAS 18000 Documentation

What the OHSAS 18001 requires is a complete system managing health and safety affairs, not a bunch of scattered management techniques. Hence, every management method and document regulation of the system should be systematically and documentarily expressed for the creation of a future management system that is "written into uniformity". Therefore, document amendment, utilization, maintenance, preservation, and control should be regulated through written rules for utilization and management convenience. Documents should be properly updated, valid, clearly identified, and easily traced for the effective management execution. Every document should be able to reflect work conditions, and duly evaluated by the approving authority. Document compilation, preservation, revision, and retraction should be suit time and place. Generally, one should still refer to the ISO 14001 "document control" and best options available during the implementation of OHSAS 18001; since the two came from the same origin and are highly compatible.

OHSAS 18001 does not have many "documentation procedures"; but whatever circumstances are, aside from the procedure, the factory should define the criteria for support based on its requirements (Wen, Ching and Hung).

The OHS Policy Statement of the organization must be in writing and prepared in consultation with workers and their representatives. Senior management must endorse it. The policy should be appropriate for the size and nature of the organization. The organization should, through a policy statement, be committed to: i) protect the health of all employees, ii) comply with relevant national and international OHS requirements, iii) ensure consultation with and active participation of the workers, and iv) continuously seek to improve the performance of the OHS system (IFC, 2003).

An appropriately sized and scoped OHS manual should be prepared and maintained. The manual should at a minimum fulfill relevant national and international requirements for the activities of the organization. The manual should include: OHS

Policy, OHS organization and allocation of responsibilities, schedules, procedures, instructions and other internal documents used for OHS management and control. There should be a section identifying key risks and hazards arising from the organization's activities together with arrangements for their prevention and control. The manual should establish procedures, schedules and methodologies for review of safety and control features, as well as plans and schedules for monitoring ambient working environment quality and individual exposure levels as appropriate.

OHS records with details appropriate to the needs of the organization should be established, managed, and maintained locally. The records should contain appropriate information regarding national OHS laws and regulation, the OHSMS itself, as well as monitoring data regarding elements such as workers health and exposure, ambient working environment, work-related injuries, ill health, diseases, incidents, training programs and lists of trainees (IFC, 2003).

4.4 OHSAS 18000 Application

Occupational health and safety, including compliance with national OHS requirements, is the responsibility and duty of the employer. Implementation of a fully transparent OHSMS in an organization is a powerful tool towards fulfilling these obligations. The OHSMS signals the commitment of the organization to ensure safe working conditions. However, active participation from workers is required for optimum results. Meaningful participation by employees may be obtainable through efficient awareness raising and training to change the prevailing labor safety culture. An OHSMS must have features for continuous feedback and self-improvement (ILO-OHS, 2001).

Maximum effectiveness of OHS systems requires the inclusion and meaningful participation of employees in implementation and maintenance of procedures and processes. To achieve meaningful and effective participation, the employer may have to implement a program to change employee culture and attitudes regarding health and safety (IFC, 2003).

The employer is responsible for planning, implementing and monitoring programs and systems required to ensure OHS on its premises . Such provisions should be pro-active and preventive by identification of hazards as well as by evaluation, monitoring, and control of work related risks. The employer shall provide and maintain workplaces, plant, equipment, tools, and machinery and organize work so as to eliminate or control hazardous ambient factors at work. The employer shall provide appropriate occupational health and safety training for all employees. The organization shall, at no cost to the employee, provide adequate personal protective equipment. The employer shall record and report occupational injuries and illnesses. Contract specifications must include demands for service providers, contractors and sub-contractors to have or establish systems enabling them to meet the OHS requirements of the employer (IFC, 2003).

The employer should ensure that workers prior to commencement of new assignments have received adequate training and information enabling them to understand the hazards of work and to protect their health from hazardous ambient factors that may be present. The training must adequately cover: a) knowledge of materials, equipment, and tools; b) known hazards in the operations and how they are controlled; c) potential risks to health; d) precautions to prevent exposure; e) hygiene requirements; f) wearing and use of protective equipment and clothing; and g) appropriate response to operation extremes, incidents and accidents.

A basic occupational training program and specialty courses shall be provided as needed to ensure that workers are oriented to the specific hazards of individual work assignments. Training shall generally be provided to management, supervisors, workers, and occasional visitors to areas of risks and hazards. Training should also be provided to account for new or changed risks whenever procedures are altered or new materials/equipment introduced. Training should be repeated periodically and supported by feasible incentives. Workers with rescue and first-aid duties shall receive dedicated training so as not to inadvertently aggravate exposures and health hazards to themselves or their co-workers (IFC, 2003).

In this study an OHSAS 18001 application is carried out on a marble company namely MANGAN Marble & Granite Inc. This application aims to eliminate the risk of accidents and health hazards in the company. Manual for this application can be seen on Appendix B.

CHAPTER 5

APPLICATION OF OHSAS 18000 WITH ISO 9000

5.1 ISO 9000, OHSAS 18000 Comparison in Mining Perspective

Until the development of the OHSAS 18000 Standard, ISO 9001 and ISO 14001 standards were used systematically in dealing with the quality and environmental problems of the companies. However, these standards do not serve to the occupational health and safety considerations. Therefore, to eliminate this deficiency and to compete with these two standards OHSAS 18001 has been developed (Seymen, 2003).

The general structures of ISO 9001 and OHSAS 18001 have lots of similarities. The experiences acquired while preparing ISO 9001 are used in the development of OHSAS 18001. When examining the criteria of Occupational Health and Safety Management System, it is easily seen that it benefits from the structure of ISO 9001. The main reason behind this is that the companies can easily combine the health and safety systems with quality systems. Therefore companies have an opportunity to apply both ISO 9001 and OHSAS 18001 simultaneously. Beside these similarities, the following differences are seen:

- The basic difference between the standards is about their concepts. ISO 9001 deals with Quality whereas OHSAS 18001 deals with health and safety.

- Another difference is the content of the standards. The subjects 'legal and other specifications', 'Communication' and 'Emergency Conditions' are not covered in ISO 9001.

In the following Table the concepts of these two standards are compared.

Table 2 : Comparison of Contents of OHSAS 18001 and ISO 9001 Standards (Seymen, 2003)

Clause	**OHSAS 18001**	**Clause**	**ISO 9001:2000**
		0	Introduction
		0.1	General
		0.2	Process approach
		0.3	Relationship with ISO 9004
		0.4	Compatibility with other management systems
1	Scope	1	Scope
		1.1	General
		1.2	Application
2	Reference publications	2	Normative reference
3	Terms and definitions	3	Terms and definitions
4	OH&S management system elements	4	Quality management system
4.1	General requirements	4.1	General requirements
		5.5	Responsibility, authority and communication
		5.5.1	Responsibility and authority
4.2	OH&S policy	4.5.1	Management commitment
		5.3	Quality policy
		8.5	Improvement
4.3	Planning	5.4	Planning

Table 2 : (continued)

Clause	OHSAS 18001	Clause	ISO 9001:2000
4.3.1	Planning for hazard identification, risk assessment and risk control	5.2	Customer focus
		7.2.1	Determination of requirements related to the product
		7.2.2	Review of requirements related to the product
4.3.2	Legal and other requirements	5.2	Customer focus
		7.2.1	Determination of requirements related to the product
4.3.3	Objectives	5.4.1	Quality objectives
4.3.4	OH&S management programme(s)	5.4.2	Quality management system planning
		8.5.1	Continual improvement
4.4	Implementation and operation	7	Product realization
		7.1	Planning of product realization
4.4.1	Structure and responsibility	5	Management responsibility
		5.1	Management commitment
		5.5.1	Responsibility and authority
		5.5.2	Management representative
		6	Resource management
		6.1	Provision of resources
		6.2	Human resources
		6.2.1	General
		6.3	Infrastructure
		6.4	Work environment

Table 2 : (continued)

Clause	OHSAS 18001	Clause	ISO 9001:2000
4.4.2	Training, awareness and competence	6.2.2	Competence, awareness and training
4.4.3	Consultation and communication	5.5.3	Internal communication
		7.2.3	Customer communication
4.4.4	Documentation	4.2	Documentation requirements
		4.2.2	Quality manual
4.4.5	Document and data control	4.2.3	Control of documents
4.4.6	Operational control	7	Product realization
4.4.7	Emergency preparedness and response	8.3	Control of nonconforming product
4.5	Checking and corrective action	8	Measurement, analysis and improvement
4.5.1	Performance measurement and monitoring	7.6	Control of monitoring and measuring devices
		8.1	General
		8.2	Monitoring and measurement
		8.2.1	Customer satisfaction
		8.2.3	Monitoring and measurement of processes
		8.2.4	Monitoring and measurement of product
		8.4	Analysis of data
4.5.2	Accidents, incidents, non-conformances and corrective and preventive action	8.3	Control of nonconforming product
		8.5.2	Corrective action
		8.5.3	Preventive action

Table 2 : (continued)

Clause	OHSAS 18001	Clause	ISO 9001:2000
4.5.3	Records and record management	4.2.4	Control of quality records
4.5.4	Audit	8.2.2	Internal audit
4.6	Management review	5.6	Management review
Annex A	Correspondence to ISO 14001, ISO 9001	Annex A	Correspondence between ISO 9000:2000 and ISO 14001:1996
		Annex B	Correspondence between ISO 9000:2000 and ISO 9001:1994

5.2 Adaptability & Transition of ISO 9000 to OHSAS 18000

OHSAS 18001 has been developed to be compatible with the ISO 9001 (Quality) and ISO 14001 (Environmental) management systems standards, in order to facilitate the integration of quality, environmental and occupational health and safety management systems by organizations, should they wish to do so.

The (OHSAS) specification gives requirements for an occupational health and safety (OH & S) management system, to enable an organization to control its OH & S risks and improve its performance. It does not state specific OH & S performance criteria, nor does it give detailed specifications for the design of a management system (http://www.osha-bs8800-ohsas-18001-health-andsafety.com).

5.3 OHSAS 18001 and ILO-OHS:2001

When we compare the OHSAS 18001 Standard with ILO-OHS 2001 Standard no important difference can be seen. Therefore, an Occupational Health and Safety System implemented according to OHSAS 18001 is also appropriate for the ILO-OHS guides.

Two basic aim of ILO-OHS guides :

1. Aiding the countries to establish their national health and safety system perspectives.
2. Giving information to the firms about the integration of occupational health and safety elements with general policy and managerial arrangements.

ILO-OHS guides are focused on the workers. OHSAS 18000 series focus on the personnel and other related staff. Models describing the main occupational health and safety management elements of ILO-OHS guides and OHSAS 18001 are identical. Unlike ILO-OHS , In OHSAS 18001 establishment of health and security committee is avoided unless it is forced by the laws and regulations. ILO-OHS proposes the development of prevention and health programs. OHSAS 18001 documents require the programs if the OHSAS management system and objectives ask for these. Training should be given to all the participates for free of charge. However, this clause is not covered in the OHSAS documents. ILO-OHS guides have more attention on prevention from hazards and risks (TSE, 2003).

CHAPTER 6

CONCLUSION

This study aims to examine the benefits, applicability and application difficulties of ISO 9000 and OHSAS 18000 series in mining. Therefore both of the series have been inspected in details and a case study has been applied in one of the leading companies of Turkish marble industry. This case study evaluated specifically in mining perspective. As explained in the related sections it brings about lots of benefits. However, minimizing defective items, knowledge share and standardisation of processes are more impacting. The most significant difficulty seen in the case study is the insufficient commitment of the top management. Moreover loe education level of labors is a factor affecting the success of trainings negatively. On the other hand, it has been observed in the study that process approach is not understood clearly in marble industry. Some difficulties have arisen because of lack of proper documentation and data infrastucture in the company. Looking at the surveys applied by trade organisations it is predictible to see similar diffculties in the other mining companies. This situation is mostly valid for nonindustrial batch type of plants. Regarding the requirements of ISO 9001 Quality Management System, it can be concluded that applying ISO 9001 to mines and quarries is much more difficult than plants. In this sense a study about ISO 9001 certification in quarries would be very complementary and improving. This study also deals with an occupational health and safety system namely OHSAS 18001. OHSAS 18000 series has been examined in comparative to ISO 9000 series. It is determined that ISO 9001 and OHSAS 18001 are very beneficial especially to the mining companies. Unlike some other marble processing companies MANGAN fulfills the occupational health and

safety requirements. Therefore, it is easier to apply the OHSAS 18001 system to the company. Unfortunately there are not sufficient researches and studies to be taken as a reference in the implementation of OHSAS series. Therefore this study has a great importance being a reference to next studies. This study shows that our mining companies will be facing some difficulties in the implementation of the OHSAS series because of insufficient knowledge and education level of some personnel. Therefore it will be beneficial to take help from acredidated companies.

As a result this study shows that ISO 9000 and OHSAS 18000 Series of Standards can be applied together successfully in spite of some difficulties and these stadnards provide great benefits in mining companies.

.

REFERENCES

Andaç, A., 2000, 2000 yılında ISO 9000, 9001, 9004 Kalite Yönetim Sistemi Standardları, Albak Matbaası, Ankara.

ANSI, Professional safety March 2003, Solving the mystery: a summary of OHSAS 18000, ISO 18000 & ISO/IEC.

Bozkurt, R, 2003, TS EN ISO 9001:2000 Dokümantasyon Klavuzu, MPM Yayınları, Ankara.

Brumm, E., K., January 1995, Managing records for ISO 9000, Quality Progress.

Davis, S., Goetsch, D., 2000, Introduction to Total Quality Management for Production, Processing and Services, Prentice Hall, New Jersey.

Durand, G., I., Marquardt, D., W., Peach, R., W., Pyle, J., C., July 1993, Updating the ISO 9000 Quality Standards: Responding to marketplace needs, Quality Progress.

Goetsch, L., D., Davis, S., B., 1998, Understanding and implementing ISO 9000 and ISO Standards, Prentice Hall, New Jersey.

Hamilton, W., R., April 1995, How to construct a basic quality manual, Quality Progress.

IFC, June 24, 2003, Revision 15, Environmental guidelines for occupational health and safety.

ILO-OHS 2001, 2001, After Guidelines on occupational safety and health management systems, Geneva.

ILO/OSH-MS2001 guidelines on occupational safety and health management systems

İzmir Ticaret Odası, 1998, ISO 9000 Standartları, uluslararası rekabet ve kobiler, İzmir Ticaret Odası, İzmir.

Jackson, P., Ashton, D., 1996, Achieving BS EN ISO 9000, The Sunday Times, London.

Johnson, L. P., 2000, The year 2000 and beyond, McGraw-Hill, Newyork.

Kaganov, M., March 2003, A quality manual for the transition and beyond, Quality Progress.

MESS, 1999, 2000 yılında ISO900X Kalite Güvence Sistemi Standardları, Şahinkaya Matbaacılık, Ankara.

Ozeki, K., Asaka, T., 1998, Handbook of quality tools, Productivity Press, Tokyo.
Paradis, W., G., 1996, Demistfying ISO 9000, Addison-Wesley, USA.

Pun, K., F., Hui, I., K., VOL. 13, NO. 3, 2002, Integrating the safety dimension into quality management systems: a process mode**l,** TOTAL QUALITY MANAGEMENT.

Randall, R., C., 2000, Randal's practical guide to ISO 9000 implementation, registration and beyond, McGraw-Hill, Newyork.

Rich A., B., June 1997, Continuous improvement: the key to future success, Quality Progress.

Russel, J., P., May 2003, Use ISO 9004 to improve performance, Quality Progress.

Russo, C., W., March 1997, 12 rules to make your ISO 9000 documentation simple and easy to use, Quality Progress.

Schomaker, S., J., 1996, ISO 9001 for engineers and designers, McGraw-Hill, Newyork.

Scotto, M., J., June 1996, Seven ways to make money from ISO 9000, Quality Progress.

Seivold, G., May 2002, IOMA'S Safety Director Report.

Seymen, O., A., March 2003, OHSAS 10081 Mesleki Sağlık ve Güvenlik Yönetimi Standardı ve Konaklama İşletmelerinde Uygulanabilirliği Üzerine Bir İnceleme, Verimlilik Dergisi, MPM YAYINI.

Strubing, L., January 1996, 9000 standards?, Quality Progress.

Tricker, R., 2000, ISO 9000 for small businesses, Reed educational and Professional Publishing Ltd.

TS 18001 iş sağlığı ve güvenliği yönetim sistemleri-şartlar

T.S.E., 1994, Kalite Notları, TSE, Ankara.

Vloeberghs, D., Bellens, J., June 1996, Implementing ISO standards, Quality Progress.

Wen, M., M.., Ching, C., H., Hung, L., How to implement the occupational health & safety management system, FTIS Company.

Weston, F., C., October 1995, What do managers really think of ISO 9000 registration process?, Quality Progress.

Zuckerman A., July 1999, ISO 9000 Revisions are key to knowledge age excellence, Quality Progress.

APPENDICES

APPENDIX A.1 APPLICATION OF QUALITY MANUAL

MANGAN GRANITE & MARBLE INC.

ISO 9001

QUALITY MANUAL

MANGAN Marble & Granite Inc.

ISO 9001 Quality Manual

Document No.: ___1___ Revision:___2___

Issue Date:23/03/2003

Approval Signatures

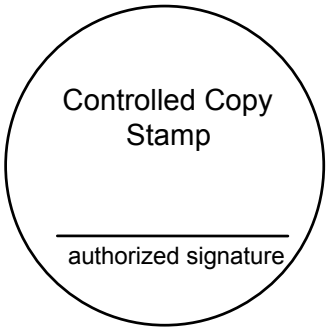
Title _____

Title _____

Title _____

Change Record

Rev	Date	Responsible Person	Description of Change
1994	16/04/2002	Mesut Akaner	Initial Release
2000	23/3/2003	Mesut Akaner	Revision



Controlled Distribution List

The following individuals are on the controlled distribution list:

	Signature	Position/Responsibility
1.	_____	Managing Director (General Manager)
2.	_____	Operations Manager
3.	_____	Financial Editor
4.	_____	ISO 9001 Registrar
5.	_____	Quality Manager

TABLE OF CONTENTS

INTRODUCTON

MANGAN, as the first company specialized in granite and marble applications in Turkey, has a contemporary structure covering all stages of the surface finishing activity such as material selection, material supply and application. Up to now we have covered many pleasant and elegant buildings both in Turkey and abroad with natural, durable esthetic materials. We have completed all of our contracts successfully, without any delay. We added MANGAN's care and sound esthetic understanding to natural materials to finishing to perfection of tastefully designed buildings. Our carefully done works resulted with complete satisfaction of both our clients and us… and gave us the opportunity of establishing good friendships.

We as the MANGAN Company with our staff of 550 experienced in all stages of the surface finishing process, together with our integrated manufacturing abilities shall remain at your service in the future also.

1.0 SCOPE AND EXCLUSIONS

This manual describes system requirements for contracts between MANGAN Marble & Granite Inc. and its customer and demonstrates capability MANGAN Marble & Granite Inc. to supply product requirements for preventing nonconformity from production to servicing.

This manual provides a description of the quality management system in accordance with the ISO 9001 Revision 2000 requirements and serves as a reference for implementing and maintaining MANGAN Marble & Granite Inc. quality management system.

The MANGAN Marble & Granite Inc. Quality Manual provides general policies and procedures for the manufacturing, packaging, testing, storage, and distribution of MANGAN Marble & Granite Inc. products and/or services.

Where any requirement of ISO 9001: 2000 can not be applied due to the nature of our organization, its activities and its products, they will be considered for exclusion. Therefore design related facilities are excluded from the system.

The Managing Director has the responsibility and authority for examining whether the proposed exclusions are appropriate and for approving them. Evaluation and approval of exclusions are conducted within the framework of management reviews of the quality system.

2.0 NORMATIVE REFERENCE

- ISO 9001: Quality Management System – Requirements.

3.0 TERMS AND DEFINITIONS

- Applicable – related to this quality management system or any referenced standard.
- Appropriate – reasonable.
- Documented – written.
- Product – end result of a process.

4. QUALITY MANAGEMENT SYSTEM

4.1 General Requirements

MANGAN Marble & Granite Inc. has prepared its quality management system based on ISO 9001 2000 revision and documented as described in the related sections. Regarding the continuous improvement principle quality system documentation and processes are revised and improved.

4.2 General Documentation Requirements

4.2.1 General

The Quality System is documented. The documentation describes the plan that involves all functions such as sales, manufacturing, purchasing, training and servicing. Where a specific jurisdictional or industrial standard deviates from the requirements as defined in this program, the requirements are accommodated by the company. Quality manager supports and maintains the quality system and objectives.
The structure of the quality system documentation is:

- level 1 Quality Manual
- level 2 Quality Procedures
- level 3 Work Instructions, Quality Plans, Forms, etc.

The documentation ensures that equipment and personnel are capable of carrying out the plans, and provides adequate quality records.
MANGAN assures compliance to its quality system through assessment.
The processes to which the documentation applies are:

- Marketing and market search

- Extraction of blocks
- Stocking of blocks
- Processing of blocks (cutting, polishing, drilling etc.)
- Packaging of products
- Storage of products
- Sales and distribution
- Waste disposal
- Water treatment and recycling
- Inspection
- Maintenance of equipments

Quality plans document how quality requirements are met. Quality manager is responsible for preparing quality plans.

Quality plans identify:

- Required controls (veins in the plates, quality of polishing, stability in the storage of blocks, wearness of abrasives, tightness degree of packaging which is important to prevent breakages during transportation etc.)
- Required resources and stocks
- Processes (loading to the machines, transportation from one machine to another, cutting, polishing, side shaping, packaging etc.)
- Calibration of ST and bridge cutter
- Verification points in the process
- Required records
- The workmanship criteria

Quality plans ensure the compatibility of design, production, installation, servicing, inspection, and testing. Quality plans include updating test equipment and inspection and testing measures.

4.2.2 Quality Manual

Playing a vital role in the development and operation of the quality system, Quality Manual is critical in the ISO 9000 certification process. Quality Manual can be

considered as a manual for describing the quality system structure and objectives of the company. It provides the construction and application of the quality system. Our Manual includes quality policy, organizational structure, management representative definition and responsibilities. It also contains details of the quality assurance section, its structure and organization together with a description of responsibilities. MANGAN's quality manual gives information about training and quality control activities. Quality manual is also used as a training and initiation document.

4.2.3 Document and Data Control

Preparation and control of documents are explained in details in the referenced procedures. These procedures describe the rules for looking over approval distribution revision and canceling the quality system documentation by authorized personnel. Types of documents in the system and the format of these documents with the responsible people and preparator are given in the related procedure. All the documents in a department and document over the company are listed in forms. In these lists (forms), the document name, document type, document code and a brief description of document subject are written. Personnel affecting the quality of the products and services given by the company can easily reach the current editions of the documents pertinent to their quality related functions.

5. MANAGEMENT RESPONSIBILITY

5.1 Management Commitment

Top management decides the company's strategies and targets regarding the customer expectations, technical data and observation and proposals of personnel. These strategies and targets are adopted and applied by all the personnel in any level and position. In this regard missions, visions and values are prepared and updated according to the requirements of the day.

OUR MISSION

MANGAN will consolidate its leadership position in the marble industry by further pushing its technology edge, by expanding its existing partnerships with suppliers in the market, and by raising its profile. Our mission is to provide high quality products of marble, granite and other stones with the maximum concern for work safety and health as well as environmental conservation

OUR VISION

Increasing the market share and reliability of the company in our company and abroad.

OUR VALUES

- Being respective to the nature,
- Providing health and safety of labors

- Procuring honesty and trust among all the personnel
- Establishing team comprehension

5.2 Customer Focus

MANGAN gives great importance to customer focus and customer satisfaction. This is also pointed out in the quality policy of our company. Customer decisions on whether customer expectations are satisfied or not are succeeded as a part of quality management system performance measurements. In this regard face-to-face communication activities with customers are performed during delivery of products. Moreover, customer satisfaction questionnaire is applied to the ex-customers. This questionnaire is filled by the ex-customers 3 times a year. Customer satisfaction questionnaire, is applied to the new customers are one week after the delivery of the first order. This questionnaire measures the customer's decisions expectations and proposal on the existing products and services. The results of the questionnaires are evaluated by Quality Manager. Quality Manager prepares a report related to the results and introduce it in the meetings. Brainstorming sessions carried out to find solutions to increase the customer satisfaction and eliminating the nonconformance. This process is also a part continuous improvement facility. The results of the brainstorming sessions are used in corrective and preventive actions. Our suppliers are also considered as our customers, being in cooperation with suppliers and making information sharing are thought as benefits.

MANGAN's workers are the internal customers. According to the process flow, each production unit is the customer of the preceding and succeeding units.

5.3 Quality Policy

Our quality policy is to supply our products and services intime with committed quality and compliant to TS EN ISO 9001 : 2000 Quality Management System. MANGAN MARBLE & GRANITE Inc. aims to reach and exceed customer expectations by continuous improvement of the processes and services.

The policy is communicated to employees through seminars and is endorsed by the signature of CEO. The policy is reviewed and revised ,as ,required, to reflect MANGAN ongoing commitment to quality and customer requirements.

Quality Policy:

MANGAN is committed to QUALITY, ON TIME DELIVERY and COST-EFFECTIVENESS , and will:

- Provide products and services which meet or exceed customer needs and expectations:
  - Manufacture products which meet customer specifications
  - Strive to meet customer's objective values
  - Monitor customer satisfaction.
  - Deliver on time
  - Ship on the date required by the customer
  - Monitor on time delivery performance
- Reduce all costs to the lowest possible level
  - Establish cost reduction programs
  - Monitor the cost of quality

5.4 Quality Planning

5.4.1 Quality Objectives

- Minimizing the rate of defects of the ST product by detecting the balance of the discs earlier
- Getting zero defect products in dimension basis after the calibration operation
- Reducing the defective product rate less than 3% in polishing process
- Decreasing the broken product rate less than 5% at packaging and transportation stages.

5.4.2 Quality Management System Planning

MANGAN has completed the required plans for meeting the general quality management system requirements and quality objectives. When a change in the quality management system is desired it is reflected to the plans. These changes should not disturb the integrity of the system. While preparing plans, processes are taken into consideration.

5.5. Responsibility, Authority, and Communication

5.5.1 Responsibility and authority

Responsibility and authority distribution is also explained in details in each of the procedures.

Managing Director

Competency: The owner of the company or a qualified person. The required qualification consists of at least five years of experince as a manager, knowledge of quality based systems and a university degree in mining engineering, industrial engineering or administration.

Duties:

- Approval of the Quality Management System
- Management Review
- Supplier Selection & Purchasing
- Contract Management & Control
- Training

Quality Manager (ISO9001 Management Representative)

Competency: Quality manager should have the following characteristics:

1. At least three years of technical and managerial experince in marble processing
2. Experience on preparation of ISO 9000 Quality Management Systems or having enough training to cope with the system preparation, implenmentation and resolution of discrepancies.
3. Having a leader character and ability to impress, encourage and persuade other people.
4. University degree in mining engineering, industrial engineering or administration.

Duties:

- Internal Audit
- Resolution of Quality Management System Discrepancies
- Control & Maintenance of the Quality Management System
- Documentation & Change Control (Quality System Documents)

Sales Director

Competency: Sales director should have the following characteristics:

1. Having at least one year experience in the sales department of a marble plant.
2. Having knowledge about suppliers and customers.
3. Planning and organizing ability.
4. A university degree on related faculties.

Duties:

- Management & Co-ordination of Sales and Support Functions
- Contract Review
- Sales Order Processing
- Estimating

- Project Management
- Control of Contract Documentation
- Planning & organization
- Supplier Selection & Purchasing
- Definition of Installation, Inspection, and Maintenance Requirements
- Training
- Order Processing

Support Engineers

Competency: Support engineer should have the following characteristics:

1. Having a university degree in mining engineering
2. Ability to overcome difficulties
3. Ability to give technical assistance

Duties:

- Planning & Performance of Installation, Technical Assistance,
- Repairs, and Maintenance Activities
- Control of Equipment and Materials Allocated

Financial Director

Competency: A university degree in the related fields

Duties:

- Control of Finance, Accounts and Warehouse Operations
- Training
- Supplier Selection and Purchasing

Warehouse

Competency: A university degree in the related fields

Duties:

- Control of Stock
- Replenishment Recommendation
- Protection and Preservation of Stock
- Receiving Inspection
- Packaging and Dispatch

Administration Order Processing Clerk

Competency: A university degree in the related fields. Personal characteristics can also be considered as a competency requirement. An example is given in appendix A.5

Duties:

- Sales Database Administration
- Checking of Sales Orders
- Allocation of Order Reference Numbers

5.5.2 Management Representative

The management representative is responsible for the establishment, implementation, and maintenance of ISO 9001:2000 International Quality Management System Standard. The management representative has the authority and responsibility for ensuring that the requirements of this Manual and the entire Quality System are implemented and maintained.

MANGAN executive management reviews the quality system to assure that ISO 9001 compliance is maintained and continuous improvement is accomplished.

Executive management reviews are held monthly. Corrective actions resulting from management reviews are assigned and completed in a timely manner. Monthly assessments of the Quality System are conducted and reviewed by executive

management. Executive management communicates the results of assessments to employees through:

- meetings
- face-to-face communications

Minutes of executive management reviews are maintained as part of Quality Records. The review includes:

- findings of audits
- the overall effectiveness of the quality management system in achieving stated quality objectives
- considerations for updating the quality management system for changes in technologies, quality concepts, market strategies, and social and environmental conditions

5.5.3 Internal Communication

MANGAN believe in the necessity of reachability of new information about the company on time . Therefore a complete and coordinated data flow is aimed. In this regard both formal and informal communication activities are used. Providing information about new technologies, and technical subjects to the employees is one of the basic principles of the company. The methods used to increase the speed of data flow and to make communication activities more effective are as follows:

- Meetings: Meetings can cover not only the managerial subjects but also quality, production, training and informing.
- Reports: Reports provide the observation of fluctuations in the processes and productivity by all the labors.
- Written and Communication Activities: Face to face discussions, or written notes are given to the labors if required.
- Other Methods: These methods include telecommunication devices, papers, computers etc.

5.6 Management Review

5.6.1 General

General director and other top managers and authorities of each department have a meeting once a year. In this meeting, the quality management system applied is reviewed. During the certification period the number of meetings can be increased. Quality manager determines the date of meeting and informs the general director at the end of the year. This date can be changed by the general director. When the date of meeting become definite, other participates of the meeting are informed by written notes. Participation to the meeting is compulsory and if the required majority can not be obtained the meeting is postponed.

5.6.2 Reviewing Inputs

Quality manager prepares the content of the review meeting. Managing director (general director) examines the content and approves if it is proper. Clauses of the content is determined and notified to the participants two weeks before the date of meeting. The following concepts and their related documents are evaluated in the meeting;

- The reasons of failure in realizing the determined targets
- Internal audit reports
- Customer complaints and market conditions
- Quality records
- Corrective and preventive actions
- Quality costs
- Quality system
- Other quality related meeting's reports
- Continuous improvement and training activities

5.6.3 Reviewing Outputs

After the management review meeting, a report related to the decisions made is prepared and published. The corrective and preventive actions are started according to the report. These actions are done as described in the related procedure. In the management review reports; report number, date, subject, and a brief description are included. These reports are distributed only to the company's managers.

6. RESOURCE MANAGEMENT

6.1 Provision of Resources

The person verifying quality has authority and organizational freedom to:

- initiate action to prevent product, process, and Quality System nonconformities
- identify and record product process and Quality System problems
- initiate, recommend, or provide solutions through designated channels
- verify the implementation of solutions
- control further processing, delivery, or installation of nonconforming product until the deficiency or unsatisfactory condition has been corrected

MANGAN provides resources for all verification activities required to comply with the ISO 9000 standard. Management provides adequate resources and assigns trained personnel for verification activities. Operators verify quality of the others work. Management conducts verification.

Proper equipment is provided to ensure compliance to MANGAN specifications and customer requirements. Management representative conducts assessments. MANGAN has determined the level of competence, experience, and training necessary to ensure the capability of personnel. MANGAN identifies the quality factors affecting its market position and objectives relative to new products, processes, or services. MANGAN allocates resources on a planned and timely basis.

Persons or organizations responsible for defining the acceptability of items or work performed are sufficiently independent from the pressures of production. The positions in the organization responsible to manage, perform, and verify work affecting quality are identified in the company's current organization chart.

MANGAN has adequate resources essential to implement the quality policies and to achieve its quality objectives.
These resources include:

- Human resources
- Financial resources
- Other resources

6.2 Human Resources

6.2.1 General

In the effective implementation of human resources management, the principles “right person to the right job” and “payment according to performance” are adopted. In assigning personnel to personnel to a job and in employment activities, characteristics of personnel and requirements of the job are considered and therefore; assignment of the most proper person to each work.

6.2.2 Perfection, Conscious and Training

The evaluation of the requirements of the work to be performed is a responsibility of Production Engineer (Support Engineer), foremen and other technical personnel. The qualification of the personnel is determined by considering education level and training, job related experiences and his / her performance. After assigning the right person to the right job, performance of workers is measured by using statistical methods. These performance values, weight of work characteristics of personnel are the diagnostic criteria. The principle of payment according to performance increases the performance of workers contributing to the product quality and productivity. The need for training program, training content and evaluation of trainings are determined by manageing director and other administrative personnel.

6.3 Infrastructure

The infrastructure necessary to provide product requirements such as buildings, working areas, machineries, support services are assigned and kept going. The plant having a stocking area of 45000m^2 is constructed from the Italian machines with the most developed stone technology.

6.4 Work Environment

MANGAN has performed the modifications determined by the labor health and work safety regulations of Ministry of Work and Social Security. Spraying is applied to minimize and suppress the dust. To minimize the effects of noise ear stoppers and curtains are used.Productive taps prevents the possible injuries. By signboards and related trainings, all the personnel are warned for the accidents. Besides these, required importance is given to the cleaning of working environment and protection of the nature. In the determination of the condition of work environment basic rules of ergonomics are taken into consideration.

7.0 PRODUCT REALIZATION

7.1 Planning of Product Realization

MANGAN has planned and improved the required processes for product realization. The basics of the plan are compatible with the other quality system processes. In this planning quality objectives, process documentation and product requirements, product definitions and processing stages are determined and taken into consideration. The records showing the product conditions are kept as a part of quality documents.

7.2 Customer Related Processes

7.2.1 Determination of Requirements of the Products

- Requirements by laws and governmental decrees
- Requirements of general usage of products
- Documented requirements in the contract with the customer
- Any kind of additional requirements

7.2.2 Examination of the Provisions of the Products

Examination of the product related requirements is performed in accepting a new order and in the changes of orders. To yield review, firstly the requirements of the products are determined. The differences between demand of customer and proposal given are evaluated. The demand is analyzed economically and technically. After making the requirements definite described in the preceding section, company get in touch with customer for the contract provisions and the contract is signed.

7.2.3 Communicating with Customer

The contract to be signed with customer covers not only customer requirements but also transportation and after transportation services. If a change occurs in the conditions of the contract, MANGAN contracts with the customer and agreement is provided. This agreement is documented. By means of some questionnaire and forms the customer satisfaction is measured and taken as feedback. In this feedback general conclusions, statistical results and future improvement in the processes and services are given.

7.3 Design Control

As design activities are not applied in MANGAN Inc. the sections related to the design facilities are omitted.

7.4 Purchasing

7.4.1 Purchasing Process

Purchasing process is an action to obtain the materials and services to provide services and products to customers in the most efficient, economical and most suitable way to the quality system.

Sales Director investigates the suppliers. Suppliers are selected based on:

- Ability to meet contract and quality requirements
- Historical quality data
- Product type
- Effectiveness of the quality controls made by suppliers

Subcontractors are selected based on:

- ability to meet contract and quality requirements
- historical quality data

- product type
- effectiveness of the quality controls made by subcontractors

MANGAN maintains a list of approved subcontractors.A record of each subcontractor includes:

- contracts
- submission dates and related data
- product specification matching data

Financial director re-evaluates and updates qualified subcontractors.

The evaluation of subcontractors ans suppliers is based on price and specification of products, order-delivery time period length, conformance of products and services to the requirements and compliance with the quality systems.

7.4.2 Purchasing Data

Purchasing Department (Financial Director) initiates purchases of third party materials. Purchasing Department issues specifications and monitors the subcontractor's performance.

Purchasing documents ensure that they clearly describe the product ordered and purchased products and supplies meet all customers' requirements. Revisions to purchasing documents are controlled in the same manner as the original document. The following information is included in the purchase document:

- price
- quantity
- description
- documentation with proper revision level
- delivery requirements
- technical requirements

7.4.3 Verification of Purchased Product

MANGAN verifies the conformance of purchased product.

This verification involves:

- suitability of marble blocks to be processed in ST and other machineries in the plant
- convenience of cutting discs (diamond discs) to have smooth surfaces in the edges of the plates
- quality of filling components to provide a filling material with a proper color, density and adhesiveness.
- visual homogeneity of granite and marble plates
- products and services found to be nonconforming are:
- send back to the supplier
- not used (for marble blocks) and stored until an order for which these blocks can satisfy the requirements

7.5 Process Control

7.5.1 Control of Product and Service Providing

Required plans to control production are prepared and applied controlled conditions include product specifications, work instructions and availability and usage of proper equipment, measurement devices. Personnel performing complex and critical operations are provided with work instructions and workmanship criteria.

7.5.2 Validity of processes for product and service providing

MANGAN controls processes critical to product and service quality. Production and individual operations are planned and documented. Personnel performing complex or critical operations are provided with work instructions and workmanship criteria. Processes are controlled and performed in accordance with written procedures.

Production equipment and processes are maintained and checked for adequacy prior to use. Production areas are clean and provide a suitable work environment.

Support Engineer is responsible for stopping any operation, which is not under control.

Processes are controlled using:

- quality plans
- statistical analysis

Personal performing the operation is trained for the task.Work instructions and workmanship standards are available to the personal performing the task. Equipment and processes are verified to be working adequately prior to use. Support Engineer is responsible for maintaining this system. Records are maintained for qualified processes and equipment part of Quality Records.

7.5.3 Tracebility and Identification

MANGAN maintains methods to identify product, as it relates to quality, to ensure customer requirements can be met. Traceability is maintained when required by customer contract. Quality manager is responsible for assuring that product identification and traceability standards are maintained.

Product is identified at all stages of production, and records are kept:

- for the standardization of the products according to the specifications given in the order
- to obtain the product quality and conformance to the requirements in all stages of the production
- to identify materials, parts, components, and products, MANGAN:
- uses a classification method according to products origin (extraction quarry, and pit location)

Records are kept for:

- each batch
- each type of product

Procedures for identification and control of such items ensure:

- only correct and acceptable items or materials are used in fulfilling customer orders
- the items can be related, at all stages of processing, to an applicable drawing, specification, or other technical document
- means of traceability of products where required are provided
- methods exist to identify, segregate, and disposition nonconforming items, and to remove such items from storage and manufacture.

Adequate records of inspection, audit inspections, tests, and examinations are maintained as:

- evidence of compliance
- for use in corrective action activities

7.5.4 Customer Supplied Product

MANGAN maintains customer supplied product from receipt to delivery to ensure customer requirements are met. Records of all customer supplied product are maintained as part of Quality Records.

Customer supplied products includes the following products made by marble travertine and granite:

- plates
- slabs
- baseboard
- drain board
- staircase

- step
- others

Customer supplied products are:

- inspected visually and measured by the experts for the conformance to the customer requirements
- controlled after production, before and after delivery to the customer
- Customer supplied product received in a nonconforming or damaged condition is:
- taken back and replaced by the conformed ones as soon as possible
- the reason for the nonconformity or damage is examined and precautions are taken

7.5.5 Product Protection

Employees are trained in the proper handling of materials and in the maintenance of material storage environments.

Specific training is provided for the handling of:

- granite plates
- marble blocks by means of double girder winch
- newly filled travertine blocks

Designated storage areas are used to protect all materials from damage or deterioration of products prior to use or delivery. Documented authorization is required for dispatching to and from storage areas. Two trained labor packages controlled end product.

Training is provided in the proper packaging, packing, and marking. Where contractually specified, MANGAN is responsible for packaging and preservation during transit including delivery to destination.

7.5 Control of Monitoring and Measuring Devices

Controls are established to maintain the integrity of equipment used in inspection, measuring, and testing of products. MANGAN uses an outside calibration service and requires the calibration service to prove traceability to a recognized national standard. MANGAN audits the service twice a year. Quality manager schedules, calibrates, and maintains inspection, measuring and test equipment whether owned, rented, or provided by the customer to ensure conformity of products to specifications with the required measurement capability.

Calibration is traceable to national standards. MANGAN maintains individual calibration records of all inspection, measurement, and test equipment as Quality Records. New equipment is registered and calibrated prior to its use.MANGAN provides employees with training in the handling, storage, and use of inspection, measurement, and test equipment, where required. Safeguards against inadvertent adjustments to equipment, hardware, and software are used when applicable.Support engineer reviews of any product which is manufactured or tested by out-of-tolerance inspection measurement and test equipment is conducted.

8. MEASUREMENT, ANALYSIS AND IMPROVEMENT

8.1 General

Appropriateness of the products is guaranteed by measurement, analysis, and improvement activities. These activities also ensure the appropriateness of the quality system. With these activities the effectiveness of the quality management system is kept under control and improved continuously. Some statistical techniques and TQM tools ,as described in the related procedure, are used in the analysis of the data taken by measurement processes.

8.2 Monitoring and Measurement

8.2.1 Customer Satisfaction

Customer satisfaction principle of MANGAN is based not only the meeting but also exceeding the customer requirements. Therefore; the best products and services are aimed. Customer decisions on whether customer expectations are satisfied or not are succeeded as a part of quality management system performance measurements. In this regard face-to-face communication activities with customers are performed during delivery of products. Moreover, customer satisfaction questionnaire is applied to the ex-customers. This questionnaire is filled by the ex-customers 3 times a year. Customer satisfaction questionnaire, is applied to the new customers are one week after the delivery of the first order. This questionnaire measures the customer's decisions expectations and proposal on the existing products and services. The results of the questionnaires are evaluated by Quality Manager. Quality Manager prepares a report related to the results and introduces it in the meetings.

Brainstorming sessions carried out to find solutions to increase the customer satisfaction and eliminating the nonconformance. This process is also a part continuous improvement facility. The results of the brainstorming sessions are used in corrective and preventive actions.

8.2.2. Internal Audit

Approval of the quality related activities and related results according to the plans and examination of the effectiveness of the quality system is carried out by internal auditing. The responsibility distribution in internal audit facilities is described in the related procedure. The results of the audits are kept as a part of the quality system documents and prepared and kept as described in the document and data control procedure. The results of the internal auditing activities are examined and evaluated in the review meeting of the management.

8.2.3 Monitoring and Measurement of Processes

Having all the production facilities and services at the desired quality level and continuity of this condition, keeping all the processes under control and taking the precautions intime is a requirement of our company. .So the processes in each step of production is traced. The factors affecting the product quality are determined and the MANGAN focuses on these factors in the continuous improvement and process control activities. The fluctuations in these factors are followed and kept under control. In the determination of the influences of the processes in the quality of products both the interval auditing and customer satisfaction reports are used. Quality is controlled after cutting, polishing, dimensioning and packaging processes. Therefore; the defects in the processes are determined. Beside visual inspections, tape measure and some other metric measure devices are used to determine the appropriateness of the dimensions of the end products. The calibration of the measuring devices is done according to the related procedure.

8.2.4 Monitoring and Measurement of Products

Prior to release to manufacturing or shipment to customers, material received from subcontractors is inspected visually for any cracks, fractures etc. Material which cannot be inspected and tested at the time of receipt is inspected before usage.

Material found to be nonconforming in the inspection and test process is sent back to the supplier for exchange with the proper ones or stored in an excluded area to prevent inadvertent usage.

When a non-conformance or failure is detected during fabrication, inspection, testing or during any other activity it shall be recorded on a suitable form and a disposition made with respect to: stopping or continuing of ongoing activities, use-as-is, rework to original requirements, scrapping of defective items or other appropriate dispositions to be determined by Support Engineer.Materials received from a certified ship-to-stock supplier are shipped directly to the stock and inspected before usage. Incoming product released for urgent production prior to verification is positively identified with a mark. A Quality Record for the released product is maintained, in the event of recall and replacement due to nonconformity Product manufactured at MANGAN is monitored through process inspection points. Support Engineer generates tests to verify manufacturing capabilities. Foremans perform routine manufacturing tests. Support Engineer verifies that manufacturing tests are performed by:

- reviewing data
- verifying product performance
- performing inprocess audits, including product audit

Required inspections and test are completed, documented, and authorized prior to shipment of product to customers.MANGAN audits a representative sample of packaged units. Adequate records of inspection, audit inspections, tests, and examinations are maintained as:

- evidence of compliance
- for use in corrective action activities

8.3 Control of Non-Conforming Product

Inspection and test status of a product is identified to assure that only product that has passed inspection is to be processed or shipped . Authority responsible for the release of conforming products is defined.

MANGAN monitors and controls the inspection and test status of:

- raw materials (marble blocks, granite plates etc.)
- purchased materials used in production (abrasives, polyester, hakemi, freezers etc.)
- final products

Test and inspection status markings and production records identify the responsible authority for the release of the material to the distribution system.Product cannot be released without passing the required inspections. Inspection and test status records are maintained as part of Quality Records.

Quality Manager is responsible for ongoing maintenance of the inspection and test status of products within the assigned area throughout MANGAN.

Personnel are trained to maintain all inspections and test status. Non-conforming product is identified, documented evaluated, and prevented from being used or shipped. Responsibility for disposition of nonconforming product is defined and, when required, the customer is conducted for advertisement. Repaired or reworked product is re-inspected. Detailed rules for nonconformity review, making the disposition decision and recording these activities are provided in the related procedure. All non-conforming product that can not be corrected using repair or rework is identified and documented. Discrepant material is segregated until as disposition is made. General director , quality manager and support engineer are authorized to make the disposition for a non-conforming product.

Disposition decision may be:

- Use as is
- Rework
- Scrap
- Return to supplier

Customer is contacted for advisement or acceptance of a discrepant customer supplied product. Repaired or reworked products are re-inspected. Records of discrepant material reports are retained.

8.4 Analysis of Data

Quality manager is responsible for the selection and use of appropriate statistical techniques to ensure customer requirements and company quality standards are achieved. Statistical process control (SPC) and quality tools are carried out to control the variations in the production, machine performances, process improvement and other activities aiming zero defect. MANGAN has established documented procedures to measure, monitor, and improve products and processes by the use of statistical techniques. Documentation of statistical techniques is maintained as part of Quality Records. Employees are trained in the proper use of statistical techniques.

8.5 Improvement

8.5.1 Continuous Improvement

Customer expectations and complaints, and internal auditing results are used in the elimination of the defects in the products and solving the problems in the processes. Beside these, these data is joined with statistical methods and quality tools application results and used to determine the factors affecting the quality and productivity. Focusing on these factors processes and products are improved continuously.

8.5.2 Corrective Action

MANGAN emphasizes the use of problem prevention or problem correction to determine the potential cause or actual cause of non conformances (including customer complaints, non conforming products, and nonconforming processes) and prevent their occurrence or reoccurrence. MANGAN investigates the causes of non-conformances relating to the quality system, including quality system products and processes. The results of these investigations are maintained as quality records.

Investigations resulting in changes to documented procedures are processed in accordance with the document and data control system or the configuration management control system. Preventive and corrective action is taken to eliminate potential or existing non-conformances and to eliminate or minimize the impact on safety, performance, dependability, processing cost, quality-related cost, and customer satisfaction.

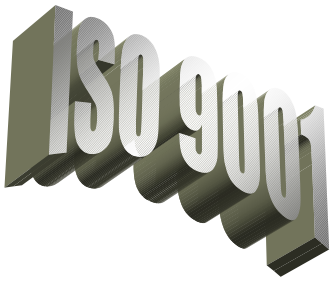
8.5.3 Preventive action

MANGAN maintains a preventive action program to identify, correct and prevent the reoccurrence of non-conformity and deficiencies. Processes and identifying issues which may potentially cause nonconformity are reviewed as part of the preventive action program.To eliminate potential causes of nonconforming product or process, MANGAN analyzes:

- work processes
- work operations
- quality records
- audit records
- customer complaints

A.2 PROCEDURES MANUAL

MANGAN GRANITE & MARBLE INC.



PROCEDURES MANUAL

MANGAN MARBLE & GRANITE INC.

PROCEDURE FOR DOCUMENT CONTROL

PROCEDURE NO	1
NUMBER OF PAGE	3

PREPARED BY

MESUT AKANER

NUMBER OF CHANGE	DEFINITION	DATE OF CHANGE
0	Original	15.12.2002
1		
2		
3		
4		
5		

1. OBJECTIVE

The procedure aims to control the documents of the Quality Management System. The main documents to be controlled are quality manual quality policy and objectives. The records taken in the quality system are controlled revised and cancelled according to another related procedure.

2. RESPONSIBILITIES

2.1. Quality Manager

Quality Manager has a responsibility to ensuring that only the latest versions of the documents are distributed and applied by the personnel. Quality Manager has also a responsibility of ensuring that documents are revised according to the new requirements of the quality system.

3. PROCEDURAL STEPS

3.1. Approval

Quality manual, procedures, the quality policy, and the objectives are approved by the managing director. Each document should be signature approved or seal approved. Other quality documents are approved by quality manager.

3.2. Re-Approval

Revision and re-approval of the documents is carried out by the authority who made the original approval. Quality manual and procedures are reviewed at least once a year by the quality manager. Reviews are examined in the managements review meetings.

3.3. Revision Status

Any change in the quality manual and procedures are recorded to the first page of the documents and document list. If any change is applied in quality policy or objectives than only a re-approval signature and the current date will be sufficient. Any changes to existing records will be lineout with a new entry.

3.4. Availability

Quality manager should make sure that all employees have access to the latest revisions of the Quality Manual, Procedures, and other necessary documents at the point-of-use or as near as practical to the point-of-use.

3.5. Legibility and Identification

Quality related documents are followed by the quality manager to ensure that they remain legible. The header of the quality manual and procedures states the title of the document. Quality manual , objectives and other documents are identified by their title.

3.6. External Documents

External documents are the documents originally prepared outside the company but they are referred within the quality system. Quality manager decides on the applicability and properness of the document.

3.7. Prevention of Unintended Use

There is no requirement to keep any of the obsolete revisions of any of the documents mentioned in this procedure. However, if an obsolete revision is kept for any reason, it must be clearly marked as ‘OBSOLETE’.

MANGAN MARBLE & GRANITE INC.

PROCEDURE FOR QUALITY RECORDS

PROCEDURE NO	2
NUMBER OF PAGE	2

PREPARED BY

MESUT AKANER

NUMBER OF CHANGE	DEFINITION	DATE OF CHANGE
0	Original	15.12.2002
1		
2		
3		
4		
5		

1. OBJECTIVE

This procedure aims to control the records of the quality system. These records are taken and maintained to provide evidence for the conformity to the requirements and the effective operation of the quality management system.

2. RESPONSIBILITIES

2.1. Quality Manager

Quality Manager has a responsibility to ensuring that the quality manual and procedures are kept up to date and available to the employees.

3. PROCEDURAL STEPS

3.1. Legible

All quality records will be maintained so that they can be readable throughout the retention period.

3.2. Identification

The identification of the quality records is provided by the title of the documents.

3.3. Retrivable

Using the attached Quality Records Matrix, the person desiring legitimate access to a record can retrieve the record using the retention time, storage location, storage format, identification of indexing method, and disposition requirements, if any. If no disposition requirement is listed, the record may be disposed at the discretion of the person responsible for the original filing.

MANGAN MARBLE & GRANITE INC.

PROCEDURE FOR NONCONFORMING PRODUCTS

PROCEDURE NO	3
NUMBER OF PAGE	2

PREPARED BY

MESUT AKANER

NUMBER OF CHANGE	DEFINITION	DATE OF CHANGE
0	Original	15.12.2002
1		
2		
3		
4		
5		

1. OBJECTIVE

This procedure aims to define the method for the control of nonconforming products and services. It includes decision processes on nonconformances and records. When a nonconformance occurs general director is reminded. A nonconformance report is prepared. In this report the nonconformaning situation is clearly explained, general director can take an action to eliminate the nonconformity.

2. RESPONSIBILITIES

2.1 Quality Manager

Quality Manager has a responsibility to keep track of NCR's in an NCR binder.

2.2 The President or General Director

The President or general director has a responsibility to make the decisions on how to disposition nonconformances. The President or general director may delegate this authority when appropriate.

3. PROCEDURAL STEPS

When any employee identifies a nonconforming situation, it will be brought to the attention of the President or General Manager. The President or General Manager will initiate the attached Nonconformance Report (NCR) as follows:

1.) Clearly document the situation or occurrence, including the date, on the NCR form.

2.) As appropriate, the President or General Manager will select one of the following choices to disposition the nonconformance:

a.) Take action to eliminate the nonconformity;

b.) Authorize its use, release or acceptance under concession by his/her authority, and where applicable, by the customer; and

c.) Take action to preclude its original intended use or application.

The decision must be recorded on the NCR form that is forwarded to the ISO 9001 Management Representative to be entered into the NCR Binder.

Any nonconforming product/service resulting in corrective action shall be subject to re-verification to demonstrate conformity to the requirements.

When nonconforming product/service is detected after delivery or use has started, the organization shall take action appropriate to the effects of the nonconformity. This may include completing the NCR form or completing a Corrective Action Request (CAR) as a customer complaint.

MANGAN MARBLE & GRANITE INC.

PROCEDURE FOR CORRECTIVE ACTION

PROCEDURE NO	4
NUMBER OF PAGE	1

PREPARED BY

MESUT AKANER

NUMBER OF CHANGE	DEFINITION	DATE OF CHANGE
0	Original	15.12.2002
1		
2		
3		
4		
5		

1. OBJECTIVE

This procedure covers the method for taking action to eliminate the cause of nonconformities in order to prevent recurrence. This procedure is used to analyze and remove the root cause of actual nonconformities within the quality system and to process customer complaints.

2. RESPONSIBILITIES

2.1. Quality Manager

Quality Manager is responsible for providing the implementation of corrective action activities. Preparation of the corrective action forms and collecting them are also the responsibility of quality manager.

2.2. Top Management

Top Management is responsible for the l approval of the corrective actions taken.

3. PROCEDURAL STEPS

If nonconformance is seen or a customer complaint is taken by an employee, he/she should fill the corrective action form and bring it to the quality manager. Quality manager examines the form and select the proper person to analyse and eliminate thenonconformance. This person analysis the nonconformance and finds the root causes of the problems. He/she determines the actions taken to remove nonconformities. If the action is approved by the top management it is implemented by the assigned person. The process applied by the assignee is documented in the corrective action form and returned back to the quality manager.

MANGAN MARBLE & GRANITE INC.

PROCEDURE FOR PREVENTIVE ACTION

PROCEDURE NO	5
NUMBER OF PAGE	3

PREPARED BY

MESUT AKANER

NUMBER OF CHANGE	DEFINITION	DATE OF CHANGE
0	Original	15.12.2002
1		
2		
3		
4		
5		

1. OBJECTIVE

This procedure aims to describe the method to eliminate the root causes of nonconformities to prevent the possible occurrence of the problems.

2. RESPONSIBILITIES

3.1. Quality Manager

Quality Manager is responsible for providing the preventive acvtion activities.

3.2. Top Management

Top Management is responsible for the approval of the actions taken.

3. PROCEDURAL STEPS

If an employee realizes a potential nonconformity in the quality system, he/she fills a preventive action form and forwards the form to the quality manager. Quality manager selects the proper person for the evaluation of the problem and dettermiantion of the preventive actions. Assigned person evaluates the situation and documents the required actions for the prevention of the nonconformance. He/she implements these actions, if approved by top management. Assigned person writes down the preventive action results, and it's effectiveness to the preventive action and brings it back to the quality manager.

MANGAN MARBLE & GRANITE INC.

PROCEDURE FOR INTERNAL AUDITING

PROCEDURE NO	6
NUMBER OF PAGE	3

PREPARED BY

MESUT AKANER

NUMBER OF CHANGE	DEFINITION	DATE OF CHANGE
0	Original	15.12.2002
1		
2		
3		
4		
5		

1. OBJECTIVE

This procedure covers the methods for performing internal audits.

2. RESPONSIBILITIES

2.1. Quality Manager

Quality Manager has a responsibility to overseeing the implementation of the internal audits, including planning, conducting the audits, reporting the results, and maintaining records.

3. PROCEDURAL STEPS

The quality system is internally audited at least once per year. Various areas of the quality system may be audited more frequently based on status and importance. The quality system will be audited sufficiently to determine if it meets the planned arrangements of the system and the ISO 9001:2000 Standard, including the effective implementation and maintenance of the system. Each internal audit will be planned (using the Internal Audit Plan), taking into consideration, the results of the previous audits of this area. The audit criteria and scope shall be documented in each plan. The internal audits will be conducted by trained internal auditors, independent of the area being audited, or outsourced to a consultant with at least three years experience in quality system implementation and auditing.

The internal audit results will be documented in a report to top management and the management of the area audited. The auditor will enter each internal audit nonconformance on the Internal Audit Nonconformance form and process according to requirements listed on this form.

The manager responsible for the area being audited will determine the corrective action, and ensure that actions are taken without undue delay to eliminate the

detected nonconformities and their causes. The follow-up by the original auditor will verify the effectiveness of the actions taken to correct the nonconformance. This verification will be recorded on the Internal Audit Nonconformance form. The form will be returned to the Management Representative for overall audit closure and record retention.

A.3 WORK INSTRUCTIONS

MANGAN GRANITE & MARBLE INC.

ISO 9001

WORK INSTRUCTIONS

INSTRUCTION FOR SIMEC BLOCK SELECTION

INSTRUCTION NO	1
NUMBER OF PAGE	1

PREPARED BY

MESUT AKANER

NUMBER OF CHANGE	DEFINITION	DATE OF CHANGE
0	Original	12.6.2003
1		
2		
3		
4		
5		

1. Decide on the proper block features regarding the visual properties (color vein structure etc.) of the products ordered.
2. Select the marble blocks with convenient properties.
3. Make elimination among the fitted blocks according to the specified product size demands
4. Choose the block to be processed minimizing the total number of blocks considering the product size (minimizing the total number of blocks to be processed is important in eliminating the delays in production and in providing the homogenity in the products.

MANGAN GRANITE & MARBLE INC.

INSTRUCTION FOR SIMEC BLOCK TRANSPORTATION AND LOCATING

INSTRUCTION NO	2
NUMBER OF PAGE	2

PREPARED BY

MESUT AKANER

NUMBER OF CHANGE	DEFINITION	DATE OF CHANGE
0	Original	12.6.2003
1		
2		
3		
4		
5		

1. Control if there exists anything on the crane track that prevent the movement of the crane.
2. Control whether a block is in the movement field of the crane body.
3. Remove any people or vehicle in the movement field of the crane hook.
4. Using the direction buttons on the control panel place the crane hook to the appropriate location
5. Control the steel ropes for any loose in the connection points and any deformation or cracks in the wires that form the steel ropes.
6. Attach one ring of the steel ropes to the hook.
7. If going on a block in performing the process is needed than make sure that the related blocks are stable.
8. If the block to be processed is located under the other blocks than remove these blocks first and put them on the ground if possible.
9. Attach two steel ropes to the marble block in the cross position and put the rings on the hook.
10. After going away about three meters from the block raise the block about 20-30 centimeters
11. Control the steel ropes for and sliding or deformation in case of any danger of droping of ther block.
12. If there exist any danger of dropping of block than leave the block slowly.
13. If there is no danger than carry the block slowly to the ST wagon and leave it.
14. After ensuring the stability of the block untie the steel ropes and remove from the block.
15. If the block is not stable than make it stable by means of manuvela.
16. Control if there exists anything that prevent the movement of the wagon on the way of it. If exists remove it.
17. Move the wagon using the movement buttons on the ST control panel

MANGAN GRANITE & MARBLE INC.

INSTRUCTION FOR SIMEC BLOCK CUTTER

INSTRUCTION NO	3
NUMBER OF PAGE	6

PREPARED BY

MESUT AKANER

NUMBER OF CHANGE	DEFINITION	DATE OF CHANGE
0	Original	12.6.2003
1		
2		
3		
4		
5		

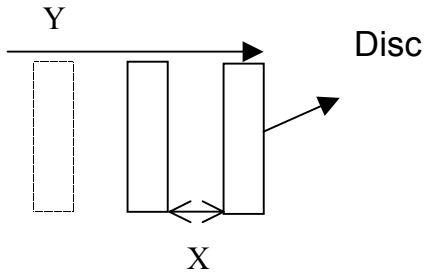
VERTICAL CYCLE

The diamond discs are positioned to Z- and this position is stabilized by pressing F3 button regarding the marble block. The same procedure is also applied for the Z+ position and F11 button is pressed.

The maximum and minimum disc diameters are changed by entering the new value pressing ins button and than pressing the enter button. The generally used disc diameter is 1200 mm and only this dimension is used in the factory. Therefore one should enter this value as both maximum and minimum values.

Displacement pitch X, shows the distance taken between each successive cuttings in a vertical cutting. This distance is calculated by adding the distance between two disc to the disc widths.

displacement pitch X = X + Y



NORMAL STEP CUTTING CYCLE

The step of the disc must be at most 1mm. If the diamond discs are not sharpened, the step must be 0.3mm at the first usage and than must be increased slowly controlling the degree of the visibility of the diamond particles.

COMBINED SYSTEM OF CUTTING

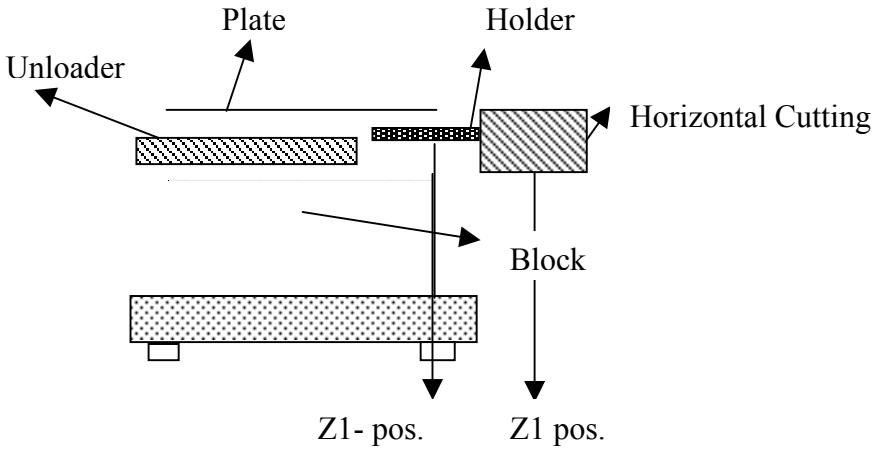
Both the distance from position Z- and distance from position Z+ values must be 1mm.

HORIZONTAL CYCLE

The diamond discs are positioned to Z1- and this position is stabilized by pressing F4 button regarding the marble block. The same procedure is also applied for the Z1+ position and F12 button is pressed. If no defects exists than the waiting times should have the value of 0. cutting step Q in Z1- position should be 17.2 and cutting step Q in Z1+ position ought to be 21.0. Required cutting length X is entered according to the order such as 200-300 mm. Horizontal blade kerf is measured and entered in millimeters. If only horizontal cutting is applied, than it is calculated as this; One should look at the vertical cycle part and read displacement pitch X and required cutting length X values. These values are added. Lastly the resultant value is entered as cutting length.

STRIP UNLOADER

Z1 distance from Z1- position for both holding and taking the plate should be entered to the machine. To find the Z1 distance from Z1- position (to Z1- direction) to enable the strip unloader for to hook a strip value. The holder of the horizontal cutting part must be in proper position to hold the plate and head of the unloading unit should be adjusted to prevent strike of it to the horizontal cutting part.



The distance to let the unloader to hold the plate is calculated by subtracting Z1- position value from Z1 position value.To find the second value horizontal cutting is positioned above the block and taken away. This point is the real value of the Z1 and when Z1- is subtracted from Z1 the distance to take the plate is calculated.

SELECTION OF CUTTING CYCLE

To adjust the cutting process one should press F9 button i.e. NT 2 Various Data Button. Then, one should reach to the 'Choice of Cutting Cycle' page using the arrow keys.

CHOISE OF CUTTING CYCLE

If 0 value is entered to select the cutting process it means both horizontal and vertical cutting will be applied, likewise if the value of 1 is selected it means vertical cycle and value of 2 means horizontal cycle only. To abolish the first horizontal cycle operator should select “abolishing the actual horizontal cycle ?” then press 1. for general reset operator should select general reset and then press 1. If the program does not move the carriage directly and start second cutting, one should cancel the first cutting.

STARTING CUTTING

After completing all the adjustments, operator must reset the machine. Do perform this, firstly both horizontal and vertical cuttings must be in “man” position. To reset horizontal cutting F14 and to reset the vertical cutting F6 buttons should be used. After that, buttons are taken back to the “aut” position and vertical discs are operated. Operator waits for the lightening of the warning lamp for the vertical discs and presses start button. After completing the first vertical cut, carriage starts moving to enable the second vertical cutting in this instant both vertical and horizontal cutting is possible. Therefore the horizontal disc is started to operate.

LUBRICATION INSTRUCTIONS

1. Put grease to the machine once a week.
2. Control the level of lubricates in reductor and gears.
3. Change the lubricate of reductor and gears four times a year.
4. Control the lubricate of sledges of the horizontal and vertical cuttings.
5. Change the lubricate of sledges of the horizontal and vertical cuttings four times a year.
6. Control the lubricate of pressure reductor once a week.
7. Control the lubricate of sledges of the horizontal head.
8. Change the lubricate of sledges of the horizontal head four times a year.
9. Control the lubricate of gears of the horizontal head.
10. Change the lubricate of gears of the horizontal head twice a year.
11. Control the lubricate of sledges of the carriage.
12. Change the lubricate of sledges of the carriage four times a year.
13. Control the lubricate of speed reductor of the carriage each week.
14. Change the lubricate of speed reductor of the carriage twice a year.

MAINTENANCE INSTRUCTIONS

1. If the machinery is not used for a month lubricate all the parts.
2. If the machinery is not used more than a month remove all the lubricates from the machine.
3. Before lubricate alteration and after removing the lubricate wash the machine.
4. Remove the lubricate when it is warm to increase fluidity of it.
5. While removing the lubricate some of it may be left in the machine therefore start the machine for five minutes and remove the remaining lubricate.

WARNINGS

1. Diamond discs are always started to operate outside the blocks.
2. If the discs are in the block, to operate them, firstly they are removed manually from the block.

3. Operator should check anything that prevents the movement of carriage, horizontal and vertical cuttings and remove if any.
4. Don’t enter the working area of the machine.
5. Keep clean the surroundings of the machine.
6. Inform the authorized person if any breakdown occurs.
7. Control the electric cables systematically and inform the authorized person if any leakage occurs.
8. Don’t leave anything used for the maintenance and repairing after the operation.
9. If the machinery does not continue to operate at the end of the shift, close it first by the key then from the electric panel.

MANGAN GRANITE & MARBLE INC.

INSTRUCTION FOR SIMEC MULTIPLE CUTTER

INSTRUCTION NO	4
NUMBER OF PAGE	3

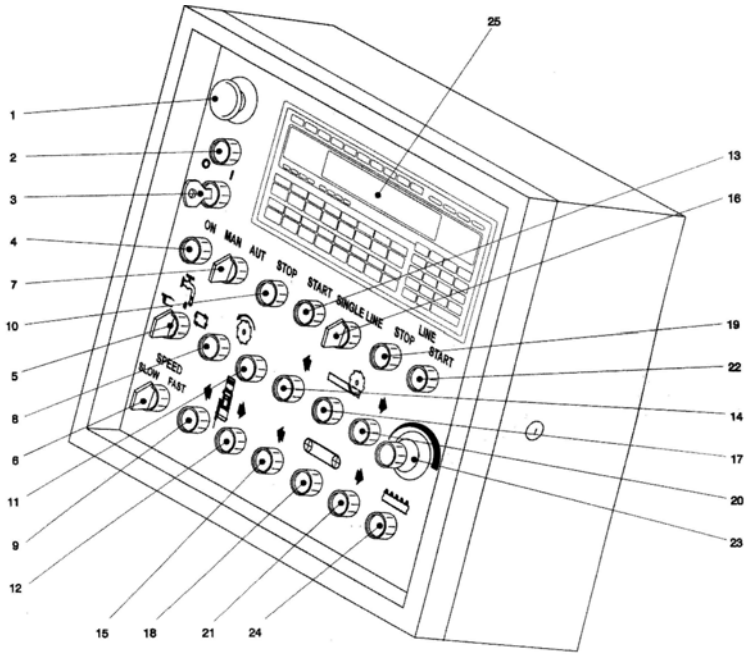
PREPARED BY

MESUT AKANER

NUMBER OF CHANGE	DEFINITION	DATE OF CHANGE
0	Original	12.6.2003
1		
2		
3		
4		
5		

CONTROLS

1. Emergency Stop Button
2. Pilot Lamp
3. Switch
4. Start Button
5. 3 Way Automatic– Manual Selection Button
6. 2 Way Fast-Slow Button
7. 3 Way Automatic – Manual Selection Button
8. Disc Stop Button
9. Disc Head Down Button
10. On-Line Stop Button
11. Disc Start Button
12. Disc Head Up Button
13. On-Line Start Button
14. Bridge Forward Button
15. Belt Backward Button
16. Individual- On-Line Button
17. Bridge Stop Button
18. Belt Stop Button
19. Line Process Stop Button
20. Bridge Backward Button
21. Belt Forward Button
22. Line Process Start Button
23. Bridge Speed Adjustment Switch
24. Roll Movement Button
25. Program Screen



WORK INSTRUCTIONS

1. Bring the switch to “I” and machinery “on” position
2. Adjust the switches for manual or automated cutting
3. If the machine is used itself than select “single” otherwise select “line”
4. Enter the distances between the discs to the computer according to the required dimensions
5. Open the water for the heads
6. Press the start discs button
7. For the automated working turn the switch to line value then press line start button
8. Adjust the speed
9. For the automated working, turn the switch to man value
10. Start discs
11. Press cutting button
12. after completing the cutting press bridge backward button
13. remove the plates from the machinery by moving the belt and rollers

LUBRICATION AND MAINTENANCE

1. Put grease to the machine once a week.
2. Control the level of lubricates in reductors once a week.
3. Change the lubricate of reductors twice a year.
4. Control the lubricate of speed variator each week.
5. Control the lubricate of sledges of the bridge and table once a week.
6. Change the lubricate of sledges of the bridge once a year.
7. Control the lubricate of hydraulic tube each week.
8. Control the lubricate of pneumatic system each week.

MANGAN GRANITE & MARBLE INC.

INSTRUCTION FOR SIMEC 6/20 POLISHING MACHINE

INSTRUCTION NO	5
NUMBER OF PAGE	4

PREPARED BY

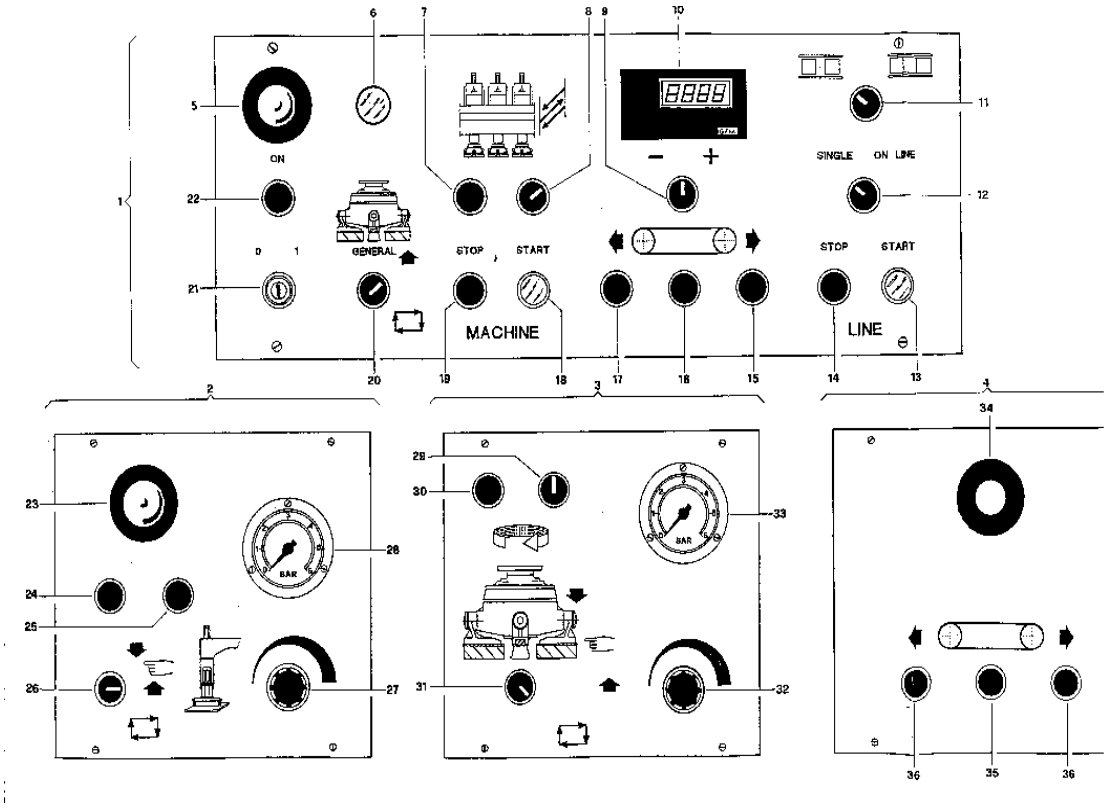
MESUT AKANER

NUMBER OF CHANGE	DEFINITION	DATE OF CHANGE
0	Original	12.6.2003
1		
2		
3		
4		
5		

CONTROLS

1. Machinery Control Panel
2. Machinery Exit Control Panel,
3. Polishing Heads Control Panel
4. Belt Control Panel
5. Emergency Button
6. Signal Lamp
7. Stop Button
8. 2 Way Selection Switch
9. Speed Switch
10. Speed Indicator
11. 2 Way Usage Switch
12. Individual/With Line Working Selection Switch
13. Line Starting Button
14. Line Stopping Button
15. Belt Forward Button
16. Belt Stopping Button
17. Belt Backward Button
18. Machine Starting Button
19. Machine Stopping Button
20. Head Starting/Stopping 2 Way Switch
21. Lock
22. Machinery Opening Button
23. Emergency Stop Button
24. Belt Stopping Button
25. Belt Moving Button
26. 2 Way Switch
27. Air Pressure Adjustment Switch
28. Manometer
29. Head Starting Button

30. Head Stopping Button
31. Head Leveling Switch



STARTING THE MACHINE

1. Press ON Button
2. Start the heads
3. Start the machinery
4. Adjust the speed
5. Adjust the switch
6. Press the line on button for working with line
7. Adjust the pressure of each head
8. If polishing quality is excessive increase the speed and decrease the head pressure
9. Put the proper abrasives to the heads according to the table given below

ABRASIVE-PRESSURE TABLES

1	2	3	4	5	6		
24V	24	30	30	30	46		
24V	24	24	30	30	30		
2BAR	**2BAR**	**2BAR**	**2BAR**	**2BAR**	**2BAR**	**MAX. 2,5 BAR**	

1	2	3	4	5	6	7	8	9	10
46	60	60	120	120	180	180	220	220	320
46	46	60	60	120	180	180	220	220	320
2BAR	**2BAR**	**2BAR**	**2BAR**	**2BAR**	**2BAR**	**2BAR**	**2BAR**	**2BAR**	**2BAR**
11	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**
320	400	6	800	800	1200	LUX	LUX	LUX	LUX
320	400	6	800	800	1200	LUX	LUX	LUX	LUX
2BAR	**2BAR**	**2BAR**	**2BAR**	**2BAR**	**2BAR**	**3BAR**	**3BAR**	**3BAR**	**3BAR**

LUBRICATION AND MAINTENANCE

1. Put grease to the machine once a week.
2. Control the level of lubricates in reductors.
3. Change the lubricate of reductors once a year.
4. Control the lubricate of variator.
5. Change the lubricate of variator once a year.
6. Control the lubricate of sledges of the bridge once a week.
7. Change the lubricate of sledges of the bridge once a year.

MANGAN GRANITE & MARBLE INC.

INSTRUCTION FOR SIMEC SIDE POLISHING MACHINE

INSTRUCTION NO	4
NUMBER OF PAGE	3

PREPARED BY

MESUT AKANER

NUMBER OF CHANGE	DEFINITION	DATE OF CHANGE
0	Original	12.6.2003
1		
2		
3		
4		
5		

CONTROLS

1. Emergency Stop Button
2. Warning Lamp
3. 2 Way Selection Switch
4. Start Button
5. Start Button
6. 3 Way Selection Switch
7. 2 Way Selection Switch
8. Speed Indicator
9. Stop Button
10. Start Button
11. 2 Way Selection Switch
12. 3 Way Width Adjustment Switch
13. Digital Width Reader
14. Main Control Panel
15. Side Calibration And Beveling Panel
16. Stop Switches
17. 3 Way Selection Switch
18. 3 Way Selection Switch
19. Manometer
20. Pressure Counter
21. Pressure Control Unit

WORK INSTRUCTIONS

1. Open the machine by Power on button
2. Adjust the width by means of switch and digital indicator
3. start the heads for beveling, side calibration or both
4. start the machine
5. press the line start button if the system works with the line
6. Adjust the speed
7. adjust the beveling depth by adjusting the pressures of the heads

LUBRICATION AND MAINTENANCE

1. If the machinery is not used for a month lubricate all the parts.
2. If the machinery is not used more than a month remove all the lubricates from the machine.
3. Before lubricate alteration and after removing the lubricate wash the machine.
4. Remove the lubricate when it is warm to increase fluidity of it.
5. While removing the lubricate some of it may be left in the machine therefore start the machine for five minutes and remove the remaining lubricate.

MANGAN GRANITE & MARBLE INC.

INSTRUCTION FOR SCAPEZZATRICE SMZ 200 S

INSTRUCTION NO	7
NUMBER OF PAGE	3

PREPARED BY

MESUT AKANER

NUMBER OF CHANGE	DEFINITION	DATE OF CHANGE
0	Original	12.6.2003
1		
2		
3		
4		
5		

BEFORE STARTING

- ✓ Tie the feeding padlock to the fixed lined (14 mm) network. Control whether pressure is in between 6 and 10 bars.
- ✓ Keeping the manometer pressure below 6 bar adjust the pressure coming the regulator apply this procedure for the other regulator keeping the pressure below 2 bars in the manometer.
- ✓ Put the plug of the control panel to the grounded socket. The network voltage and control panel voltage have to be the same with a value of in between 220-380V. If the voltage value is not within these values make adjustments by means of transformator.
- ✓ Make the connection between the machinery and the control panel.

STARTING PROCEDURE

- ✓ Turn the main switch to position 1 and selector to position 'out hammer' then do the followings:
    1. Adjust the slope of the puller,
    2. Put the wedge,
    3. Arrange the returning material.
- ✓ Adjust the machinery according to the properties of the material.
- ✓ Position the selector to 'single cycle' and press speed button.
- ✓ Adjust the stroke.
- ✓ Be sure that the stroke value is selected as minimum.
- ✓ Check whether the belt fits to the width of the puller.

The following data changes with respect to the properties of the material.

- ✓ Put the selector to 'continuous cycle' position and start working.
- ✓ Pause Time holder adjusts the speed of two successive works and this depends on the working capacity of the operator.

ADJUSTMENT OF PULLER AND IT'S SLOPE

- ✓ Two screws are loosened and the arm locating at the middle is turned to get the required slope then the screws are re-tightened.
- ✓ For an ordinary work the most proper marble dimensions are : width:10cm and thickness:3cm.

ADJUSTMENT OF WEDGE

- ✓ Put the marble slab into the belt and loosen the wedge by unscrewing and push the wedge through the screw.
- ✓ Check the width of the slab.
- ✓ If the marble slab is in the limit dimensions (8 or 20 cm); remove all the hammers and loosen all the screws.

ADJUSTMENT OF THE AMOUNT OF RETURNED MATERIAL

- ✓ To adjust the amount of material taken back from the hammer, the screws of the corner supports are loosened and valve moved.
- ✓ To prevent the cracks on the marble surface, the amount of material taken should be kept at minimum.

MAINTENANCE

- Remove all the air in the tank by means of both of the dischargers at the end of the shift.
- Put antifreeze to the lubricator in winters.
- Lubricate the machine with grease once a month.
    1. Above the cylindrical hammer
    2. Above the drum support belt
    3. Moving drum and connection rope
- Control the weariness of the connections once a month and change them if required.
- Control the screws frequently

MANGAN GRANITE & MARBLE INC.

INSTRUCTION FOR EDGE BEVELLING MACHINE

INSTRUCTION NO	8
NUMBER OF PAGE	3

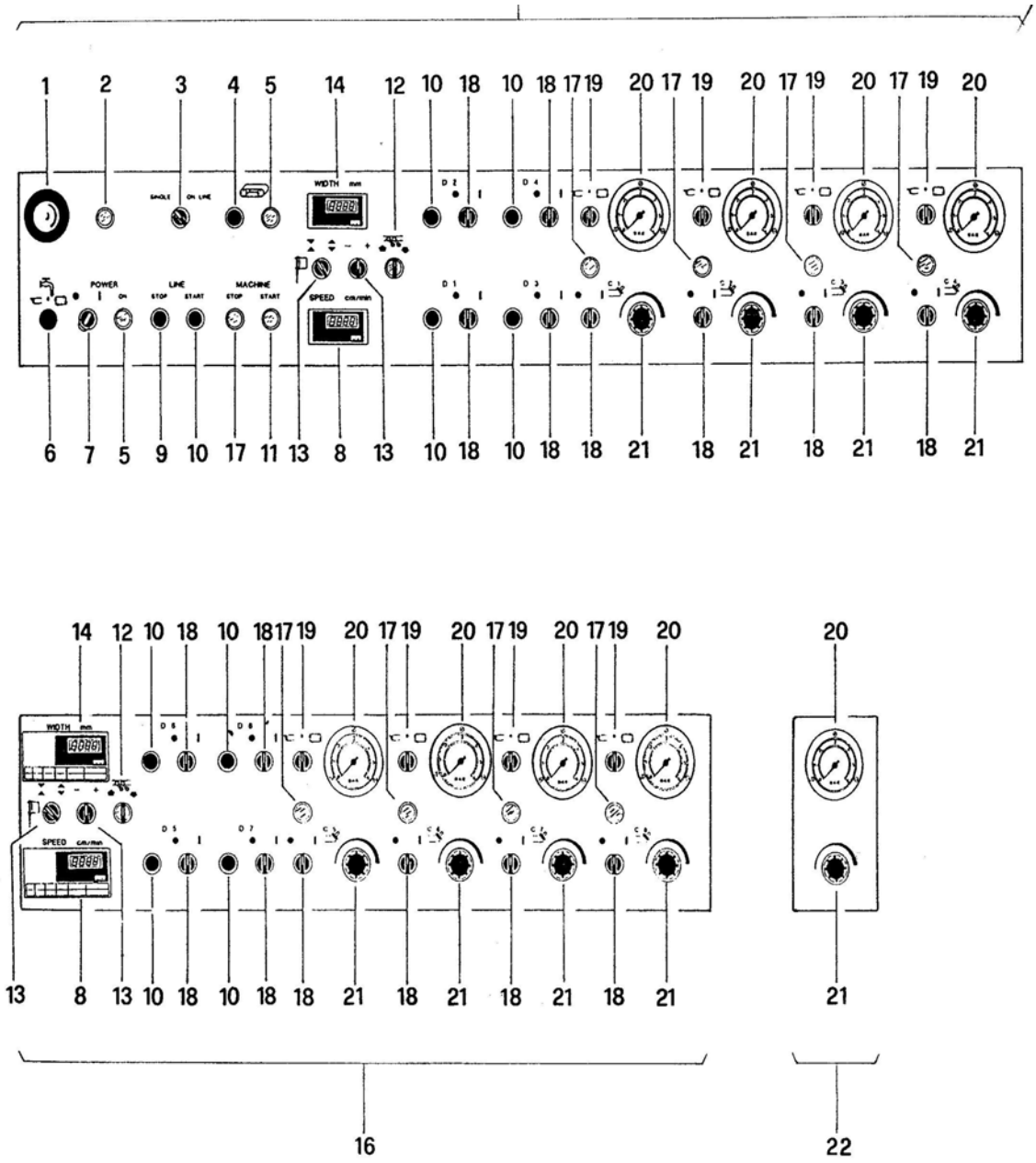
PREPARED BY

MESUT AKANER

NUMBER OF CHANGE	DEFINITION	DATE OF CHANGE
0	Original	12.6.2003
1		
2		
3		
4		
5		

CONTROLS

1. Emergency Stop Button
2. Warning Lamp
3. 2 Way Selection Switch
4. Start Button
5. Start Button
6. 3 Way Selection Switch
7. 2 Way Selection Switch
8. Speed Indicator
9. Stop Button
10. Start Button
11. 2 Way Selection Switch
12. 3 Way Width Adjustment Switch
13. Digital Width Reader
14. Main Control Panel
15. Side Calibration And Beveling Panel
16. Stop Switches
17. 3 Way Selection Switch
18. 3 Way Selection Switch
19. Manometer
20. Pressure Counter
21. Pressure Control Unit



USAGE INSTRUCTIONS

1. open the machine by Power on button
2. adjust the width by means of switch and digital indicator
3. start the heads for beveling, side calibration or both
4. start the machine
5. press the line start button if the system works with the line

6. adjust the speed
7. adjust the beveling depth by adjusting the pressures of the heads

MAINTENANCE INSTRUCTIONS

1. If the machinery is not used for a month lubricate all the parts.
2. If the machinery is not used more than a month remove all the lubricates from the machine.
3. Before lubricate alteration and after removing the lubricate wash the machine.
4. Remove the lubricate when it is warm to increase fluidity of it.
5. While removing the lubricate some of it may be left in the machine therefore start the machine for five minutes and remove the remaining lubricate.

MANGAN GRANITE & MARBLE INC.

INSTRUCTION FOR SIMEC BRIDGE CUTTER

INSTRUCTION NO	9
NUMBER OF PAGE	4

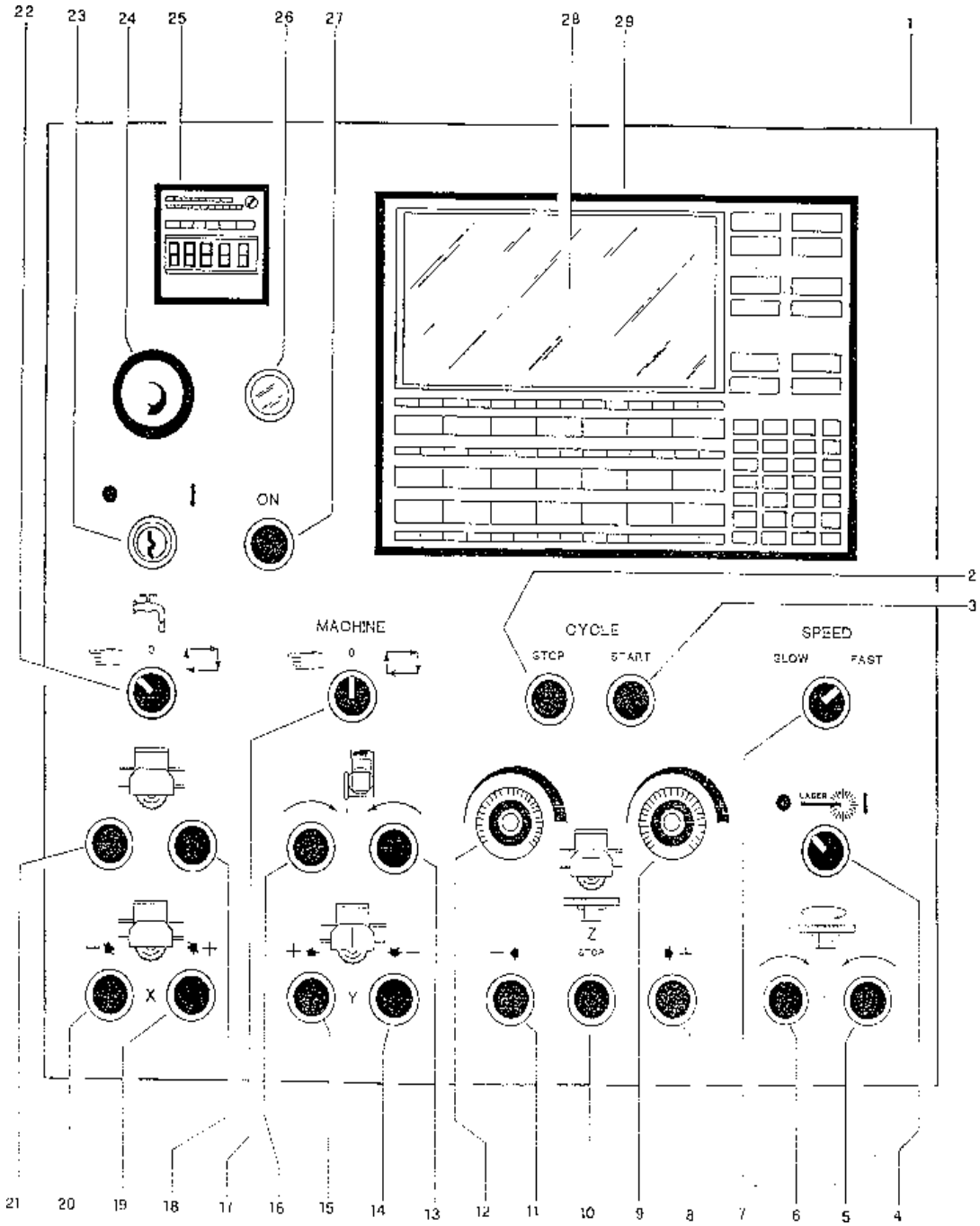
PREPARED BY

MESUT AKANER

NUMBER OF CHANGE	DEFINITION	DATE OF CHANGE
0	Original	12.6.2003
1		
2		
3		
4		
5		

CONTROLS

1. Command Panel,
2. On-Line Stop Button,
3. On-Line Start Button,
4. Laser Start Stop,
5. Table Rotation Button,
6. Fast-Slow Adjustment Switch,
7. Cutting Head Forward Button,
8. Cutting Speed Adjustment Switch,
9. Cutting Stop Button,
10. Cutting Head Backward Button,
11. Cutting Head Angle Adjustment Button,
12. Cutting Head Down Button,
13. Cutting Head Up Button,
14. 3 Way Automatic – Manual Selection Button,
15. Disc Stop Button,
16. Bridge Forward Button,
17. Bridge Backward Button,
18. Disc Start Button,
19. Machinery Start Switch,
20. Emergency Stop Button,
21. Ampermeter,
22. Pilot Lamp
23. Machinery Start Button,
24. Screen,
25. Program Unit.


22
23
24
25
26
27
28
29
1
ON
2
3
MACHINE
CYCLE
STOP
START
SPEED
SLOW
FAST
X
Y
Z
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4

MANUAL CUTTING

1. Switch on the arm at the electric panel.
2. press power on button.
3. locate the plate to be cut.
4. turn the switch to man position.
5. pres the disc start button.
6. open the water of the discs.
7. enter the dimensions of cutting.
8. take down the cutting head to the level of the table.
9. start cutting by pressing the button 8 and adjust the speed.
10. If the plate thickness is high cut the plate in two level.
11. Take back the head at the end of the cut by pressing button 11.
12. position the switch 17 to the automatic and press button 14 to provide the entered width.
13. After completing the cutting the machine will automatically stop.
14. To turn the plate use button 5 and 6.
15. for angled cutting use button 13 and 16.

LUBRICATION AND MAINTENANCE

1. Put grease to the machine once a week.
2. Control the level of lubricates in reductors once a week.
3. Change the lubricate of reductors once a year.
4. Control the lubricate of sledges of the bridge once a month.
5. Change the lubricate of sledges of the bridge once a year.
6. control the hydraulic lubricate four times a year
7. change the hydraulic lubricate once a year
8. Control the lubricate of gears of the cutting head four times a year.

MAINTENANCE INSTRUCTIONS

1. If the machinery is not used for a month lubricate all the parts.
2. If the machinery is not used more than a month remove all the lubricates
3. Before lubricate alteration and after removing the lubricate wash the machine.
4. Remove the lubricate when it is warm to increase fluidity of it.

MANGAN GRANITE & MARBLE INC.

INSTRUCTION FOR SIMEC HEAD CUTTER

INSTRUCTION NO	10
NUMBER OF PAGE	3

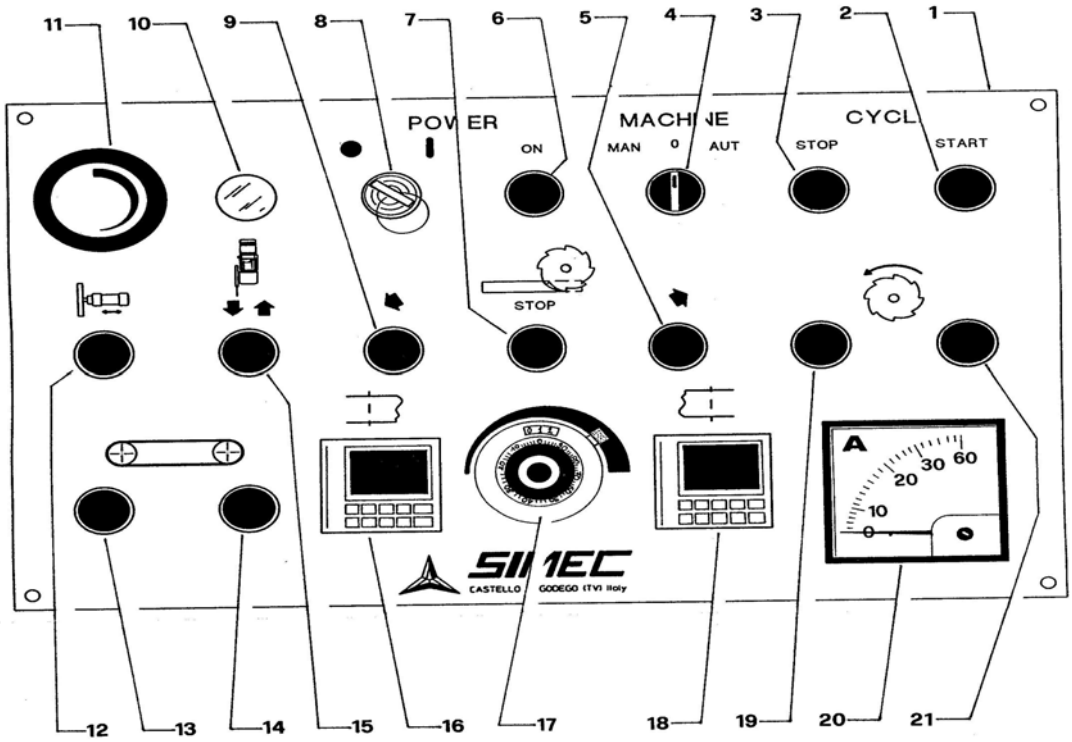
PREPARED BY

MESUT AKANER

NUMBER OF CHANGE	DEFINITION	DATE OF CHANGE
0	Original	12.6.2003
1		
2		
3		
4		
5		

CONTROLS

1. Command Panel
2. On-Line Process Starting Button
3. On-Line Process Stopping Button
4. 3 Way Automatic –Manual Selection Button
5. Cutting Button
6. Machine Starting Button
7. Cutting Stopping Button
8. Cutting Head Return Button
9. Pilot Lamp
10. Emergency Stop Button
11. Pusher Start/Stop Button
12. Belt Forward Move Button
13. Belt Backward Move Button
14. Head Down/Up Button
15. Head Top-Down Button
16. Digital Counter
17. Cutting Speed Adjustment Switch
18. Digital Counter
19. Disc Start Button
20. Ampermeter
21. Disc Stop Button



MANUAL CUTTING

1. Turn the start/open arm to the position 1
2. Be sure that no warning lamp is lighted
3. Check the machine for remaining parts of previous products.
4. press power on button and start the machine
5. press the man button
6. press the start cycle button
7. open the water of the disc
8. start the manual cutting by control keys

AUTOMATED CUTTING

1. Turn machine switch to “aut”
2. press start cycle button
3. open the water of the disc

4. adjust the switches according to the plate heads
5. adjust the digital counter to intersect both of the edges of the plate
6. to pause the cutting work press cycle stop button and than press start cycle button to restart the cutting process

LUBRICATION AND MAINTENANCE

1. Put grease to the machine once a week
2. Control the level of lubricates in reductors once a week.
3. Change the lubricate of reductors twice a year.
4. Control the lubricate of sledges of the bridge once a month.
5. Change the lubricate of sledges of the bridge twice a year.
6. Control the lubricate of cutting head of the bridge four times a year.

MAINTENANCE INSTRUCTIONS

1. If the machinery is not used for a month lubricate all the parts.
2. If the machinery is not used more than a month remove all the lubricates from the machine.
3. Before lubricate alteration and after removing the lubricate wash the machine.
4. Remove the lubricate when it is warm to increase fluidity of it.

MANGAN GRANITE & MARBLE INC.

INSTRUCTION FOR FAN AND BRUSHING MACHINE

INSTRUCTION NO	11
NUMBER OF PAGE	3

PREPARED BY

MESUT AKANER

NUMBER OF CHANGE	DEFINITION	DATE OF CHANGE
0	Original	12.6.2003
1		
2		
3		
4		
5		

CONTROLS

1. Electric Start/Stop Switch
2. Machinery Start Button
3. Machinery Start/Stop Switch
4. Machinery Start Lamp
5. Emergency Stop Button
6. Bottom Fan Start Button
7. Bottom Fan Stop Button
8. Belt Stop Button
9. Top Fan Stop Button
10. Belt Movement Button
11. Top Fan Start Button
12. First Brush Start Button
13. Second Brush Start Button
14. Line Start Button
15. Top Fan Stop Button
16. Line Stop Button
17. Second Brush Stop Button
18. First Brush Stop Button
19. 2 Way Process Selection Switch

WORK INSTRUCTIONS

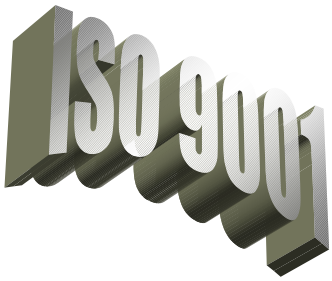
1. Turn on the switch 1
2. Turn the switch 3 to “I”
3. Press the Start button 2
4. Select process type from switches 22 and 23
5. Start the fans and brushes to be worked
6. Press the button 10 to move the belt

LUBRICATION AND MAINTENANCE

1. Put grease to the machine once a week.
2. Control the level of lubricates in reductors once a week.
3. Change the lubricate of reductors twice a year.
4. Control the lubricate of speed variator each week.

A.4 QUALITY SYSTEM FORMS

MANGAN GRANITE & MARBLE INC.



QUALITY SYSTEM FORMS

SUPPLIER LIST

SUPPLIERS OF DIAMOND DISCS AND ITS PRODUCTS

POLMAK MAKİNA SANAYİ A.Ş.

SONMAK A.Ş.

DBC MAKİNA SANAYİ TİC. LTD. ŞTİ.

TOPAŞ A.Ş.

GÜÇLÜ SOKET SAN. TİC. LTD. ŞTİ.

MAKİNA TAKIM A.Ş.

D-L DALCA SAN. TİC. LTD. ŞTİ.

SET MAKİNA TİC. LTD. ŞTİ.

S.E.A. UTENSİLİ DIAMANTATI SpA

DELLAS SpA

VINCENT-TYROLIT SpA

MG SpA

USADI SpA

ABRASIVE SUPPLIERS

VEGA ABRASIV

LUNA ABRASIVI

SOLGA ABRASIVI

CUTTING AND POLISHING MACHINERY SUPPLIERS

GÜRMAS MAK. SAN.

UĞUR MAKİNA

ES-MAŞ

SİMAŞ

SIMEC SpA

GASPARI MENOTTI

PELLEGRINI

ZONATO

BRETON

PLATE AND BLOCK SUPPLIERS

AFYONLU MERM. GRNT.

E.G.M. GRNT. MERMR.

BOSPORUS

A4

GRANITAŞ

SİLKAR

SEÇKİN NECDET

KARSEL GRANİT MERMER

ASSEMBLY SUPPLIERS

MG MÜHENDİSLİK LTD. ŞTİ.

GÜZELTAŞ MERM.

GRAMER

DESERT STONE

AGAT MAD.

MATERIAL AND HARDWARE SUPPLIERS

TAŞKEN TİCARET

ERKAN MAKİNA

ÇİFTÇİLER

MAK-PARSAN

OPAL AMBALAJ

SERDAROĞLU TEKN. MALZ. LTD.ŞTİ.

ARTI TEKNİK

HALAT TİCARET

YILMAZ KAYIŞ PAZ.

RULTRANS KAYIŞ

	QUALITY CONTROL PLAN FOR THE PURCHASING OF RAW MATERIALS					
PRODUCT NAME	**PROPERTIES TO BE CONTROLLED**	**ACCEPTANCE CRITERIA (TOLERANCE)**	**MEASUREMENT DEVICE**	**SAMPLING FREQ.**	**RECORD**	**RESPON. PERSON**
BLOCK	DIMENSION	ACCORDING TO THE ORDER	METER	ALL	BLOCK ENTRANCE REPORT	SUPPORT ENGINEER
	FRACTURE	NO	VISUAL INSPECTION			
	VEIN	PERMISSIBLE IN THE CUTTING DIRECTORY	VISUAL INSPECTION			
	SHAPE	THE DIFFERENCE BETWEEN THE DIMENSIONS OF THE SURFACES MUST BE LESS THAN %15	METER			
	CORROSION	NO	VISUAL INSPECTION			
PLATE	DIMENSION	SIPARIŞE GORE, MAXIMUM 350X150 MİNİMUM 120X120	METER	ALL	PLATE ENTRANCE REPORT	SUPPORT ENGINEER
	FRACTURE	SHOULD PERMIT CUTTING ACCORDING TO THE ORDER	VISUAL INSPECTION			
	VEIN	SHOULD PERMIT CUTTING ACCORDING TO THE ORDER	VISUAL INSPECTION			
	SHAPE	THE DIFFERENCE BETWEEN THE EDGES MUST BE LESS THAN %5	METER			
	CORROSION	NO	VISUAL INSPECTION			
Prepared By			**Approved By**		**Publication Date**	11.02.2002

SALES FROM PLANT FORM

PURCHASER:			
ORDER DATE:			
COMPLETE DATE:			
PAYMENT TYPE:			
ORDER NO:			

PRODUCT

PRODUCT TYPE	THICKNESS (cm)	WIDTH (cm)	LENGTH (cm)	SURFACE PROCESS	EDGE PROCESS	UNIT PRICE	TOTAL PRICE
						TOTALPRICE:	

ORDER APPROVAL

	RETURN AND CHANGE FORM			INPUT INSPECTION Report No:	
NAME OF THE MATERIAL SUPPLIER:				Bill/Waybill No:	
				Bill/Waybill Date:	
				Report Date:	
Name and Description of the Product	QUANTITIES				
	Demanded	Received	Rejected	Returned	Changed

Inspection Official

Plant Manager

WAREHOUSE DEMAND FORM

Date: .....
No: .....

Line No.	NAME AND DIMENSION OF MATERIAL	UNIT	QUANTITY	USAGE AREA / CUSTOMER NAME	EXPLANATIONS

NAME AND SURNAME OF DEMAND OWNER:	
DEPARTMENT:	
DEPARTMENT AUTHORIZED SIGNITURE:	
WAREHOUSE ACCOUNTABLE:	

INVENTORY LIST

MANGAN MARBLE & GRANITE **Date:**

Inventory No	Equipment Name	Mark	Type	Equipment Serial No	Dmensions	Division	Usage Tolerance	Usage Department
01	Elektronic Compass	Mitutoyo	Bolted	111	0-150 mm	0,01 mm	0,01 mm	Plant
02	Manual Compass	Mitutoyo	Bolted	504706	0-150 mm	0,01 mm	0,01 mm	Plant
03	Meter	Fisco	Strip	3	0-2 m	1 mm	1 mm	Plant
04	Meter	Fisco	Strip	4	0-2 m	1 mm	1 mm	Plant
05	Meter	Fisco	Strip	5	0-2 m	1 mm	1 mm	Plant
06	Meter	Fisco	Strip	6	0-2 m	1 mm	1 mm	Plant
07	Meter	Fisco	Strip	7	0-2 m	1 mm	1 mm	Plant
08	Meter	Fisco	Strip	8	0-2 m	1 mm	1 mm	Plant
09	Meter	Fisco	Strip	9	0-2 m	1 mm	1 mm	Plant
10	Meter	Fisco	Strip	10	0-2 m	1 mm	1 mm	Plant
11	Meter	Fisco	Strip	11	0-2 m	1 mm	1 mm	Plant
12	Meter	Fisco	Strip	12	0-2 m	1 mm	1 mm	Plant

Prepared By
Plant Manager

Approval
Quality Manager

A.5 OBJECTIVE PLANNING, PROCESS DEFINITION COMPETENCY SAMPLES

MANGAN	PURCHASING PROCESS DEFINITION			
Prep. by	Appr.	Validity Date	Revision	Page No.
			00	1 / 7

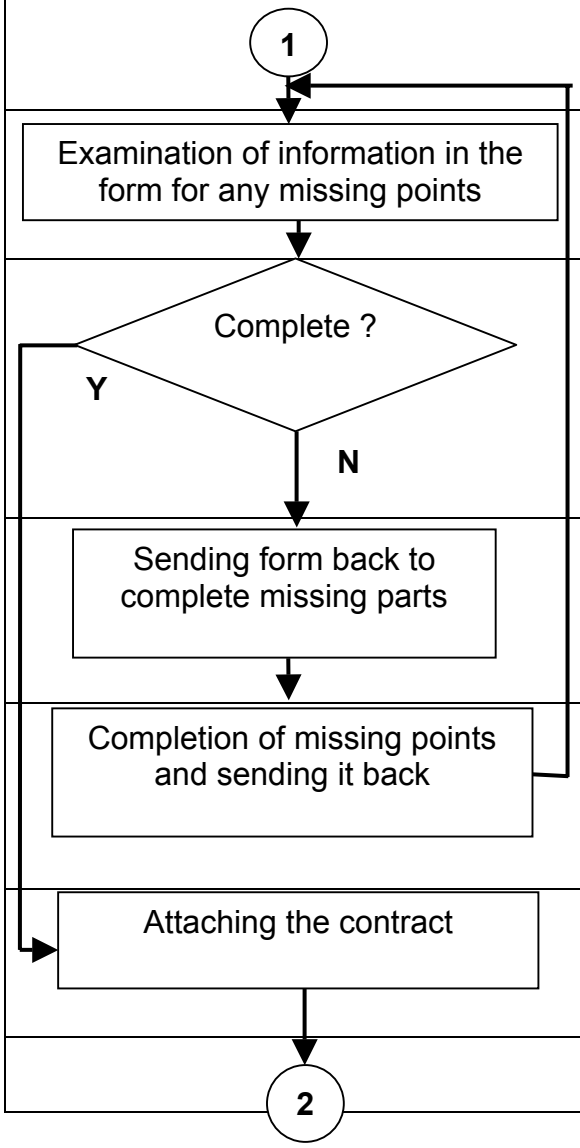
1- REFERENCES

TS-EN-ISO 9001:2000 Qaulity Management Systems-
Specifications 7.4- Purchasing

2- WORK FLOW DIAGRAM

Process steps	Resp.	Document
Start		
Determination of purchasing needs	Who needs	Order form
Asking the availablitity of the needed material in stocks	Who needs	
Filling the order form	Who needs	
Approval of order form	General Director	
Sending form to sales manager	General Director	
1		

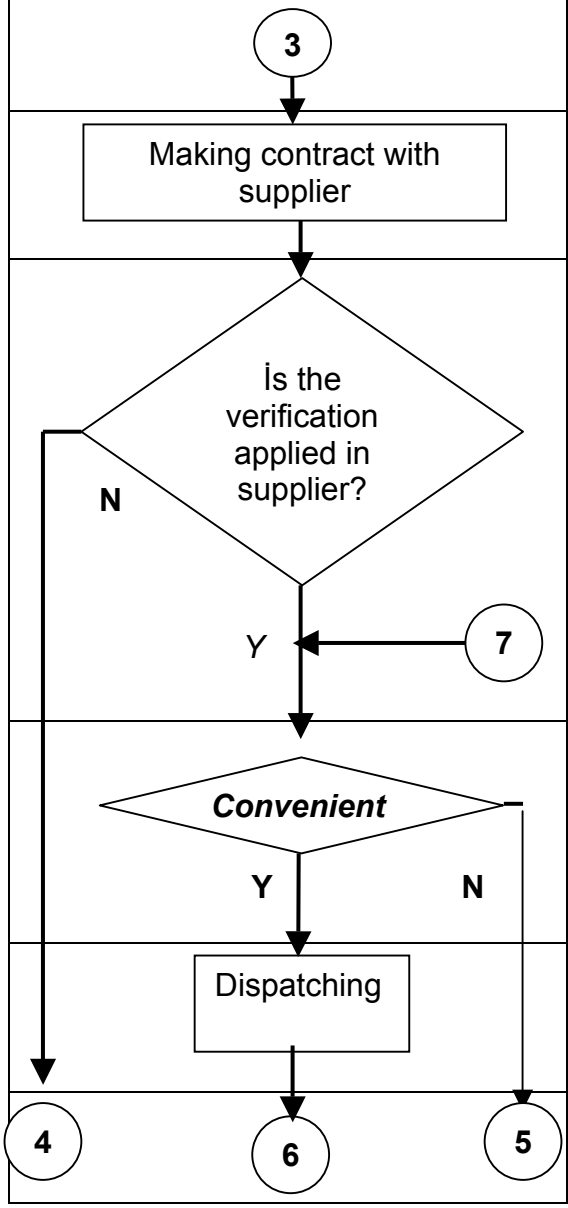
MANGAN	PURCHASING PROCESS DEFINITION	
Validity Date	Revision 00	Page No. 2 / 7

Process Steps	Resp.	Document
	Sales Manager Sales Manager Sales Manager Who needs Sales Manager	Material, Equipment andservice contract

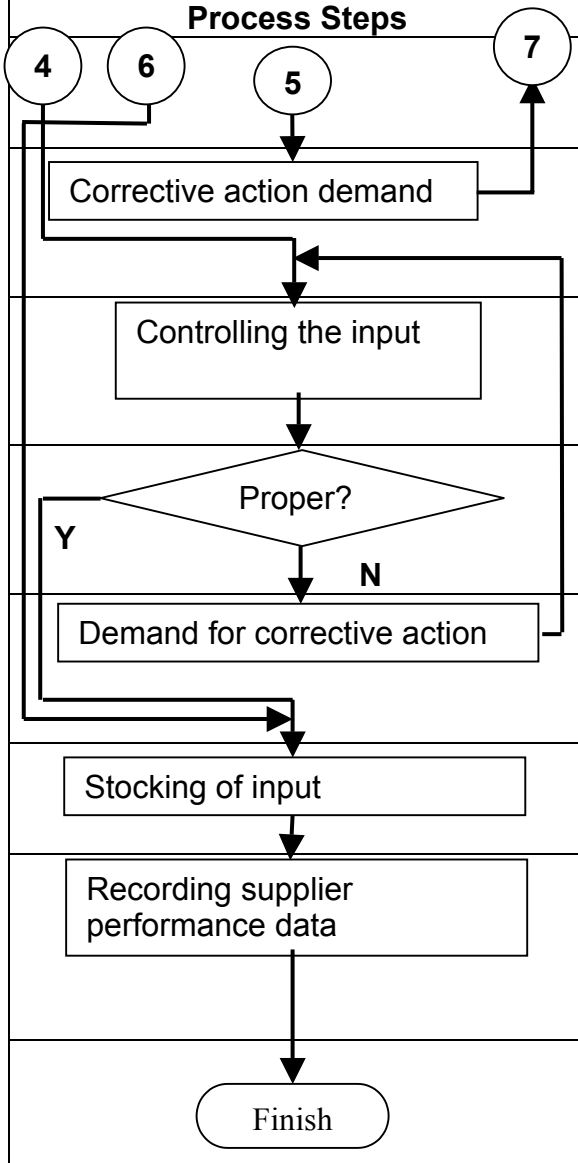
MANGAN	PURCHASING PROCESS DEFINITION	
Validity Date	Revision 00	Page No. 3 / 7

Process Steps	Resp.	Document
2		
Selection of supplier from approved supplier list	Sales Manager	Approved Supplier List
Sending purchasing form and contract to supplier	Sales Manager	
Sending a proposal by supplier	Supplier	Proposal
Evaluation of proposal	Purchasing production and quality managers	
Appropriate to provision (Y / N)	Purchasing production and quality managers	
Informing supplier	Sales Manager	İnformation document
3		

MANGAN	PURCHASING PROCESS DEFINITION	
Validity Date	Revision 00	Page No. 4 / 7

Process Steps	Resp.	Document
	Sales Manager Sales and Quality Managers Supplier	Contract İnput quality control form İnvoice, waybill

MANGAN	PURCHASING PROCESS DEFINITION	
Validity Date	Revision 00	Page No. 5 / 7

Process Steps	Resp.	Document
	Sales Manager Quality Manager Sales Manager store Sales Manager	Corrective action demand form Input Control Form Stocking card Supplier evaluation card

3- INPUTS

- Order form
- Material, equipment and service purchasing contracts
- Proposals of suppliers
- Approved supplier list

4- OUTPUTS

- Contract
- Input quality control form
- Demand for corrective action
- Stock card
- Supplier performance evaluation card

5- PROCESS OWNER

Enterprise Manager

6- PROCESS ACCOUNTABLE

Sales Manager

7- PROCESS TEAM

Sales and purchasing accountables

8- PROCESS PERFORMANCE CRITERIA

Total time period of process
Appropriateness of procure times of inputs
Intime obtained input amount / total input amount
Number of rejected orders / total orders
Defect rate of inputs
Input cost / total cost
Number of Suppliers
Number of corrective actions

MANGAN	PURCHASING PROCESS DEFINITION	
Validity Date	Revision	Page No.
	00	7 / 7

9- PROCESS CUSTOMERS

- Persone who has a need
- Suppliers
- Warehouse
- Financial departments

10-PROCESS SUPPLIERS

- Suppliers of the approved list
- Who needs

(Bozkurt, 2003).

QUALITY OBJECTIVE PLANNING

1- Aim and objective: Increasing the on time delivery rate from 87% to 95%.

2- Strategy: Improving the delivery process to provide on time delivery.

3- Coordinator: Sales Manager

4- Action Plan:

4.1- Examining the existing condition of delivery process

4.2- Determination of data collecting plan

4.3- Determination of deviations from submission (delivery) dates

4.4- Determination of the reasons from deviations

4.5- Providing precautions and taking them into action

4.6- Implementation of the data collecting plan to examine the new condition

4.7- Evaluation of data and comparing with objective values

4.8- Standardization of the work if the objectives are satisfied

4.9- Repeating the steps starting from 4 if the objectives are not satisfied

5- Time Period: 6 month

6- Product: A new work flow diagram without any delivery time obstacle (Bozkurt, 2003).

COMPETENCY FOR GENERAL DIRECTOR

- **Influence:** Providing respect, assuring the personnel about the existence of their job when they obey the general principles of the company and use whole of their abilities and knowledge.
- **Success Focus:** Feeling the opportunities for improving, changing and renewing and using these opportunities in time.
- **Team Work and Cooperation:** Providing a working environment that encourages team work and awarding the teams.
- **Analytical Thinking:** Predicting the obstacles, providing solutions and applying these solutions.
- **Initiative Power:** Having ability to select the best alternative for the solution of a problem.

- **Improving others:** Determining the training needs of the others and providing them required trainings
- **Self Confidence:** Having self confidence
- **Leadership:** Determining the objectives of the company and motivating the personnel regarding the objectives, determining vision, mission and values and informing the personnel about them.
- **Information Search:** Searching improvements and changes in politics, economy and technology from different resources (Bozkurt, 2003).

B. OHSAS 18001 APPLICATION IN MANGAN MARBLE & GRANITE INC.

B.1 MANGAN MARBLE & GRANITE INC. OHSAS 18001 SYSTEM DESCRIPTION

MANGAN GRANITE & MARBLE INC.

OHSAS 18001

SYSTEM SPECIFICATIONS

TABLE OF CONTENTS

INTRODUCTION AND PURPOSE

This document describes the basis of the Mangan Marble & Granite Inc. OHSAS 18001 System. The aim of this document is to control and guarantee the occupational health and safety of the personnel working in any level of the company and to control and eliminate the health and safety risks of the properties products and environment. This document does not cover the operational procedures and work instructions of the company applied as a part of the OHSAS 18001 System.

The purpose of the document is:

- To Establish a system that eliminates and controls the risk for
    - employees and others exposing to risks associated with activities, products and services
    - properties of MANGAN
    - the environment
    - MANGAN business and image.
- To implement, maintain and continually improve the MANGAN OHSAS 18001 System.
- To guarantee and demonstrate the conformance of the MANGAN occupational health and safety policy.

The requirements given in this document are incorporated into the all departments of the Mangan Marble & Granite Inc. Details of the system application are given in the related documents.

TERMS AND DEFINITIONS

For the purposes of this and related documents the following terms and definitions apply:

Accident

An undesired event giving rise to death, ill health, injury, damage or other (business) loss.

Assessment

The periodic evaluation of activities being carried in comparison to those contained in the of the standing plans that form part of the Mangan Marble & Granite Inc. OHSAS 18001 System.

Audit

A systematic examination to determine whether activities and related results conform to planned arrangements and whether these arrangements are implemented effectively and are suitable for achieving the policy and objectives of MANGAN Company.

Continuous Improvement

The process of enhancing the MANGAN OH&S system, to achieve improvements in overall occupational health and safety performances, in line with the MANGAN OH&S policy.

Hazard

A source or situation with a potential for harm in terms of human injury or ill health, damage to property, damage to the (workplace) environment, loss of business objectives or a combination of these.

Hazard Identification

The process of recognizing that a hazard exists and defining its characteristics.

Incident

An undesired event giving rise to an accident or that has the potential to lead to an accident.

Interested Parties

The individual or group concerned with or affected by the OH&S performance of MANGAN.

Management Programs

The identified and structured management activities making up the MANGAN OH&S Management Manual These programs or elements are ongoing activities with the purpose of eliminating or the risks associated with MANGAN activities. While these programs are part of the larger OH&S system, they are more or less standing alone , each with their own objectives. These programs include the “standing plan” which will remain active during the lifetime of the operation involved.

Non-conformance

Any deviation from work standards, practices, procedures, regulations, management system performance etc. that could either directly or indirectly lead to injury or illness, property damage, damage to the workplace environment, business loss or a combination of these.

Objectives

The broader long term goals, described in terms of overall OH&S performance, that MANGAN has set itself to achieve through implementation of its OH&S management system and related "standing plans".

Occupational Health and Safety

The conditions and factors that affect the well-being of employees, temporary workers, contractor personnel, visitors and any other person in the workplace.

OH&S Management System

Part of the overall management system that allows and assists MANGAN management to control the OH&S risks associated with its business. This includes the organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining MANGAN's OH&S policy.

Performance

The measurable indicators of the OH&S management system related to MANGAN's control of health and safety risks, based on its OH&S policy and objectives

Review

The periodic evaluation of the MANGAN OH&S efforts and results in relation to changing societal, political, industrial and environmental conditions and the obligations – be it voluntary or imposed – that those changes will put on the MANGAN organization.

Risk

The combination of the likelihood and consequence(s) of a specified hazardous event occurring.

Risk assessment

The overall process of estimating the magnitude of risk and deciding whether or not the risk is tolerable.

Safety

The freedom from unacceptable risk of harm.

Single-Use Plan

An identified set of specific activities to arrive at a specific goals or targets, with a determined budget and within a determined time period. Single-use plans are often used to cope with certain problems or to reach specific objectives. While these plans are limited in time and scope, they often contain issues that should be considered for inclusion in the management system to prevent re-occurrence of the same or similar problems or to maintain performance at a desired level.

Standing Plan

An identified set of more generic activities to arrive at broad rather general goals or objectives, not having a specific budget and without a determined time period. Standing plans are used to reach strategic objectives. Rather than being directed at particular issues or problems, these standing plans are intended to both prevent specific issues through risk or (potential) problem identification as well as uncover those at an early stage of development. These plans are not limited in time and will normally exist during the lifetime of the related activity or organization and beyond that as applicable. They will be adapted over time depending on results obtained as well as due to changes in industrial, social, political and environmental conditions.

Target

The specific short term goals, described in terms of specific OH&S performance, that MANGAN has set itself to achieve through implementation of specific OH&S "single-use plans" that are either directed at solving identified problems or at reaching short term performance goals.

Tolerable Risk

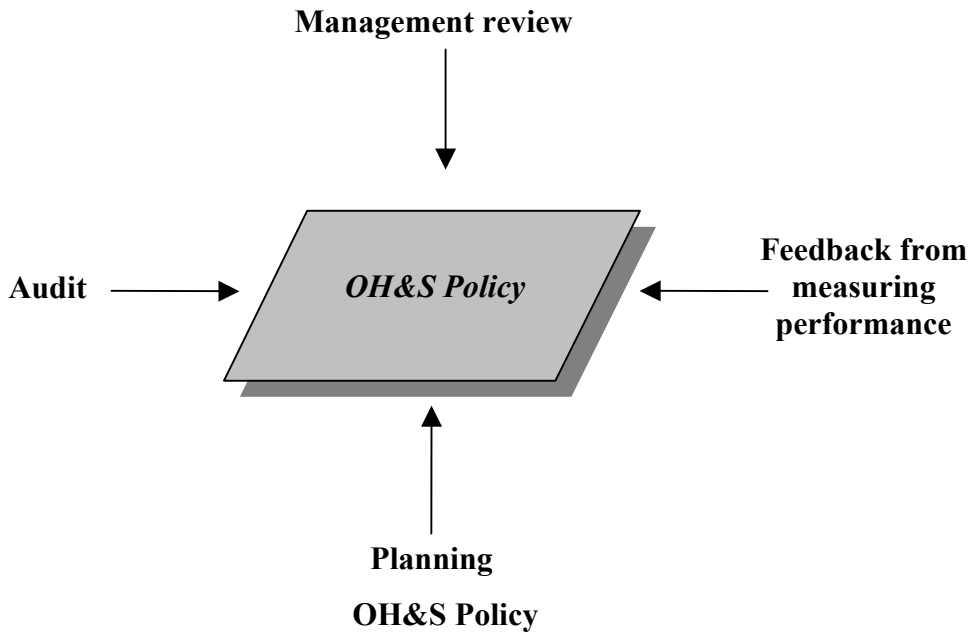
The risk that has been reduced to a level that can be endured by the organization having regard to its legal and societal obligations and its own OH&S policy. Care should be taken as to not have the change of occurrence factor overshadow the potential consequence factor.

OH&S MANAGEMENT SYSTEM ELEMENTS

3.1 General Requirements of The MANGAN Marble & Granite Inc. OHSAS 18001 System

This chapter defines the Mangan Marble & Granite Inc. OHSAS 18001 System Manual. All the elements given in this chapter are being applied as a part of the MANGAN OH&S management system.

3.2. Mangan OH&S Policy



The OH&S policy aims to apply the following company activities: No undue negative OH&S risks will be caused to any party with whom MANGAN has a relation, business or otherwise. Such parties to include employees, clients, shareholders, authorities, neighbors and the public at large.

Ongoing improvement will occur to maintain OH&S performance at a level commensurate with local and international legislation and other requirements to which MANGAN subscribes and with locally and internationally accepted industry practices, The occupational health and safety assessment system is documented and improved continuously. The necessities, aims and benefits of the system are described to all the personnel beside the technical health and safety information related to their job. However, any type of OH&S system document can only be distributed after the control.

Required level of descriptive documents related to the Mangan Marble & Granite Inc. OHSAS 18001 System can be given to the suppliers, customers etc. Certain restrictions on the availability of the information exists where provision of such information may damage the commercial or other interest of MANGAN.

MANGAN MARBLE & GRANITE INC.
OCCUPATIONAL HEALTH AND SAFETY POLICY

The Management of MANGAN considers the safety and health of their employees and other persons and regard for the conservation of the environment as vital issues in conducting their activities. The Management regard Safety, Health and Environmental matters. on a level at least equal to other aspects of business.The management is committed to :

- To provide a safe working area for all of the personnel working under the responsibility of the company
- Promote the health of personnel
- Only the safe and environmentally friendly processes and installations are carried out.
- Only the safe and environmentally friendly raw materials are purchased from the suppliers.
- Only the safe , environmentally friendly and healthy products are produced.
- Comply with all the related occupational health and safety legislations.
- Management practices are carried out regarding the occupational health and safety results.
- Management is responsible for guaranteeing the commitment and participation of all the personnel to the occupational health and safety system.
- Management provides long term occupational health and safety goals

Detailed responsibilities together with appropriate authorities and accountabilities will be assigned to relevant individuals or groups at all levels in the organization.

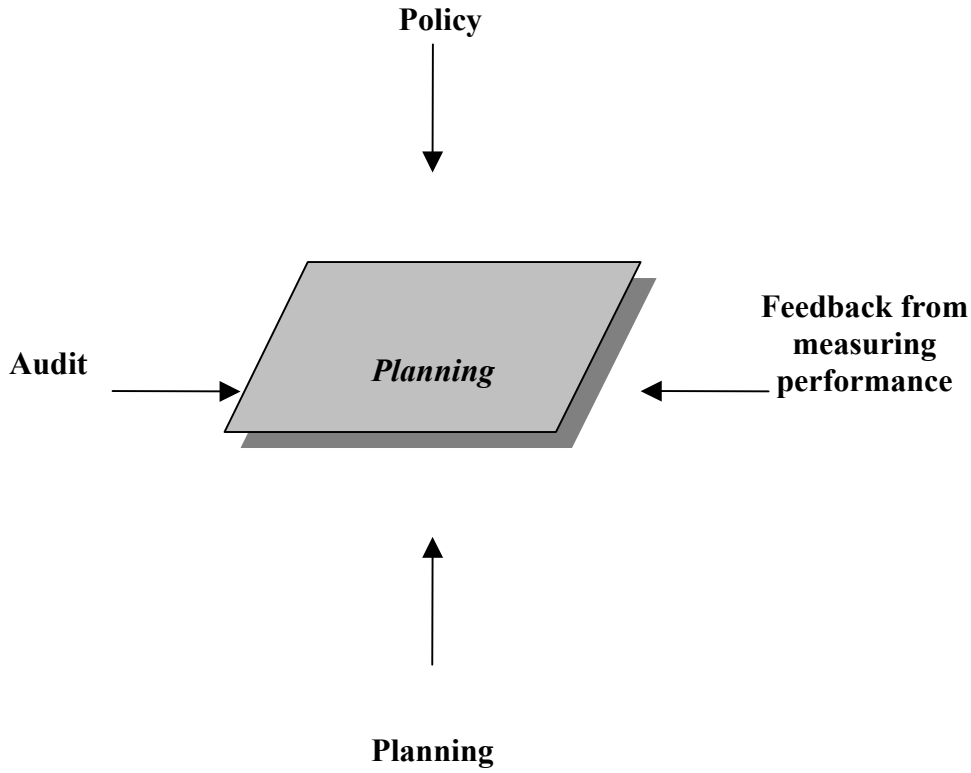
The Management of MANGAN Quality Manager

--- ---

3.3. Mangan Occupational Health and Safety Manual

The main relations between the MANGAN OH&S Policy and the Manual can be found in the following management programs or elements contained in the Manual references

3.4 Planning



3.4.1 Planning for hazard identification, risk assessment and risk control

MANGAN has produced and review the procedures for the identification of hazards, risk assessments, control measurements. These procedures are explained in details in the Occupational health and safety manual. They cover;

- Routine and non-routine activities
- Activities of all personnel

- Facilities at the working area
- Emergency situations

Hazard identification and risk assessment activities include:

- Design, development and construction stages of products, processes, procedures
- Inspection and maintenance of facilities
- Revision of procedures and instructions
- Communication with the employees and taking the idea of them
- Communication with the suppliers and customers and taking the idea of them
- Analysis of unconformities, accidents etc.
- National and international legislations

The hazard and risk assessments processes are carried out by properly qualified and experienced people. Control measurements aim to minimize the risks and risks are kept under tolerable levels.

The results of the hazard and risk assessments and the effects of controls suggested and implemented are considered when setting OH&S objectives.

The main relations between the OH&S Planning for hazard identification, risk assessment and risk control are given in the MANGAN Occupational Health and Safety Manual. This manual includes the standing plan, review of legislation for the minimum requirements, employee training activities, communication activities and improvement facilities etc.

The relations between the MANGAN Legislative and other requirements are given in chapter 3.4.2. and tin the MANGAN Occupational Health and Safety Manual.

3.4.2 Legal and other requirements

As described in the MANGAN Occupational Health and Safety Manual the company has prepared and continuously reviews the process of identification of lagal and other requirements. The results of this porcess is evaluated through the MANGAN and any corrective activen is determined and applied in the company.

3.4.3 Objectives

MANGAN has provided and maintained documented OH&S objectives, at each relevant function and level within its organization. These objectives are measured whenever and wherever applicable and related to both the efforts to obtain the desired objectives as well as the results.

Objectives are set and prioritized by applicable at the company and management annually and these objectives can cover:

- Expanding or dropping the OH&S facility;
- Development of current program facility;

MANGAN considers the legal and other requirements with the OH&S danger and risks as defined through the related processes, its technological options as well as its financial, operational and business requirements, and the views of relevant interested parties, during construction and examination of the objectives. The objectives are coherent with the OH&S policy, covering the commitment to continuous improvement.

3.4.4 OH&S management programs

MANGAN gives a start to the management programs as part of its continuing attempt to succeed, keep and further improve its OH&S objectives. Management programs are pointed out on the following page as part of a process to obtain and keep safe operation in the organization. This process has 4 phases:

- Preparation – the facilities and areas needed to arrange to establish safe operation and construct facilities based on criteria established during preparation phase
- Maintenance – activities and operations at the desired safe operation level
- Improvement – activities, operations and systems in a changing environment

Each program or element explained in the MANGAN Occupational Health and Safety Manual has the documentation for

- The scope and objectives of the system with the supporting activities.
- Requirements of the company to reach the objectives.
- Organizational and other conditions required to the success of the OH&S System.
- Determination of the responsibility and authority distribution through the company.
- Activities to determine the objectives.
- Training facilities.
- Activities related to eliminate the nonconformances.
- Reviewing the responsibilities and authorities periodically.

MANGAN Occupational Health And Safety Manual	Activities to Obtain Level Safe to Operate		
	During system life time		
Elements or programs – the subjects	Prepare	Maintain	Improve
1. Management leadership & culture	♦	♦	♦
2. Risk identification of / legislation concerning:			
2.1. processes	♦		
2.2. products	♦		
2.3. goods / materials	♦		
2.4. installation / workplaces	♦		
2.5. tasks to be carried out	♦		
2.6. personnel (including management and supervision)	♦		
2.7. third party services	♦		
3. External communication	♦	◊	
4. Information & documentation	♦	◊	
5. Obtain (purchase) safe level of:			
5.1. processes	♦	◊	
5.2. products	♦	◊	
5.3. goods / materials	♦	♦	
5.4. installations / workplaces	♦	◊	
5.5. work instructions / procedures	♦	◊	
5.6. personnel	♦	♦	
5.7. third party services	♦	♦	
6. Training	♦	♦	♦
7. Construction and start-up	♦	◊	
8. Inspections and maintenance	◊	♦	
9. Critical task observations	◊	♦	
10. Behavior management	◊	♦	
11. Modification management	◊	♦	
12. Internal communication	◊	♦	
13. Emergency planning and preparedness	◊	♦	
14. Accident / incident investigation & analysis	◊	♦	♦
15. Audits	◊	♦	◊
16. Reviews	◊	◊	♦

These programs and elements are given in details in the MANGAN Occupational Health and Safety Manual. MANGAN Occupational Health and Safety Manual provides the basic content, objectives and the operational structure for whole of the company.

The programs explained in the MANGAN Occupational Health and Safety Manual has the following structure.

1.	Need assessment and management statement
2.	Co-ordination of element activities
3.	Formulation of “standing” plan
	3.1. Review of legislation etc. For minimum requirements
	3.2. Specific activities
	3.3. Employee participation in development/improvement
	3.4. Employee training
	3.5. Employee participation in implementation
	3.6. Communication needs
	3.7. Standing plan assessment (“program audit”)
4.	Review and improvement (“program review”)

OHSAS 18001 management programs are reviewed and improved if necessary each year. According to the improvement decisions corrective actions are taken place.

B.2 MANGAN MARBLE & GRANITE INC. OHSAS 18001 SYSTEM MANUAL

MANGAN GRANITE & MARBLE INC.

OHSAS 18001

SYSTEM MANUAL

TABLE OF CONTENTS

1. SCOPE

This document describes the basis of the Mangan Marble & Granite Inc. OHSAS 18001 System. The aim of this document is to control and guarantee the occupational health and safety of the personnel working in any level of the company and to control and eliminate the health and safety risks of the properties products and environment. This document does not cover the operational procedures and work instructions of the company applied as a part of the OHSAS 18001 System.

The purpose of the document is:

- To Establish a system that eliminates and controls the risk for
    - employees and others exposing to risks associated with activities, products and services
    - properties of MANGAN
    - the environment
    - MANGAN business and image.
- To implement, maintain and continually improve the MANGAN OHSAS 18001 System.
- To guarantee and demonstrate the conformance of the MANGAN occupational health and safety policy.

The requirements given in this document are incorporated into the all departments of the Mangan Marble & Granite Inc. Details of the system application are given in the related documents.

2. REFERENCES

- TS 18001 Occupational Health and Safety Management Systems-Specification
- OHSAS 18002 Occupational Health and Safety Management Systems-Guidelines for the Implementation of OHSAS 18001
- BS 8800 Guide to Occupational Health and Safety Management Systems

3. TERMS AND DEFINITIONS

For the purposes of this and related documents the following terms and definitions apply:

Accident

An undesired event giving rise to death, ill health, injury, damage or other (business) loss

Assessment

The periodic evaluation of activities being carried in comparison to those contained in the of the standing plans that form part of the Mangan Marble & Granite Inc. OHSAS 18001 System.

Audit

A systematic examination to determine whether activities and related results conform to planned arrangements and whether these arrangements are implemented effectively and are suitable for achieving the policy and objectives of MANGAN Company.

Continuous Improvement

The process of enhancing the MANGAN OH&S system, to achieve improvements in overall occupational health and safety performances, in line with the MANGAN OH&S policy.

Hazard

A source or situation with a potential for harm in terms of human injury or ill health, damage to property, damage to the (workplace) environment, loss of business objectives or a combination of these.

Hazard Identification

The process of recognizing that a hazard exists and defining its characteristics.

Incident

An undesired event giving rise to an accident or that has the potential to lead to an accident.

Interested Parties

The individual or group concerned with or affected by the OH&S performance of MANGAN.

Management Programs

The identified and structured management activities making up the MANGAN OH&S Management Manual These programs or elements are ongoing activities with the purpose of eliminating or the risks associated with MANGAN activities. While these programs are part of the larger OH&S system, they are more or less standing alone , each with their own objectives. These programs include the “standing plan” which will remain active during the lifetime of the operation involved.

Non-conformance

Any deviation from work standards, practices, procedures, regulations, management system performance etc. that could either directly or indirectly lead to injury or illness, property damage, damage to the workplace environment, business loss or a combination of these.

Objectives

The broader long term goals, described in terms of overall OH&S performance, that MANGAN has set itself to achieve through implementation of its OH&S management system and related "standing plans".

Occupational Health and Safety

The conditions and factors that affect the well-being of employees, temporary workers, contractor personnel, visitors and any other person in the workplace.

OH&S Management System

Part of the overall management system that allows and assists MANGAN management to control the OH&S risks associated with its business. This includes the organizational structure, planning activities, responsibilities, practices, procedures, processes and resources for developing, implementing, achieving, reviewing and maintaining MANGAN's OH&S policy.

Performance

The measurable indicators of the OH&S management system related to MANGAN's control of health and safety risks, based on its OH&S policy and objectives

Review

The periodic evaluation of the MANGAN OH&S efforts and results in relation to changing societal, political, industrial and environmental conditions and the obligations – be it voluntary or imposed – that those changes will put on the MANGAN organization.

Risk

The combination of the likelihood and consequence(s) of a specified hazardous event occurring.

Risk assessment

The overall process of estimating the magnitude of risk and deciding whether or not the risk is tolerable.

Safety

The freedom from unacceptable risk of harm.

Single-Use Plan

An identified set of specific activities to arrive at a specific goals or targets, with a determined budget and within a determined time period. Single-use plans are often used to cope with certain problems or to reach specific objectives. While these plans are limited in time and scope, they often contain issues that should be considered for inclusion in the management system to prevent re-occurrence of the same or similar problems or to maintain performance at a desired level.

Standing Plan

An identified set of more generic activities to arrive at broad rather general goals or objectives, not having a specific budget and without a determined time period. Standing plans are used to reach strategic objectives. Rather than being directed at particular issues or problems, these standing plans are intended to both prevent specific issues through risk or (potential) problem identification as well as uncover those at an early stage of development. These plans are not limited in time and will normally exist during the lifetime of the related activity or organization and beyond that as applicable. They will be adapted over time depending on results obtained as well as due to changes in industrial, social, political and environmental conditions.

Target

The specific short term goals, described in terms of specific OH&S performance, that MANGAN has set itself to achieve through implementation of specific OH&S "single-use plans" that are either directed at solving identified problems or at reaching short term performance goals.

Tolerable Risk

The risk that has been reduced to a level that can be endured by the organization having regard to its legal and societal obligations and its own OH&S policy. Care should be taken as to not have the change of occurrence factor overshadow the potential consequence factor.

4. GENERAL

MANGAN has established and maintains an Occupational Health and Safety Management System for which the requirements are described in this document. The implementation of the comprehensive procedures described by the management system aims to improve the occupational health and safety performance.

OHSAS 18001 has been applied in Mangan Marble & Granite Inc. after implementing ISO 9001:2000 to provide harmonization the OHSAS 18001 with ISO 9001. MANGAN Occupational Health and Safety Management System regards the possible risks in it's establishment and implementation. This system includes OH&S policy, plans, control and corrective actions, evaluation of the management. MANGAN OHS System integrates hazard prevention and continuous improvement.

4.1. General Specification

Mangan Marble & Granite Inc. has established and continuously applied OHSAS 18001 Occupational Health and Safety Management System.

4.2. Mangan Marble & Granite Inc. Occupational Health and Safety Policy

The Management of MANGAN considers the safety and health of their employees and other persons and regard for the conservation of the environment as vital issues in conducting their activities. The Management regard Safety, Health and Environmental matters. on a level at least equal to other aspects of business.

The management is committed to :

- To provide a safe working area for all of the personnel working under the responsibility of the company
- Promote the health of personnel
- Only the safe and environmentally friendly processes and installations are carried out.
- Only the safe and environmentally friendly raw materials are purchased from the suppliers.
- Only the safe , environmentally friendly and healthy products are produced.
- Comply with all the related occupational health and safety legislations.
- Management practices are carried out regarding the occupational health and safety results.
- Management is responsible for guaranteeing the commitment and participation of all the personnel to the occupational health and safety system.
- Management provides long term occupational health and safety goals

Detailed responsibilities together with appropriate authorities and accountabilities will be assigned to relevant individuals or groups at all levels in the organization.

4.3. Planning

Mangan Marble & Granite Inc. has developed and maintained documented procedures to describe the processes of identification, evaluation and control of occupational health and safety hazards. As a part of planning systematic preventive measures are taken to control potential health and safety hazards.

MANGAN periodically performs a comprehensive examination of operational conditions and competency of personnel to identify current OHS deficiencies or possibly expected deficiencies.

If required quality control, inspection and testing techniques are revised and new ones are applied. The procedures described above have the responsibility and duty

distribution for the personnel in case of any danger or hazard. Responsible personnel are trained periodically.

Mangan Marble & Granite Inc. searched for the legal obligations and adopt it's system according to them. These obligations are given in the related list. Objectives are determined in consistent with OHS policy.

An occupational health and safety management program has been established and this program includes the documents related to responsibilities and authorities according to the objectives. These documents are supported with tools and time schedules.

4.4 Application

4.4.1. Structure and Responsibility

Mangan Marble & Granite Inc. has defined the responsibility authority and relationship of personnel who manage, identify, evaluate, or control OHS functions. MANGAN has appointed a OHS management representative who irrespective of other responsibilities and defines the authority and responsibility for establishing the requirements of the management system. Top management has the overall responsibility and authority. Required resources of OHS system has determined (human resources, specialist skills, technology and financial support) and supplied.

4.4.2. Training comprehension and sufficiency

Mangan Marble & Granite Inc. has established and maintained documented procedures for identifying OHS training needs and provide relevant training for appropriate personnel .

Training is conducted initially and at appropriate intervals. Training covers the health and safety roles, responsibilities, potential hazardous conditions, risk reduction techniques, the use and limitations of various control mechanisms.

In MANGAN all the responsible personnel have been trained to have an adequacy in the subjects reflecting to the OHS system. The term adequacy can be defined as proper training or experience. The scope of the trainings is given in the related procedure.

4.4.3. Information and Communication

Mangan Marble & Granite Inc. has established and maintains an effective occupational health and safety communication system. OHS communication activities include taking the idea of the employees about OHS system, documentation of policy and procedures for risk management, giving required information to the employees and encouraging the employees to report signs and symptoms, hazards and hazardous conditions.

These procedures assure affected workers understand basic hazards inherent to the respective operations and methods minimize exposure and implications of their actions on other employees. MANGAN employs a defined methodology for communicating medical and environmental exposure monitoring results to the appropriate personnel as expeditiously as possible.

4.4.4. Documentation

Mangan Marble & Granite Inc. has prepared and maintains documented procedure for collecting, filling, distributing, and achieving occupational health and safety documents and data. These documents describe the basic elements of the occupational health and safety system and their relations with each other. Documentation is being kept at minimum for maximum efficiency.

4.4.5. Document and Data Control

Occupational Health and Safety Management System documents are reviewed and approved for adequacy by quality manager. A list of current revisions of the documents is prepared and distributed to the related personnel when a change takes

place. The responsibility to change the documents belongs to the quality manager and support engineer. However, all the staff can give proposals for new documents or a change in the existing ones. Obsolete documents are collected and signed as "Cancelled". These documents are deleted from the document list. Documents are revised after the reviews if required.

4.4.6. Administrative Control

Mangan Marble & Granite Inc. has defined risks, risk related activities and processes. Required plans are established to prepare documented procedures in case of any deviation from occupational health and safety policy and objectives. occupational health and safety plans are used to decide on the administrative criteria in procedures

4.4.7. Emergency Preparation and practices

Mangan Marble & Granite Inc. has prepared and continuously applied the procedures and plans to forecast the frequency of the situations and emergency conditions to decide what to do under this conditions and to prevent possible causes of these conditions such as illnesses and injuries. Plans and procedures for the emergency conditions are reviewed and tried periodically.

4.5 Control And Corrective Action

4.5.1. Performance measures and Tracing

Mangan Marble & Granite Inc. collects and assesses data which would allow interested parties to gauge the overall occupational health and safety management system performance.These data is also used in the continuous improvement efforts.Data measured includes:

- lost working days
- number of accidents
- number of incidents

- validated employee comments and criticisms
- occupational health and safety trainings
- occupational illnesses of employees
- average number of days to accomplish the corrective actions
- dust and noise measurements.

Related procedures has prepared and are continuously reviewed by Mangan Marble & Granite Inc. for measuring OHSAS 18001 system performance.

4.5.2. Accidents, Occurrences and Corrective Actions

Mangan Marble & Granite Inc. has developed and maintains a systematic method of investigating occupational health and safety deficiencies to ensure root problems have been adequately addressed and that employees are informed of the status of response measures being considered or implemented.

MANGAN has prepared the required procedures fro examining, evaluating and minimizing the effects of accidents, occurrences and unconformities by corrective and preventive actions.

A risk assessment is applied before carrying out the procedures for corrective and preventive actions.

If conformance can not be achieved economically alternative temporary controls are implemented to ensure the protection of employees and other stakeholders. This control provides the description, documentation and evaluation of the nonconformances to the concerned functions.

4.5.3. Records and Record Management

Mangan Marble & Granite Inc. Has prepared the required procedures for identification, maintenance, indexing, arrangement and disposition of the occupational health and safety records. These procedures are periodically reviewed and revised if required. Records includes the sufficient detail to ensure the MANGAN's Occupational Health and Safety Management System Policy is being

met. Records cover the information describing and documenting compliance with applicable statutory and regulatory requirements , valid occupational health and safety related employee proposals and complaints product and process information management reviews etc. All the records are kept according to the related procedure.

4.5.4 Audits

All the elements, aspects and Occupational Health and Safety Management System components are internally audited and evaluated regularly. Audits are carried out to determine the contribution of various elements to the Occupational Health and Safety

Management System Policy and Objectives. The frequency of the audits depends on the probability and severity of the potential risks. Audit findings, conclusions and prioritized recommendations are submitted in the forms to the quality manager and top management. These reports cover the specific OHSAS 18001 system deficiencies information on the implementation, recommendations, corrective and preventive actions.

4.6 Management Review

Management reviews the Occupational Health and Safety Management System four times a year. Quality manager is responsible for preparing a report giving information about the occupational health and safety system performance. This report is examined and decisions are made on system policy, objectives and other elements.