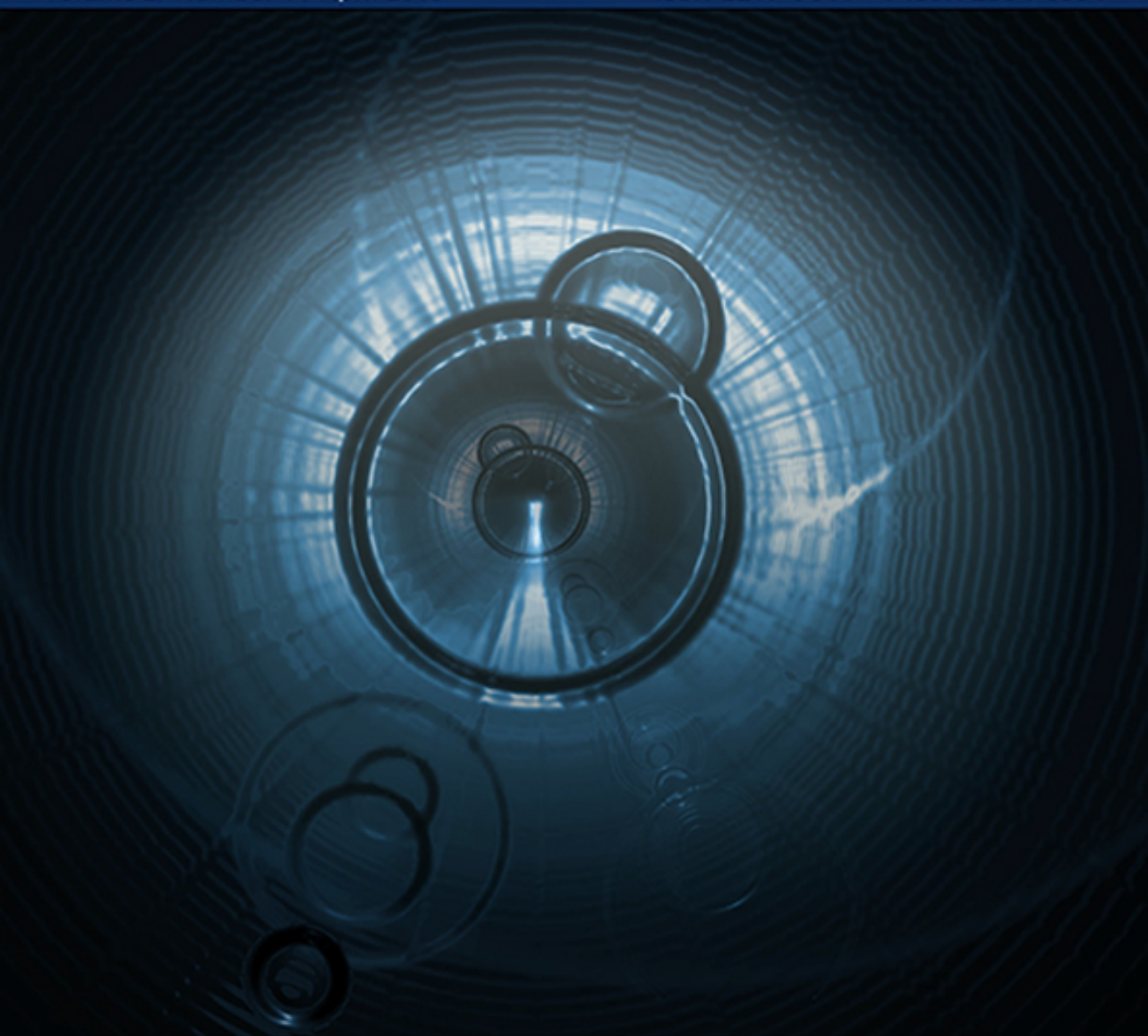


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PROJECT MANAGEMENT IN SURFACE MINING OF MINERAL DEPOSITS BY PROJECT PORTFOLIO MODEL

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Abstract: *The Project of opening and developing a surface pit mine is usually related to strategic decisions of a mining company and may have crucial significance in terms of its future development. The first and most delicate phase, in which the strategic visions are reshaped and concretised, is the pre-investment phase, whose aim is to provide high-quality basic data in terms of investment-technical documentation developed in various levels of detail. The implementation quality of the mining project pre-investment phase de facto determines the ultimate success of the implementation of the entire mining project. Organizing and managing the preparation of the investment-technical documentation for the opening and development phase of the surface pit mine according to the project portfolio management model can significantly reduce the uncertainty of the project realization and reduce the project risks to acceptable levels, creating the prerequisites for reaching optimal business decisions with regards to the continuation of the following phases, and thus the realization of the project as a whole. The aim of this paper is to present basic definitions in the area of project management in the context of selecting an optimal model of organization and project management with regards to the opening of surface pit coal mines, which in terms of complexity, scope, duration, and impact on the environment, surely deserve modern approach in the field of organizational theory and practice, especially since, historically speaking, the problem of organization and management of investment projects has not been taken into consideration sufficiently by the mining industry. This paper provides an example of the organization and management of the investment-technical documentation of opening and developing a surface pit mine on the basis of the project portfolio model.*

Keywords: *project, project management, project processes, model, portfolio*

1. INTRODUCTION

Even though project management area was developed from technical disciplines, it was influenced by other business areas, and it is increasingly becoming multidisciplinary. Therefore, for the successful operation of the entire project, not only a narrow area of project management should be taken into account, but also an organizational structure and environment of the project, knowledge from the area of project implementation, standards and legal framework, knowledge of business management, economics (especially finance), interpersonal relationships, and so on. Each of the aforementioned factors may influence the success of project implementation.

Although many authors were engaged in defining the terms of project management area, such as project, project management, program, portfolio, etc., it seems that the most general accepted definition was the one made by PMI (Project Management Institute, USA), stating that a project is a temporary group activity to produce a unique product, service or result.

2. DEFINITION OF TERMS

2.1 Project

In the effort to define the term “project management” it is necessary to define the concept of the project itself. Since most of the authors dealing with the project management were involved in the development of knowledge catalogue, published by PMI (Project Management Institute, USA), PMBOK Guide [1], or made references to PMI definitions in their own works, such definition has been accepted as the most general.

Otherwise, apart from PMI, there are several associations that operate on a global scale in project management areas such as the IPMA (International Project Management Association) and APM (Association of Project Management), as the most important ones in Europe. Like the PMI, IPMA has issued its own knowledge set called Competence Baseline [2], while the APM issue was called Body of Knowledge [3].

As mentioned before, PMI defines a project as a temporary group activity to produce a unique product, service or result [1]. From this definition two important items can be observed that distinguish the project from operational work. The first is that the project is a temporary activity, meaning that the project has its beginning and an end. Likewise, the project team is assembled during the period of the project and is adjourned after the project is completed. In other words, human resources are made available for other projects or operational activities. Another important feature is that a project has created a unique product - service.

Furthermore, a project can be defined as a set of activities and tasks with a specific purpose, defined specifications, beginning and end, limited financial resources, human and technical resources. Likewise, the project can be defined as a set of activities performed in a logical series in order to obtain a certain result, with each activity, as well as the whole project, having defined its beginning and ending.

Basically, during the definition of a project, all the authors of the project use the most general definition given by the PMI, which is, thereupon, more or less modified in order to optimize the implementation of the project.

2.2 Project Management

If the PMI is taken into account as the most general definition of the project, therefore project management is the application of knowledge, skills, tools and techniques in project activities in order to meet project requirements [1].

Project management includes determining requirements, setting clear and achievable goals and balancing the competing demands for quality, scope, time and cost. Likewise, project management is often defined as a set of methods and techniques based on accepted management principles used for planning, evaluation and control of work activities in order to achieve the desired goal on time, within the budget, and in accordance with the provided specifications.

2.3 Program and portfolio

As the entire process of project management, especially in complex organizations, takes place in the broader context than that of a single project, it caused the occurrence of such concepts as program and portfolio, with related concepts of program management and portfolio management.

The term “Program” usually denotes a set of interrelated projects organized to provide benefit that would not be possible if it were a solo project [1]. According to the

same source, the portfolio is a set of projects or programs and other works grouped together in order to effectively manage the activities to achieve the project objectives.

2.4 Project processes

A process is a set of interdependent actions and activities performed in order to obtain a predetermined set of products, results or services [1].

Project processes are presented as unique well-defined process activities even though, in practice, they sometimes overlap in methods that are difficult to define. Generally design processes can be divided into several groups [1]:

- Initiating Process Group- defines and approves the project or project phase;
- Planning Process Group - defines and specifies the purpose, plans direction and actions for accomplishing the goal and scope;
- Executing Process Group - Coordinates human and other resources to implement the plan;
- Monitoring and Controlling Process Group - measures and monitors the progress to identify deviations from the plan and perform corrective action;
- Closing Process Group - formalizes the project acceptance, i.e. the results of the project or project phase, leading to the completion of the project or project phase.

For successful project management it is necessary to select an appropriate set of processes based on the complexity, risk, size, timing and experience of the project team, resource availability, the amount of available information, organizational maturity in project management as well as in the area of application. At the same time, they represent the variables by which projects can be classified into groups.

2.5 Project management methods and methodologies

According to the PMI, methodology is defined as a system of techniques, procedures, and rules used by a person operating within a certain discipline where the procedure is a series of actions that take place in a particular order in order to obtain a certain goal [1].

J. Charvat defines methodology as a set of guidelines and principles that can be tailored and applied to the specific situation [4]. According to H. Kerzner, a good methodology displays all the important processes of project management, therefore allowing the areas that are involved in the process to continue spreading [5].

Likewise, the same author states that the characteristics of a good methodology are a recommended level of detail, standardized techniques of planning, temporal determination and cost control, a standardized form of reporting, flexibility to apply to all projects, flexibility for rapid development, user-friendliness, acceptance and usability in the organization, the use of standardized life cycle phases of the project [5].

Similar to the aforementioned definitions, the roles, teams, skills, processes, techniques, tools and standards used by the project team, can be considered as a methodology [6]. It should be noted that the most of the authors cited is of the opinion that if the above is applied by one or two people, it can be considered as a method, but if more people, i.e. the whole team applies the aforementioned, it can be considered as a methodology.

3. ORGANIZATION AND MANAGEMENT OF SURFACE PIT MINE OPENING ACTIVITIES

All the complexity and multidisciplinary nature, which appear in the surface mining of mineral deposits in all the phases, from research and planning to procurement of equipment, mining start, until the closing phase of the surface pit, while respecting the conditions for sustainable development and environmental protection throughout all the phases, indicate a very high risk of surface mining project implementation in all the phases of the project. This risk is particularly emphasized at the stage of making investment decisions concerning the opening of a new surface pit mine throughout all levels, since the technical-technological capabilities and economic viability of the entire implementation of the mining project are decided at this phase of the project.

In addition, a very common situation in the implementation of mining projects is a situation of exceeding the scope of the planned resources for their implementation, particularly the scheduled time and financial investment. Such problems are usually related to the experience of the project team and its team leader managing the entire project, but often represent the result of altering the project scope due to reinterpretation of geological and engineering-geological conditions of the resource deposit.

The main reason for such problems is the approach to the implementation of a mining project, i.e. the method of organizing and managing mining projects, especially in the preparatory stage, where on the basis of technical and economic parameters, as well as other influencing factors, a final decision is made on the project implementation of opening the surface pit mine.

Today, when all the interested parties insist on increasing and more efficient use of the everyday diminishing mineral resources, mining projects are subject to a higher degree of risk and complexity of implementation. Therefore, it is necessary that mining companies pay particular attention to the management of organization and implementation of their projects in order to meet project objectives.

Considering the level of investment in mining facilities, it is certain that, in terms of the risk aspect, the most delicate phase is preparing investment and technical documentation which further determines all the future activities regarding the opening, development and closure of a surface pit mine. In general, this phase includes a series of coordinated activities on the preparation of the following: Scope Study, Study on Geological Resources, Main Mining Project with all the corresponding technical projects, and it determines the technical and technological capacity and economic viability of the entire implementation of a mining project.

Therefore, the approach to the organization and optimization of all the aforementioned activities is very important for the efficient and effective implementation of this phase of the surface pit mine life cycle. Nowadays, it is an increasingly common trend in the world to have large, capital projects, such as mining projects, organized and managed in a project manner in order to perform optimally.

Certainly, the project of opening and developing of a surface pit mine is preceded by previous strategic decisions of the company, from the field of strategic development. Each strategic initiative comes with a large amount of information which are generated and structured, and during project implementation – evaluated, meaning that in terms of the future development of the company they might be of crucial importance. The first and the most delicate phase of the project, in which the strategic visions and decisions are concretised and reformatted is definitely the preparation of an investment and technical documentation which can, undoubtedly, affect the successful implementation of the entire

project. Other phases of the surface pit mine project can be defined as the opening phase, exploitation phase and closing phase.

Given the complexity and implementation time frame, it is required to define the aforementioned phases as separate, dynamically linked multi-projects or projects portfolio. The key difference between a project and a project portfolio is that within the project the activities are managed and all the activities are associated with interdependency, while in the project portfolio, the projects are managed, and all the projects are linked to a single goal.

The aim of project portfolio management is to allow the mining company to be focused, fast and flexible in the implementation of a project through a defined process of decision-making, improved cost control and efficient use of resources.

Management of Investment and technical documents project portfolio of a surface pit mine refers to the identification, prioritization, assignment of authorities, control and management of projects, programs and all the other activities with the aim of making a reliable investment and in accordance with the law and professional standards of well composed technical documentation of the surface pit mine.

The first step in the organization of a project portfolio is to have the management of the company identify and examine all the required projects and activities in the stage of preparing the investment and technical documentation of the surface pit mine in order to make decisions on priorities, necessary staff and individual budgets. For making such decisions it is necessary to provide the information about individual projects in a consistent and standard format, as well as the information on the project groups, and finally to all the projects.

Portfolio management is a collective process by itself, in which individuals collaborate in defining project plans, control points, key performance indicators, guidance of the projects started and approval of the projects completed. Establishing of a specialized collaboration system provides significant time saving, enabling instant access to information on the status of individual projects or on the status of individual project activities, by accelerating decision-making and promoting project management cooperation at all levels. Portfolio management, through continuous monitoring and control of project implementation, provides attaining of the planned resources, budget and scope of projects [7].

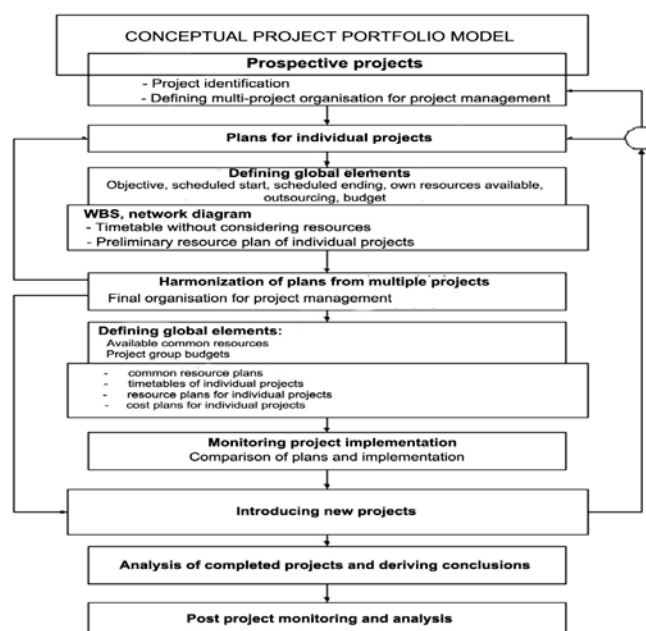


Figure 1. Conceptual project portfolio model

Typical benefits from the implementation of management process into the entire project portfolio primarily include:

- consistency of planning and budgeting;
- timely action;
- a detailed overview of all the undertaken joint projects and initiatives and related key performance indicators;
- the possibility of periodic synchronisation of initiated and planned projects with the strategic objectives of the company;
- decision making based on the criteria such as risk, profit and contribution determined by business objectives;
- optimizing the use of resources and human resources with the focus on common priorities;
- a guaranteed and centralized access to information critical for the evaluation of projects and decision making at the level of a project, therefore accelerating decision making.



Figure 2. Distribution of benefits to the management from portfolio management at all levels [1]

3.1 Formation of portfolio of investment and technical documentation of surface pit mine opening

Formation of project portfolio includes the identification of projects or groups of projects to be implemented, definition of project teams, authorisations and responsibilities, checkpoints, management and key realization performance indicators.

Bearing in mind the complexity of natural, geological, technical, technological and economic conditions for the opening and development of the surface pit mines, it is necessary to implement various types and scope of research in order to select and define optimal solutions which shall represent the basis and guidelines for the development of mining projects.

After confirming the mineral reserves through geological explorations and the Study on geological reserves, surface mining studies are prepared followed by additional

geological, geomechanical, hydrological and hydrogeological research, environment related research, as a supplement to the bases for the preparation of investment and technical documentation.

Previous research performed by conducting studies, aimed at resolving all outstanding dilemmas regarding possible solutions for opening and development of the surface pit mines. Through the solutions from the study the following actions are conducted: optimization of the structure of surface mines, optimisation of surface mines production capacity, selection of the exploitation system and equipment within the exploitation system, selection of location and method of opening and progress of the operations in surface pit mines in the function of the parameters set, of which the lifetime expectancy, capacity and exploitation economics are the most common.

For an optimized solution, a technical documentation is prepared, containing the Major Mining Project with associated technical projects related to the conception of the following: drainage, recultivation, environmental protection, physical security, construction buildings, machine and electrical installations, preparation and processing, transportation, etc.

While performing all the research and preparing the documentation it is necessary to collect a number of requirements and approvals from the relevant government institutions related to the performance of certain works.

By analysing the activities from geological exploration works through making various studies to the preparation of investment and technical documentation and obtaining the necessary permits and approvals, several groups of projects are clearly distinguished. The first group of projects includes all **exploration works** (geological, hydrological, hydrogeological, geomechanical, and so on) and the preparation of geodetic bases. The second group of projects includes the preparation of **techno-economic studies** and environmental impact assessment studies. The third group of projects includes the development of the **Major mining project** with associated technical projects.

For projects identified in such manner and project groups a corresponding project team is formed on a level of portfolio, consisting of managers of the projects or groups of projects. Project portfolio managers are appointed by the management of the company and he is responsible for the successful implementation of the project, relations between the project organization and the environment within the company and outside the company, and the control of implementation dynamics and budget at the level of the portfolio. The project managers and the managers of project groups comprise a portfolio management and are responsible for the successful implementation of projects, control of dynamics and budget and communication in the domain of their own projects and are supervised by the portfolio manager. The members of the project team are responsible for the successful implementation of project activities assigned to them and are under jurisdiction of the project manager.

Figure 3. displays an example of the portfolio organization model for the projects identified from investment and technical documentation of the surface pit mine opening, made by the author of this paper, based on the lessons obtained from the field of organization and process management as well as from personal experiences.

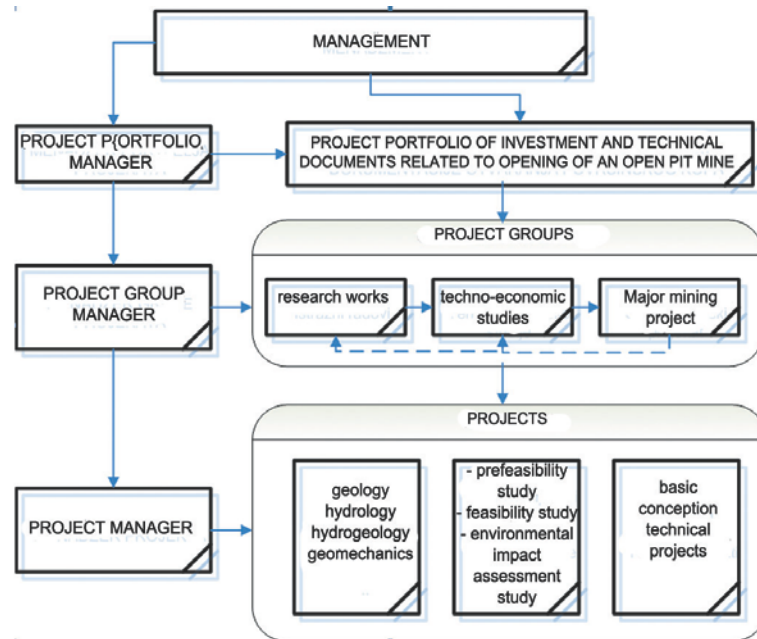


Figure 2. The organisation of portfolio of the project identified

The completion of the portfolio definition phase is followed by the phase of organizing individual projects in a traditional manner where the following is defined:

- Project scope management,
- Schedule and deadline management
- Project cost management,
- Quality management within the project,
- Human resource management,
- Communications management,
- Risk management within the Project,
- Procurement management,
- Contract management (by outsourcing).

The next phase is the completion of the project portfolio where the required human and material resources are accumulated and optimized, the budgets are accumulated and the individual implementation dynamics are coordinated.

4. CONCLUSION

Management of investment projects of opening surface pit coal mines is essentially a very complex decision-making process conditioned by a large number of input factors, while particularly having geological, economic, and environmental factors as uncertainties, which often carry risks that represent a direct reliability function of such factors. Therefore, it is necessary to apply the „world’s best practice“ in the field of project management, and then perform the economic, geological and ecological analysis and evaluation of the data reliability, which represent the input data, alongside with the use of modern software solutions aimed at defining and optimizing management models of Investment Projects related to opening of surface pit mines.

5. REFERENCES:

- [1] Project Management Institute, A Guide to the Project Management Body of Knowledge (PMBOK® Guide) -Third Edition Project Management Institute, 2004.
- [2] IPMA, IPMA Competence Baseline, Monmouth, UK: Internal Project Management Association, 1999.
- [3] R. Atkinson Project management, International Journal of Project Management, 1999.
- [4] J. Charvat, Project Management Methodologies: Selecting, Implementing and Supporting Methodologies and Processes for Projects, Hoboken, NJ: John Wiley & Sons, Inc, 2003.
- [5] H. Kerzner, Project Management: A Systems Approach to Planning, Scheduling and Controlling, Eighth Edition, Hoboken, NJ: John Wiley & Sons, Inc, 2003
- [6] A.Cocburn, People and Methodologies in Software Development, Doc. Disertacija, University Oslo, 2003.
- [7] C. Stojanović, Organizacija i upravljanje procesom izrade investicione i tehničke dokumentacije otvaranja površinskog kopa, IV Međunarodna konferencija UGALJ 2008, Beograd, str. 514-519.
- [8] P. Jovanović, Project management, "Grafoslog", Beograd, 1999.
- [9] P. Jovanović, Razvoj projekt menadžmenta i specijalizovanih upravljačkih disciplina, Naučno-stručni simpozijum: Organizacija i menadžment u saobraćaju (str. 28-36), Saobraćajni fakultet, Beograd 2000.

ISSUES AND SOLUTIONS FOR ENERGY CONSUMPTION OPTIMIZATION

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Abstract: In order to realize the economic and environmental requirements and the requirements of sustainable development, refinery complexes are forced to optimize their complex processing operations, in order to achieve maximum profits in a very narrow range of profit margins. Also, stricter limitations imposed by environmental requirements must be taken into consideration. Mathematical models as a tool that make possible to predict the response of the system with changing (independent) values of the process nowadays became an essential part of the modern way of management processes. Models are used in a very wide range, for example, they are used to track daily performance, economic and energy optimization of modeled processes as well as to optimize and synchronize the entire systems composed of several interrelated processes.

Keywords: Emissions, Energy consumption, Pollution, Mathematical model,

1. INTRODUCTION

The need for energy has increased significantly in recent decades due to the growth of industrial sector in the world. Nearly a third of the world's energy consumption and 36% of carbon dioxide emissions are attributed to the manufacturing industry. Industry for the production and processing of basic materials: chemical, petrochemical, iron and steel, paper, and other metals and minerals, involved about two-thirds of the total energy consumption. The total industrial energy consumption grew by 61% between 1971 and 2004, with the rapid growth of demand for energy in the developing countries and constant demand for energy in the developed countries.

Climate changes that are taking place represent the largest environmental, social and economic threat that the planet faces. The processes of burning fossil fuels are causing about 90% of direct and indirect emissions of greenhouse gases. Many companies are looking for solutions to reduce exposure to climate risks, developing strategies to reduce emissions which are the main reason of the greenhouse effect.

In 2009 European Commission announced the proposals how to reduce climate changes [1], with the aim of reducing carbon dioxide emissions. The overall package of measures consists of several proposals, but the focal point deals with considering charges for the carbon dioxide emissions. It is estimated that the implementation of this package will reduce the gas that cause the greenhouse effect by 20% by 2020 [1].

Refining, chemical and petrochemical industries are the largest consumers of energy, where it is estimated that these industries are responsible for 30% of the total industrial energy consumption and 16% of direct emissions of carbon dioxide [2]. According to the U.S. Environmental Protection Agency (EPA), the oil refineries in the

United States emit more than 250 million tons of carbon dioxide into the atmosphere, and along with chemical plants, form the second largest stationary source of gases that cause the greenhouse effect [3].

2. THE MAIN CAUSES FOR INDUSTRIAL POLLUTION

In the International Energy Agency (IEA) report is presented a study that shows that in Organization for Economic Co-operation and development (OECD) countries industrial needs could be reduced for about 25 to 37 exajoules per year using current technologies and best management of the processes. This is equivalent to the value of 600 to 900 million tons of fuel, which was the fuel consumption in Europe in 2007 [2]. Also, the report noted that the world's total energy saving potential is approx. from 1.9 to 3.2 gigatons per year, which represents 7 to 12% of current global emissions of carbon dioxide [2].



Fig. 1. Sinclair Refinery in Sinclair, Wyoming

Oil refinery belongs to the important strategic industry, where crude oil has been transformed into different products. Despite the fact that they are large consumers of energy, refinery complexes are also large emitters. Emissions and waste water from storage and production are very high and alarming, so the protection of the environment has become an important factor in the operational strategies of these systems. The type and quantity of the refinery emissions to the environment are well known. Oxides of carbon, nitrogen and sulfur mainly generated in combustion processes, as well as volatile organic compounds, are major air pollutants in this sector.

For example, in Sinclair Refinery in Wyoming, the violations charged to the refinery have covered incidents including improper storage of hazardous waste causing excessive odors and the release of thousands of pounds of hydrogen sulfide gas into the air (Fig. 1). In a settlement of violations related to the hydrogen sulfide gas release, Sinclair agreed to pay a \$10,000 penalty to state regulators [4].

Water is used extensively in the refining process, such as in the process with water and cooling fluid, leading to contamination of water by organic substances. For every million tons of refined oil refineries emit from 20.000 to 820.000 tons of carbon dioxide, 60 to 700 tons of nitrogen oxides, 30 to 6.000 tons of sulfur oxides and 50 to 6.000 tons of volatile organic components. Also, for every million tons of refined oil refineries emit from 0.1 to 5 million tons of waste water and from 10 to 2.000 tons of solid waste.

Table 1.1. The main air pollutants and their major sources

Gas	Source
Carbon Dioxide	Furnaces, boilers, gas turbines Regenerator in catalytic cracking process Flare Systems Incinerators
Carbon Monoxide	Furnaces and boilers, Regenerator in catalytic cracking process The process of sulfur removing Flare Systems Incinerators
Oxides of nitrogen (N ₂ O, NO, NO ₂)	Furnaces, boilers, gas turbines Regenerator in catalytic cracking process Coke calcination process Flare Systems Incinerators
Oxides of sulfur	Furnaces, boilers, gas turbines Regenerator in catalytic cracking process Coke calcination process The process of sulfur removing Flare Systems Incinerators
Volatile organic compounds	Tanks Systems for the separation of gas phase Separation systems water / oil Emissions from valves, connectors, etc. Vents Flare Systems

Refinery processes require large amounts of energy. The reduction of energy represents a huge challenge. In a typical refinery, more than 60% of the emitted gases come from some processes for power generation: gas turbines, boilers, furnaces, etc. Catalytic cracking and desulphurization as well as flaring processes significantly contribute to emission regulations. The sources of gases emitted by oil refineries are shown in Table 1.1.

Since the first oil crisis of 1973, refineries have made significant steps in improving energy efficiency. Despite the energy conservation measures, the energy requirements are growing due to more stringent product specifications, as well as changes in the production from heavy fuel oils to transportation fuels.

From aforementioned facts it could be concluded that the main reason for emissions is power generation necessary for the process. Increasing the energy efficiency of the process is one of the main conditions for reducing emissions in petroleum refineries [5]. Efficiency can be increased in two ways:

- Increasing the energy efficiency of different processes, and
- Improving energy integrations in refinery.

Increasing the energy efficiency of the processes brings financial savings, and also has a positive effect on energy safety and environmental protection, and helps to achieve sustainable economic development.

3. TRENDS FOR ENERGY CONSUMPTION OPTIMIZATION

Currently in the world a great attention is directed towards increasing the energy efficiency of the catalytic naphtha reforming of (CNR) [6]. Optimizing energy consumption of different processes is a necessary condition for increasing efficiency and thus, it will reduce emissions. The requirements that process plants must satisfy become more complex and difficult due to enlarged competition, stricter regulations related to process safety and environmental protection as well as rapid changes in economic conditions.

In order to find the optimal process conditions that satisfy all imposed requirements, it is necessary to have tools that would lead up to the optimal solution with minimum cost and minimum time period. Today, mathematical models become more accepted tools for the optimization of existing facilities and the development of new, principally because of low cost and short time needed to find optimal solutions. This is the reason why the development of mathematical models is very important.

Mathematical modeling is one of the most challenging fields of engineering and applied science. The main requirements to be achieved by the mathematical model are:

- to describe the reliability of the process,
- to try to explain the behavior of the modeled system at the same time,
- to predict the system response to certain changes in process parameters,
- together with the appropriate optimization method, to enable the determination of optimal process conditions.

It is very important to develop a model for CNR system and methods for its optimization in order to increase the energy efficiency of the process. CNR process occupies an important place in the field of oil refining, and because of its complexity it is an interesting area of academic and industrial research related to the development of adequate models and methods for process optimization. Table 1.2. shows the required amount of energy and the required number and amount of extra processing power for commercial catalytic reforming process [7].

Table 1.2. Energy and additional processing power for the process of catalytic reforming of gasoline

	Reforming	Semi-Regenerative process	Continuous-Regenerative process
Electrical energy, kWh	-	246*	6142*
Specific consumption (kWh/t)	25 – 50	55	-
Fuel consumption, GJ	-	185*	232*
Specific fuel consumption (MJ/t)	1400 - 2900	71.5 t/kt	
High-pressure steam, kg/t	50 - 90	64 - 90	97
Water for boiler, kg/t		170	22
* The values refer to the capacity of 2351 t per day. Specific values are related to the specific capacity Note: The first column contains ranges for all types of reformers			

In Table 1.3. an example of the emission from two oil refineries, as well as the emissions generated in the furnace is presented [7].

Table 1.3. Emissions generated from catalytic reforming of gasoline

	Fuel consumption (GWh/year)	Capacity (t/year)	Units	SO ₂	NO _x	CO	CO ₂
Platforme r Mider	753.74	1,000,000	mg/m ³	35	100	100	5
			t/year	24.1	68.7	68.7	3.4
			kg/ ton	0.024	0.069	0.069	0.003
Platforme r OMV	494.1	728,000	mg/m ³	18	170	5	1
			t/year	8.8	83	2.4	0.5
			mg/m ³	0.012	0.114	0.003	0.001

It is possible to have multiple alternative operating conditions in the CNR process, with complex differences between them. This is a consequence of the large number of degrees of freedom, which gives a large area for optimization. It is important to note that the process of CNR requires high energy consumption, and thus becomes a large emitter.

4. CONCLUSION

There are two directions to achieve greener production: i) in situ reduction of greenhouse emissions by including a range of enterprises that apply cleaner production technologies, and ii) the development of symbiotic relationships between companies to lower environmental impact. Optimization of existing plant performance is one of the ways to decrease energy consumption which leads to win-win situation, decrease emissions and cost of production.

Acknowledgements

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5. REFERENCES

- [1] European Commission, Directive 2009/29/EC European Parliament and of the Council. http://www.consilium.europa.eu/uedocs/cms_data/docs/pressdata/en/misc/107136.pdf
- [2] International Energy Agency (2007), Tracking industrial energy efficiency and CO₂ emission. http://www.iea.org/textbase/nppdf/free/2007/tracking_emissions.pdf
- [3] Energetics (2000), Energy and Environmental Profile in the US Chemical Industry, prepared for the DOE/OIT, May 2000. http://www1.eere.energy.gov/industry/chemicals/pdfs/profile_full.pdf
- [4] <http://wyomingoutdoorcouncil.org/>
- [5] Mirko Z. Stijepovic, Patrick Linke, Optimal waste heat recovery and reuse in industrial zones, Energy 36 (2011) 4019-4031.
- [6] Vladimir Stijepovic, Patrick Linke, Sabla Alnouri, Mirjana Kijevcanin, Aleksandar Grujic, Mirko Stijepovic, Toward enhanced hydrogen production in a catalytic naphtha reforming process, International Journal of Hydrogen Energy 37 (2012) 11772-11784.
- [7] European Commission (2003), Integrated Pollution Prevention and Control (IPPC), Reference Document on Best Available Techniques for Mineral Oil and Gas Refineries. <http://www.elaw.org/system/files/EIPPCB-BREF+-+refineries.pdf>

USING CAD SYSTEMS FOR GARMENT DESIGN: MORGAN DYNAMICS

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Abstract: The project's goal was to design an S size men's shirt, using the Morgan Dynamics software. There are two ways in which new models can be created: drawing or digitizing. In order to use both methods, the front, back and sleeves were designed by Drawing, and the patterns for collar and yoke were done manually and then placed on the digitizing surface. The patterns were captured by a camera and loaded automatically in the MD Visual software. Then the pattern grading and nesting was done by using the MD Best Nest software.

Keywords: Morgan Dynamics, shirt, design, digitizing, grading, nesting

1. INTRODUCTION

The textile industry is continuously changing. In recent years there has been a remarkable transition from 100% Lohn system production, to semi-Lohn, “full-product” and even own production – developing an own brand. Romanian producers are forced to respond increasingly faster to domestic and foreign demand. Meanwhile, prices are dropping while production costs are rising. To manage and thrive in an increasingly competitive market, Romanian companies in the textile industry must be especially well organized, efficient, and able to produce a range of high-quality goods. To meet these challenges, the Romanian producer adapted, placing the greatest emphasis on revamping the factories in order to increase productivity and the product quality. Investments are still made, even if at a slower pace, in upgrading technology and equipment (from sewing machines to cutting machines and CAD-CAM systems).

CAD (Computer Aided Design) software has been in use by designers to create sketches, croquets, patterns and silhouettes. Convergence of CAD technology with web technology is now aiming to increase production efficiency, customer satisfactory degree with modern-cheep-fit garments and reduce delivery times. [3]

Morgan Dynamics CAD software offers an adaptable solution to design patterns. Morgan is a group of companies, headquartered in Coccaglio (Brescia), Italy. The group leader is Morgan Tecnica Spa, which deals with the design and production of cutting machines for the textile industry, and, in general, for all industries where automated fabric spreading and cutting is required (clothing, furniture, upholstery, bed clothing etc.). Meanwhile, Morgan Dynamics srl deals with designing and developing software for the machines produced by Morgan Tecnica, as well as independent software, such as the CAD system. [5]

Morgan Dynamics CAD includes three modules: the MD Pattern Design program, the MD Best Nest program, and the MD Visual program.

The **MD Pattern Design program** can be used to design models, check product size for conformity with the specifications, check if pieces fit perfectly together for sewing, grade the products. Also, with this program, patterns can be digitized, models sent by email

or on digital support by clients can be imported into it, or custom models can be created based on the exact measurements of clients. [4]

MD Best Nest *does the nesting automatically and performs optimizations in the time frame established by the user. Manual nesting can also be done, or combinations of manual work and automation.* [4]

The output of the MD Best Nest program is an optimized nesting of the model's patterns, which can be printed on a plotter (in HPGL format) at a 1:1 scale. Also, the optimized nesting corresponding to a customer order is saved in the cutting blueprint based on which that particular model will be cut. [4]

The MD Visual program helps convert patterns for a model made from paper or fabric, into digital format. This requires a camera and a contrast surface (large table with a black surface). The camera is connected to a computer on which the MD Visual program is installed. After the image is captured, the application converts it in geometric shapes and technical elements. [4]

The goal of the project was to design, using the Morgan Dynamics software, a men's shirt, S size, made 100% of cotton.[2]



Figure 1. Men's shirt [2]

Left front has an ironed placket, 4cm wide.

Right front has a contrasting placket, 2.5cm wide.

The back has pleats and is made from two pieces: inset and tail.

The sleeves have two pleats and flat, 8cm long cuffs.

The collar has two distinct parts, cut separately:

- collar height is triple, in different contrasts, with different sizes;
- collar yoke.









Contrast piece 1: button placket; full yoke; the high collar; inner cuffs.

Contrast piece 2: middle collar.

The shirt has 14 buttonholes sewn with white thread, of which 10 buttonholes are on the front, in groups of two, and 4 are on the two cuffs.

2. DESIGNING PATTERNS IN MD PATTERN DESIGN


Table 1. The work modes in the MD Pattern Design software [4]


	PIECE
	MODIFY
	DRAW
	INDUSTRIALIZE
	DIGITIZE
	GRADE
	MEASURE AND CHECK
	MADE TO MEASURE



There are two ways of creating new models, which are: drawing and digitization. To build this shirt model both methods will be used. The first method will be drawing.

2.1. Designing front, back and sleeves by drawing

Building a new piece is done by drawing lines and points, freehand or by using math functions to establish distances, angles, movements and also by using functions to draw rectangles and squares, circles or ellipses. [4]

For the front, a rectangle was drawn in **Drawing mode** . While drawing, the app shows the measures of the shape, in the bottom left corner. These can be modified after drawing, by changing the values in the fields. The changes are applied to the shape by pressing the „Apply” button.

In the **Modify mode**  waypoints were created, to obtain the desired dimensions. After creating the waypoints, the internal guides were created using

Industrialize mode , with the Create text guide  option.

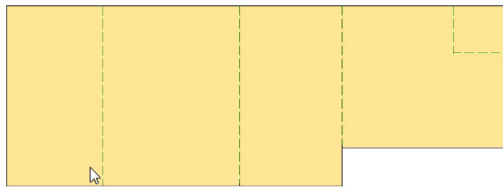


Figure 2. Designing the basic shapes for the front

Afterwards, in **Drawing mode** with the *Draw freehand or using lines and points*



option and the *Draw freehand or using curves and points*



option, the actual front

was designed with the points created earlier.

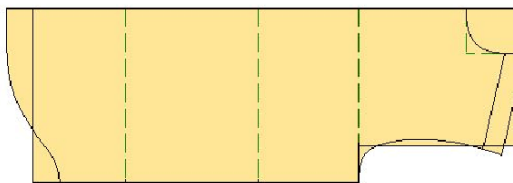


Figure 3. Designing the basic pattern for the front

These steps were repeated to create the back, sleeves and cuff, respectively.

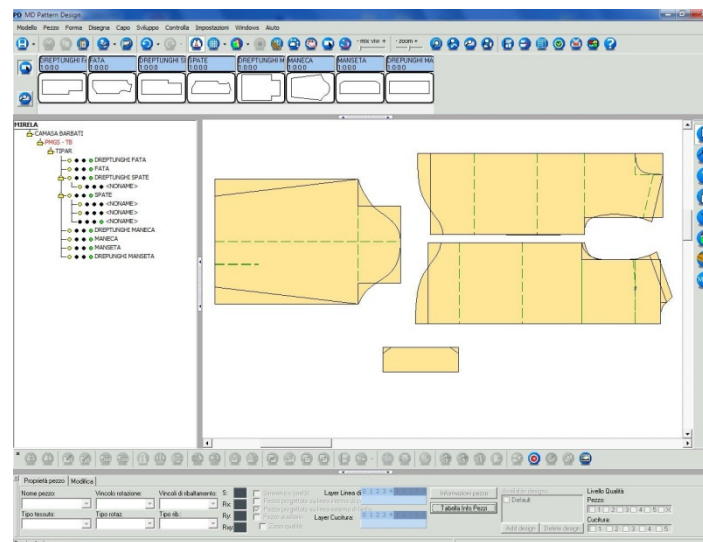


Figure 4. Designing the basic patterns

2.2. Designing the pattern for the collar through digitizing

For this part, the Morgan Dynamics Visual program was used, which contains a table with a contrasting surface and with a camera connected to the computer.

First, the pattern for the collar and yoke were done manually, then they were placed on the digitization surface and their captured image was automatically loaded in the MD Visual software.[2]

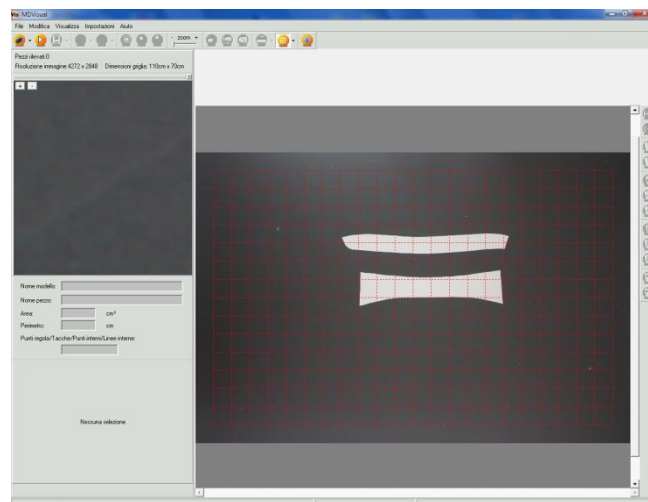


Figure 4. The patterns for collar and yoke after photographing

After the photograph was taken, the image was converted to MDY format and saved.

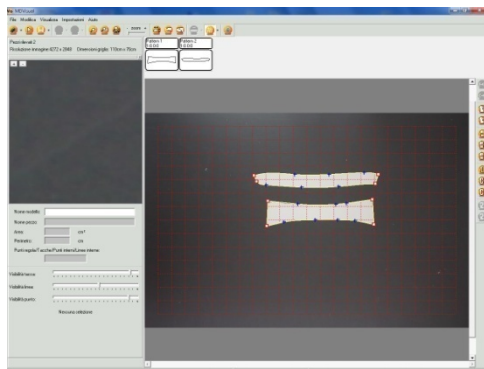


Figure 5. The patterns for collar and yoke in MD Visual, after conversion

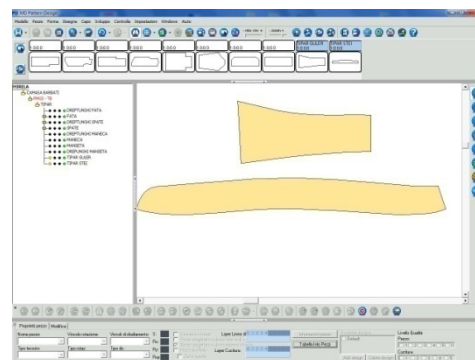


Figure 6. The patterns for collar and yoke saved in MD Pattern Design

To bring the captured image into the model project, the „Integrate” option is used.

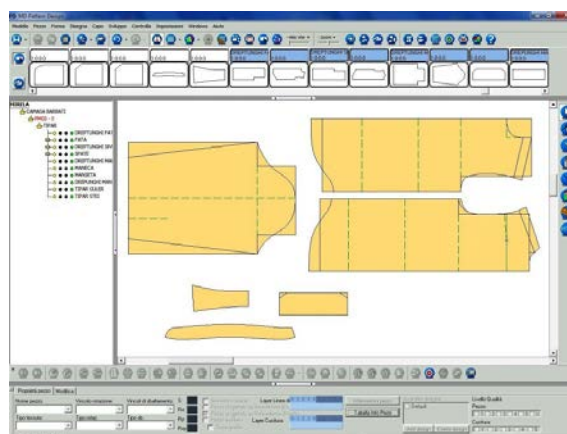


Figure 7. Designing the basic patterns

With the basic patterns in place, the next step was to transform the basic pattern into a model pattern. The model patterns are used as a base for obtaining templates. Templates are graded in order to obtain all sizes in the range. [1]

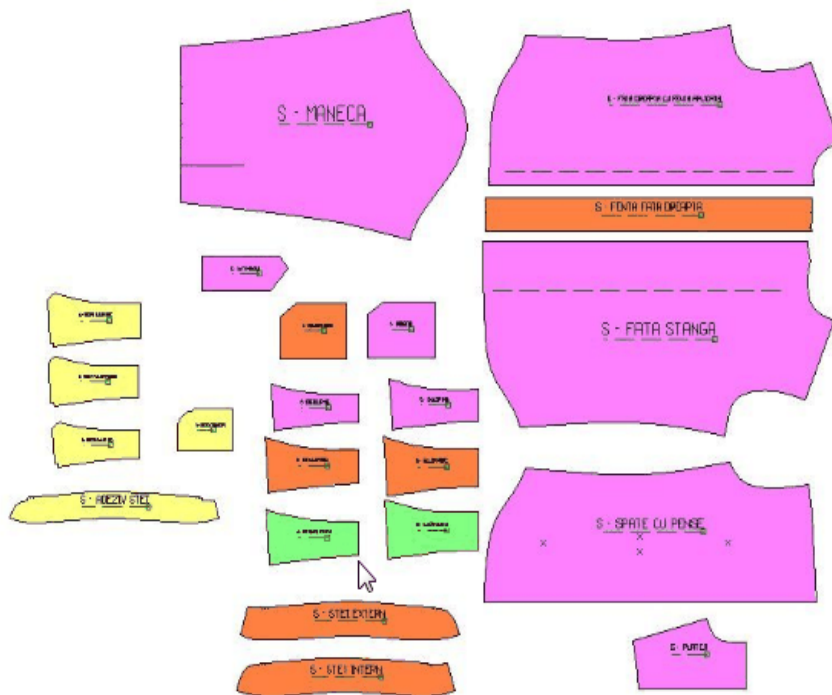


Figure 8. Men's shirt model

3. GRADING THE SHIRT

In *Grading mode* the option "Edit set sizes" was selected. In the pop-up window the sizes for the set were generated, from XS to XXXL. [2]

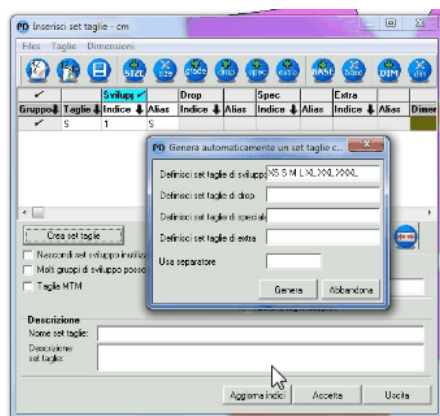


Figure 9. Editing the set of sizes

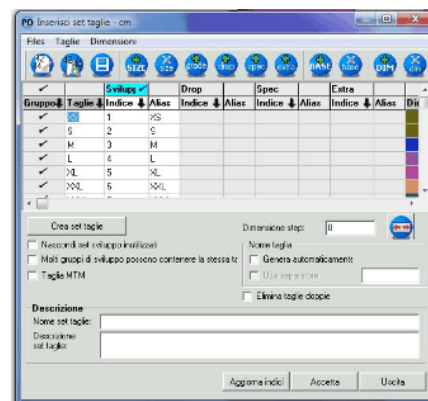


Figure 10. The set of sizes edited for sizes XS to XXXL

By pressing the „Generate” button, the newly created sizes were displayed, and then the „Accept” button was pressed.

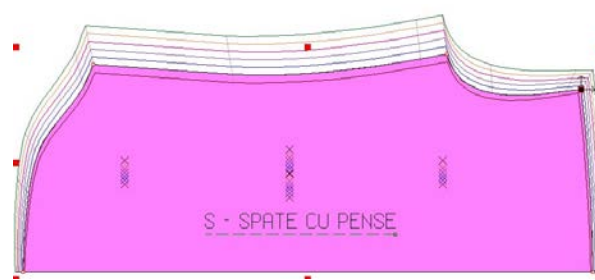


Figure 11. The graded sizes and their respective colors for the back are displayed

4. NESTING PATTERNS WITH MD BEST NEST PROGRAM

Launching the MD Best Nest program brought up the main window of the application, where the model was selected. The selection window was displayed and the folder and the „PMGY.mdy” type file were selected, respectively. After selecting the file, a window with all the guide marks of the product was loaded in the preview area, where the fabric type, fabric length, pieces, sizes and number of frames to be cut were selected, and the „Accept” button was pressed.

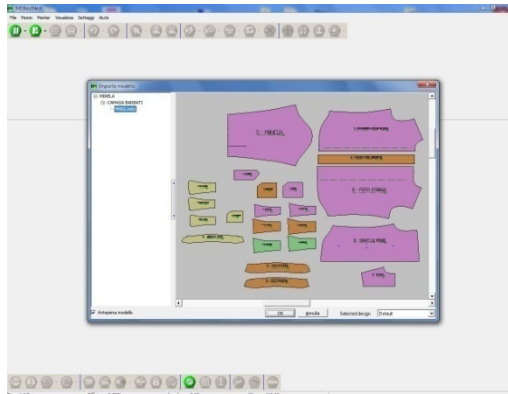


Figure 12. The model is loaded

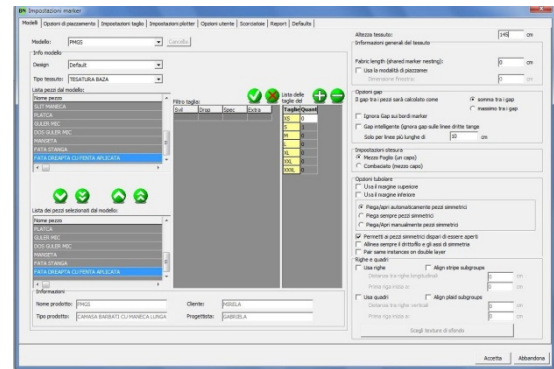



Figure 13. All the guide marks for the men's shirt are displayed



In the „Properties” table , rotation and flip type, space between the pieces and fabric shrinkage after laundering were selected.

In Progress parts														
#	Nome	Tagli	Quantità	Pezzi	Tipi stato	Stato	Tipi stato	Stato	Sub (T)	Ing (met)	SD (mm)	SD (mm)	Cap (mm)	Cat (T) / (S)
1	SPATE CUPPONE	S	1	0/1	Indipendente	ness.	Indipendente	ness.	0	0	0	0	0,1	0
2	FATA C'AVIGA	S	1	0/1	Indipendente	ness.	Indipendente	ness.	0	0	0	0	0,1	0
3	MANICA	S	1	0/1	Indipendente	ness.	Indipendente	ness.	0	0	0	0	0,1	0
4	MANICA PV	S	1	0/1	Indipendente	ness.	Indipendente	ness.	0	0	0	0	0,1	0
5	WED DREHPAT CUFFS	S	1	0/1	Indipendente	ness.	Indipendente	ness.	0	0	0	0	0,1	0
6	PLATICA	S	1	0/1	Indipendente	ness.	Indipendente	ness.	0	0	0	0	0,1	0
7	PLATICA PV	S	1	0/1	Indipendente	ness.	Indipendente	ness.	0	0	0	0	0,1	0
8	BALEN MIC	S	1	0/1	Indipendente	ness.	Indipendente	ness.	0	0	0	0	0,1	0
9	MANGETTA	S	2	0/2	Indipendente	ness.	Indipendente	ness.	0	0	0	0	0,1	0
10	ROD GLIDER MIC	S	1	0/1	Indipendente	ness.	Indipendente	ness.	0	0	0	0	0,1	0
11	SLT MANICA	S	1	0/1	Indipendente	ness.	Indipendente	ness.	0	0	0	0	0,1	0
12	SLT MANICA PV	S	1	0/1	Indipendente	ness.	Indipendente	ness.	0	0	0	0	0,1	0

Figure 14. Properties table for the pieces

The next step was to automatically nest the patterns by using the "Automatic nesting"



option. The time frame for the operation was established.

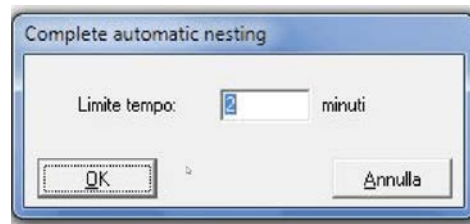


Figure 15. Time frame for automatic nesting

After automatic nesting was completed, the image was saved to a file and sent to the



plotter, by using the "Send file to plotter"

button, and was saved as "PMGS.plt".

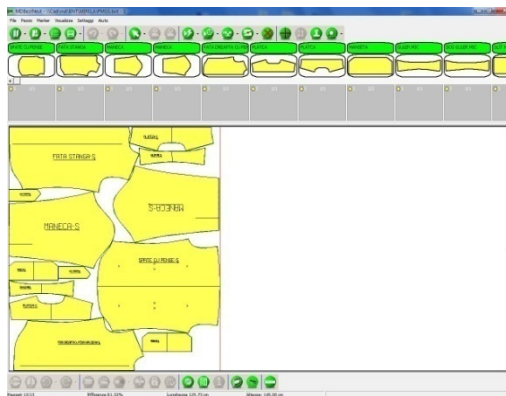


Figure 16. Simple nesting of base fabric

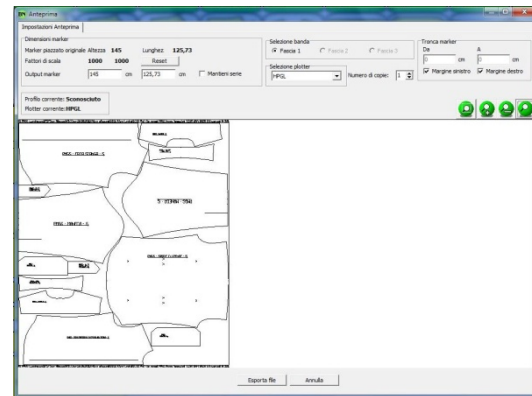


Figure 17. Sending the model to the plotter

As a final step the model can be sent to the automatic cutting machine, by pressing the



„Export file to ISO”

button, which produces a file with the „.cut” extension.

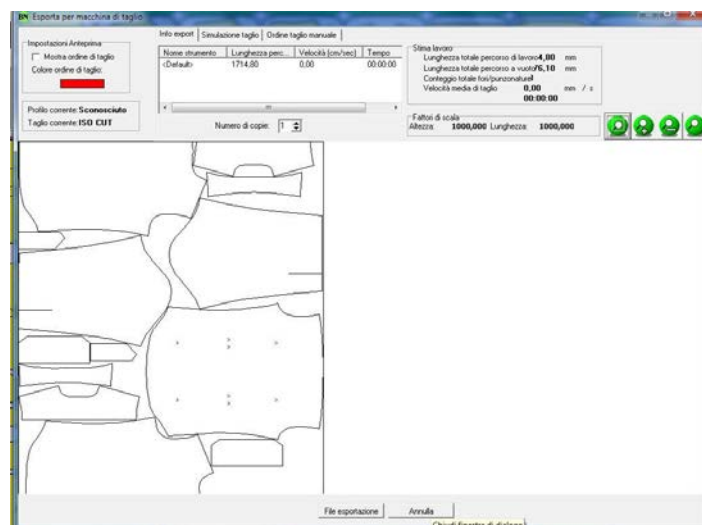


Figure 18. Exporting the file to the automatic cutting machine

The same procedure was applied for nesting adhesive and contrast fabric.

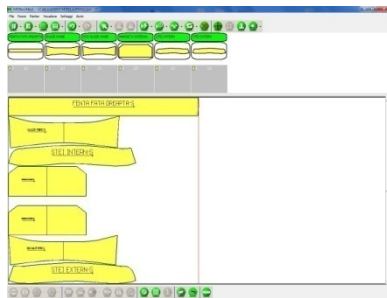


Figure 19. Simple nesting of contrast fabric 1

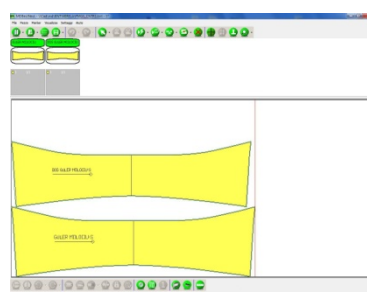


Figure 20. Simple nesting of contrast fabric 2

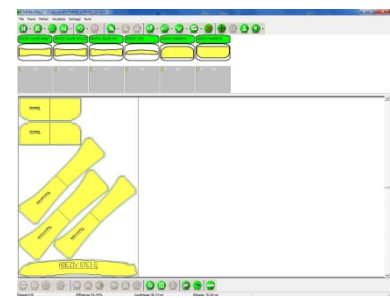


Figure 21. Simple nesting of adhesive

Both simple nesting (just for size S), and combined nesting (sizes S, L, XXXL) were done.

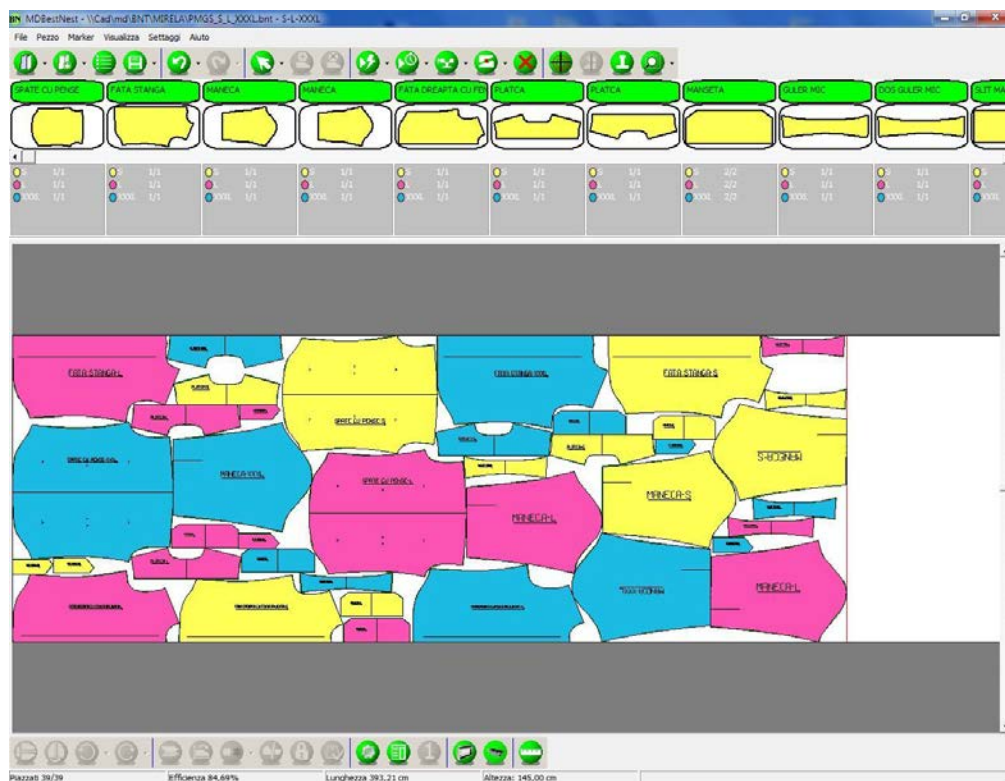


Figure 22. Combined nesting of three sizes for the base fabric

After all the nesting was done in MD Best Nest, the images for the model can be printed on the plotter.

5. CONCLUSION

It was noted that using the simple nesting (size S) for this shirt model leads to a higher fabric consumption than using combined nesting of three sizes (S, L, XXXL), the nesting efficiency for a fabric 1.45m wide being 81.32% for size S and 84.69% for three nested sizes.

Collar digitization was done in just a few minutes using the camera, while using the classic digitization system would have required approximately 30 minutes.

6. REFERENCES

- [1] Pintilie, E., Ciubotaru, G., Avadanei, M. (2010). Proiectarea confecțiilor textile asistată pe calculator, Ed. Performantica, Iași.
- [2] Pop, M. (2012). Disertație, Proiectarea unei cămăși pentru bărbați cu ajutorul programului MORGAN DYNAMICS, Universitatea din Oradea, iulie 2012, Oradea.
- [3] Vircan, A., Avădanei, M., Mitu, S.(2010). Flexible solution for designing garments pattern (GEMINI CAD SYSTEM), 7th International Conference - TEXSCI 2010, September 6-8, Liberec, Czech Republic
- [4] *** - MD CAD -Quick Manual
- [5] *** www.morgantecnica.it/pages

NATURAL RESOURCE MANAGEMENT AS A FUNCTION OF ENVIRONMENTAL CONSERVATION

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Abstract: *The protection and preservation of a healthy environment is an imperative of any modern society. It is a wide range of duties that relate to large number of subjects, from citizens through business entities (companies, enterprises, entrepreneurs) to local governments and the highest social bodies and institutions. Business activities greatly endanger the living environment. Most affected are benefits of the earth - air, water, forests, flora and fauna. This leads even to the question of survival of all living beings on earth. Conflict relations between economy and ecology can be reconciled only with adequate management of natural resources. Namely, using the resources of nature must not endanger the living environment and resulting environmental damage must be repaired. In addition, exploitation of renewable natural resources should be in line with the process of their regeneration, and the use of nonrenewable resources must be conducted in an extremely rational manner, with maximal representation of substitutes and the recycling process.*

1. INTRODUCTION

One of the basic principles of sustainable development is, of course, improvement of environmental quality. Unfortunately there was no adequate attention paid to this matter. Serious debates on this issue started during seventies of last century within the consideration of limits to economic growth.

Otherwise, the World is now faced with serious environmental problems of planetary importance, such as:

- "Ozone holes"- damaging the ozone layer that protects all living things on Earth from harmful ultraviolet rays of the sun;
- "Greenhouse effect"- continual warming of the planet that could lead to melting of eternal snow and ice, and thus to increase water levels of seas and oceans;
- "Harvesting" Amazonian rainforest - considered to be the lungs of the planet, thereby directly threatening the world climate.
- "Increased pollution"- as a result of rapid economic development (1).

For this reason, the exploitation and use of natural resources must not undermine the capacity of the living environment. The mankind must pay more attention to natural values as air, water, soil, forests, geological resources, flora and fauna. In this sense, natural resource management is gaining in importance.

2. TERM, DISTRIBUTION AND SIGNIFICANCE OF NATURAL RESOURCES

There is a considerable number of definitions of natural resources in economic theory. Every their author has his/her view and points out their character, their significance and the role in economic development, however, among these definitions there are no substantial results. We will point out some of them.

According to Komar, the resources mean energy that is used in the production process in accordance with the development of productive forces. According to Branko Djerić, natural resources constitute a special segment of manageable nature that is a part of nature that is used in the economic development and can be economically valorized.

Further, for Blagoje Zarkovic, natural resources are different types of natural wealth which are the basis of human life and its basic activities. Finally, a rather complete and comprehensive definition of natural resources was given by professor Gojko Rikalovic. According to him, 'the natural resources' are specific forms of natural conditions in that stage of economic development involved in the reproduction process and are directly exploited in the production or processing. What elements of nature will appear as natural resources depend on the achievements in the development of technology, the economic possibilities and appropriateness of use and the level of exploitation"(2).

From all the aforementioned it comes out that natural resources are only one part of the natural conditions, that is a gift of nature, which is used in the process of reproduction to create new useful values.

Otherwise, the resources in nature, depending on the criteria that are used in this field, are classified in different ways. One of the most common classifications is according to the degree of depletion. According to this division, all natural resources are classified as:

- Depletable, and
- Undepletable.

Depletable natural resources are reduced or depleted during use. Besides, it is especially important whether these resources are reproduced or regenerated by their use. Accordingly, depletable resources are divided into:

- Renewable energy, and
- Non-renewable

Natural resources as soil, flora and fauna and some mineral resources that renew or regenerate at exploiting belong to this group. In contrast to renewable, non-renewable natural resources reduce or deplete by use. Such characteristics have energy mineral resources as well as metals and nonmetals.

On the other hand, a particular group is made by undepletable natural resources. They are in the space frames considered final, but from the point of use are unlimited or abundant. The first group of natural resources include: solar energy, air, wind, water, seas and oceans, tides, geo energy etc. It should be pointed out that between depletable and undepletable natural resources there is no strictly established difference, however such division can be considered conditional.

In economic theories, in addition to this, there are also many other divisions of natural resources. Here are some of them:

According to the possibility of exploitation:

- Potential natural resources that will be used in the far future;
- Natural resources that are to be considered in the near future, and
- Natural resources, that can be used now.

According to the possibility of compensation:

- Recoverable, and
- Irreplaceable natural resources

According to the possibility of replacement – substitution:

- Replaceable, and
- Irreplaceable natural resources

According to the degree of exploration:

- Available, and
- Unavailable natural resources.

It is interesting to mention that the S. Milenkovic classifies all natural resources into 19 groups and N. Rainer in as many as 74 units.

Economic resources represent an important factor of economic development. Although their importance somehow decline due to continued advances of science, engineering and technology, knowledge, skills and craftsmanship in their work, they will still be an essential factor in defining the economic structure and economic development in general, especially in underdeveloped countries. Also, they play an important role in maintaining a healthy environment. Their exploitation should be conducted in conformity with prescribed standards without endangering living environment and human health.

3. MANAGEMENT OF ECONOMIC RESOURCES

Rapid economic development with environmental protection justifies the need to control economic resources. This is the wide public interest.

Otherwise, under the management of economic resources means a set of measures, methods and activities that provide the optimum level of exploitation of these resources to the achievement of desired economic and social objectives. Basically, these activities are based on the principles and assumptions of the concept of sustainable development. In addition, the sustainable development means the harmonized system of technical, technological, economic and social activities in the overall development in which natural and real values of the Republic of Serbia are used on the principles of economy and ratio in order to preserve and enhance environmental quality for present and future generations" (10).

Management of natural resources includes three segments:

- Strategic planning,
- Realization of the strategic settings, and
- Controlling the execution of strategic goals.

Management of natural resources begins with strategic planning. This is the first stage at which goals and objectives and the means and methods to achieve them are established. Relevant documents define the level of exploration of natural resources by type, spatial distribution, diversity, volume and quality, then, the balance sheet categories (spatial and temporal features, quantity, quality, vulnerability, reproducibility, strategic reserves) and the foreseen trends of change and way of evaluating the conditions for sustainable economic use of resources and goods. Then, for each individual economic resource and the good, through plans, programs and principles the ways of utilization and protection are carefully elaborated.

The next stage is the realization of goals and objectives stipulated by the strategic documents and plans, programs, and foundations. Legal entities and individuals use the natural resources on the basis of the offered projects and approval of the competent state authorities. In addition, economic and other entities are obliged when use natural resources to follow the appropriate legislative and other prescribed standards in this field.

Use and protection of natural resources and goods are subject of control of appropriate authorities. According to applicable legislation, the control of these activities is performed by authorities and organizations of the Republic of Serbia, the Autonomous Province of Vojvodina and local authorities.

In the past, the pursuit of a rapid economic development, caused a high degree of depletion of natural resources both renewable and non-renewable, which led to some disruption of balance in nature and threats to the environment. Here are a few examples:

In the second half of 20th century due to poor processing methods about 550 million hectares, or one third of arable land all over the world was degraded. Such tendencies are still in progress;

Reduction of the forest area. It is estimated that the annual cut down is about 30 million hectares of forest. It has an unfavorable impact on the ecosystem, given that forests absorb large amounts of harmful carbon dioxide while producing necessary oxygen.

Besides, other resources as water, flora and fauna, air and living environment in general are endangered. In some areas the situation is alarming. Something similar is the situation of non-renewable resources.

In such circumstances, the question arises: how to harmonize relations between economy and ecology? The answer is to be found in the strict application of the concept of sustainable development.

3.1. MANAGEMENT OF RENEWABLE NATURAL

Renewable resources, as noted above, represent a special group of depletable resources. They are spent at use, but at the same time restore, or regenerate. The essence of management of these resources is reflected in harmonizing the relationship between the degree of depletion and the degree of regeneration.

Bearing in mind that the flora and fauna are the most important segment of renewable resources, the greatest attention is paid to management of these resources. Every year an annual plan of production (growth) is made for each species of plants and animals as well as for the scope of use (depletion), then, the way of the plan realization, and ultimately the control of execution of planned objectives.

Accordingly, the annual volumetric increase of timber in the year 2007 in the forests of Serbia is 9,079,772 m³, while the volume of forest cut amounts 2,247,000 m³ which is several times smaller than the increment. To this fact the resulting damage to forests as for example natural drying and a certain amount of uncontrolled timber cut that is not recorded should be added to this calculation.

Special attention is given to the wild flora and fauna. By appropriate regulation issued by the Government of the Republic of Serbia, various species of flora, fauna and mushrooms are considered as a protected species and under what level of control can be collected from natural habitats, use and trade. The main objective of oversight of the collection, use and trade of protected species is based on ensuring their sustainable use, preventing the collection of these species from natural habitats in amounts and ways that would threaten their survival in the future, the structure and stability of such living communities.

Based on the estimated status of species in their natural habitats, every year the annual quantities of protected species that may be collected for commercial purposes are established. In addition, for each protected species the conditions and manner of collection are regulated. So, for example, collecting endangered species of flora, depending on which parts or developmental stages are used, are under condition that such species are collected in the optimal stage of vegetative development for use. It is also regulated at what species where underground organs are used, a part of the underground organ is to be left in the soil together with vegetative bud.

According to a prescribed contingent of wild plant species, and the advertised announcement, the competent ministry shall grant license to interested legal entities and entrepreneurs for the collection, use and trade of wild flora. For this purpose, an adequate compensation will be paid.

The species and quantities of wild plants that can be collected in the year 2011. are shown in the table below.

Table 1 - Contingents of wild flora and mushrooms that can be collected in the 2011 (Selected species with larger quantities)

No. Latin name	Traditional English name (for existing) plants	Quantity in kg
A. PLANT SPECIES		
1. Achilla millefolium L.	1. Milfoil, Verbena	140,000
2. Allium L. ursinum	2. Cremosa, Bear garlic	500,000
3. Althaea officinalis L.	3. Marshmallow, Sweet Mallow	230,000
4. Betula pendula Roth	4. Birch	160,000
5. Centaurium umbelatum Gilib	5. Brush, stave, Grass of fever	25,000
6. Cornus mas L.	6. Cornel berry	200,000
7. Corylus avellana L.	7. Hazel, hazelnut	50,000
8. Crataegus monogyna Jacq.	8. White hawthorn, hawthorn	260,000
9. Crataegus L. oxycantlia	9. Red hawthorn	100,000
10. Equisetum arvense L.	10. Hosetail, Moor panicles	200,000
11. Fragaria vesca L.	11. Wild Strawberry, Strawberry	330,000
12. Galium verum L.	12. Lady's flowers, St John's grass	50,000
13. Geranium robertianum L.	13. Mercury grass, Needle	80,000
14. Hedera helix L.	14. Ivy	300,000
15. Hypericum perforatum	15. St. John's Wort, Virgin's grass	250,000
16. Juniperus cernua	16. Juniper, Cade	2,000,000
17. Juniperus communis L. Ssp. nana Syme	17. Low Juniper	100,000
18. Mililotus officinalis L. Pa llas	18. Melilot	120,000
19. Ononis spinosa L.	19. Rabbit thorn, Wolf thorn	100,000
20. Origanum vulgare L.	20. Oregano	100,000
21. Petasites hybridus L.	21. Cocklebur	150,000
22. Prinus spinosa L.	22. Blackthorn	180,000
23. Rosa canina L.	23. Wild Rose, Hip rose	5,000,000
24. Rubus fruticosus L.	24. Blackberry	2,200,000
25. Rubus idaeus L.	25. Raspberry	110,000
26. Sambucus nigra L,	26. Elder blossom and berry	1,200,000
27. Symphytum officinale L.	27. Black comfrey, comfrey	300,000
28. Teuorium chamaedrys L.	28. No traditional name	50,000
29. Thymus serpyllum	29. Thyme	300,000
30. Tilia tomentosa Moench	30. White lime, Silver linden	80,000
31. Vaccinium myrtillus L.	31. Blueberry	3,100,000

B. MUSHROOMS		
1. Boletus edulis Bull. Fr	1. Summer, autumn porcini	5,000,000
2. Cantharellus cibarius L.Fr.	2. Chanterelle	1,800,000
3. Craterellus cornucopioides Pers.	3. Brown trumpet	500,000
4. Lactarius deliciosus LSFGray	4. No traditional name	150,000
5. Marasmius oreades Fr.	5. Oread	50,000

A similar procedure is carried out for wildlife fauna is concerned. For example, collecting of protected species of snails can be done from 1 June to 1 October, frogs from 1 June to 1 August and fish (beluga) from 1 June of 31 March of the next year. It is forbidden to collect, use and trade the following sizes of protected species – snails with shells width less than 3 cm, frogs weighing less than 50 grams and bigger ones of more than 120 grams, or length of less than 9 and bigger than 15 cm, more than 50 individuals of horned viper at the site of collection and whose length is less than 50 cm and males at the site collection and whose length is less than 50 cm, and beluga male, whose length is less than 180 cm in length and females less than 210 cm.

The species and quantities of animal species that can be collected in the year 2011 are given in the table below.

Table 2 - Contingents of fauna that can be collected in the year 2011.

No.	No. Latin Name	Traditional english name	Quantity in kg
1.	Hirudo medicinalis	Medical leech	500
2.	Pelophylax kl. esculenta	Edible frog	5,000
3.	Pelophylax ridibundus	Frog	5,000
4.	Pelophylax lessonae	Little Frog	5,000
5.	Helix aspersa	Garden snail	200,000
6.	Helix leucoru	Forest gray snail	200,000
7.	Helix pomatia	Vineyard snail	200,000

Depending on the assessment of the situation in the field, the Ministry may provisionally prohibit the collection of certain endangered species of flora and fauna in certain areas, or on the other hand, in the entire state. In this way it protects the survival of some species and prevents disturbance of the structure and stability of living communities. However, it should be noted that many failures occur in this field. There is no adequate assessment of the situation in the field, so it happens that much larger contingents of objectively possible are approved for collecting and trading. This can greatly endanger the continued survival of some species, especially flora. Such is the case with the following species of wild flora: Alchemilla sp., Centaurea umbellata Gilib, incana Lam., Lamium albumh., Marrubium vulgare L., Polygonum bistorta L., Potentilla erecta (L) Rauschel, Primula elatior (L) Hill, Primula veris L., Primula vulgaris Hudson etc.

Besides the aforementioned, it is important to add to the state of the hunting game. In this field every year a draft plan containing the state of hunting game and allowed shooting possibility. This plan applies to the Republic of Serbia and hunting areas - regions. In doing so, one must take into account the sustainable use, in order not to jeopardize the survival of certain species.

The following explanations present some examples of management of renewable natural resources. Similar approach is applied in other areas when these resources are concerned.

3.2. MANAGING NON-RENEWABLE NATURAL

Unlike the previous group of resources, management of non-renewable natural resources is much more complicated and complex. These resources permanently reduce by their utilization. This group includes mineral resources.

Mineral resources, because of their specificity, require adequate management, primarily of strategic character, in order to achieve desired goal by their exploitation, above all, the optimum level of efficiency and effectiveness.

The basic approach in the management of non-renewable natural resources (minimal resources) reflects a high degree of rationality in their use. This is achieved by intensive exploitation whose main goal is to achieve maximum utility with the minimal possible natural resources.

By strategic management of mineral resources at one side, their quasi-use, should be provided and on the other side, the planned economic growth. In other words, the management of these resources has to ensure achievement of sustainable development.

When it comes to managing of non-renewable resources, the question of substitution and recycling is unavoidable. This is one of the ways of their conservation and rational use. Development of science and technology opens the way for the application of various forms of substitution. This particularly applies to the replacement of non-renewable resources, and finding suitable substitutes for nonrenewable natural resources.

The other area, also of importance for the management of natural resources is recycling. The advantages of recycling are numerous: protection and conservation of natural resources, ensuring quality and low cost of raw materials for processing industry, maintaining a healthy environment etc.

Exploitation of mineral resources can greatly undermine the quality of the living environment. This usually leads to land degradation, destruction of flora, pollution of the environment - air, water, to the endangerment of human health.

The essence of management of mineral resources in these circumstances is reflected in the effort to reduce the damage to the natural environment, as well as their proper removal. Environmental costs borne by entities that led to their creation. They are counted in the cost and further transferred to selling prices of products.

In this respect the principle of prevention and precaution provides that "any activity must be planned and implemented so as to: cause the least possible change in the living environment, is the least risk to the environment and human health, reduce the load space and the consumption of raw materials and energy in building , production, distribution and utilisation, include the possibility of recycling, prevent or limit environmental impact at the very source of pollution.

The precautionary principle is realized by assessment of environmental impact and using the best available technology and achieved technology, know-how and equipment'. (10).

4. CONCLUSION

Natural resources are an essential factor of economic development and preserving a healthy environment all over the world. Although their importance is somehow declining in terms of economic development, because other factors of development get more and more important role (technology, know-how and especially knowledge), thus their role in the ecological sense is growing.

Economy and ecology ones from two conflict areas have become complementary ones. Permanent technical and technological progress allows business activities without any major damage to the environment at one side, while a healthy natural environment contributes to the preservation of natural values and human health, on the other side. This provides both economic growth and conservation of the living environment.

The realization of such complex goals can be achieved only with adequate management of natural resources. It is a complex and responsible but inevitable process in contemporary business activities. Only by sustainable use of natural resources (renewable and non-renewable) economics and ecological stability all this can be achieved with the goal of economic development and increase of overall human welfare.

5. REFERENCES

- [1] R. Nikolić, Ekonomija prirodnih resursa, Kompjuter centar, Bor, 2010.
- [2] G. Rikalović, Ekonomika prirodnih resursa, Biblioteka "Dr Djordje Natošević", Indjija, 1999.
- [3] T.S. Hačutarov, Ekonomika pripodopljzvanja, Nauka, Moskva, 1987.
- [4] J. Bluden, Mineral Resources and their Management, Longman, London, 1985.
- [5] B. Skinner, Marth Resources, Yale, University, 1989.
- [6] Grupa autora, Ekonomija prirodnog kapitala, Institut ekonomskih nauka, Beograd, 1998.
- [7] Pearce, D.W., R.K. Turner, Economics of natural resources and the environment, New York et al, 1990.
- [8] B. Milenković, Ekološka ekonomija, Fakultet zaštite na radu, Niš, 2000.
- [9] S. Milenković, Resursi u ekonomiji, Ekonomski fakultet, Kragujevac, 2000.
- [10] Zakon o zaštiti životne sredine, „Sl. glasnik RS“, br. 135/04.

NEGOTIATION SKILLS AND NON-VERBAL COMMUNICATION

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Abstract: *This paper discusses the basic psychological and communicational factors, as well as negotiating skills that are necessary for successful business negotiations. The aim is to explain the importance of non-verbal communication, in particular the acquisition of communicational skills which are needed for successful negotiations.*

Keywords: *communication, gesture, improvisation, mime expressions, space, listening*

1. INTRODUCTION

Successful business negotiation depends on many factors and requires knowledge of the multiple disciplines that a negotiator should master so that their negotiation activities lead to positive results. In order to master the art of negotiation, it is necessary to know the basic principles of communication studies - an interdisciplinary science that has its roots in the arts such as rhetoric, grammar, philosophy, psychology, linguistics etc. Today communication studies link with psychoanalysis, neurology, computer science and sociology.

When communicating with other people, consciously or unconsciously, controlled or spontaneously, along with words we use facial expressions, posture, gestures, spatial and temporal situation in which we communicate, modulation of voice, style of dress, etc., all of which fall within the scope of non-verbal communication. Non-verbal communication is often referred to as body language.

2. NON-VERBAL COMMUNICATION - THE ROLE AND IMPORTANCE OF

Non-verbal signals show thoughts and emotions, attitudes and traits. They also support verbal communication or they are a substitute for it. Gestures reveal moods and states, enabling us to express agreement or disagreement, acceptance or rejection.

Any gesture can be seen as a specific act that indicates an action, starting someone or something. Most modern research in the field of Communication Studies shows that non-verbal communication is crucial in the first contact. As much as 60% of a complete impression when meeting (first impression) is formed on the basis of non-verbal communication. This moment is settled in the domain of intuitive, unconscious.

Words are often the backbone of human communication, but words can often deceive, mislead or hurt if the evidence is not properly and clearly formed, or is wrongly decoded. If the meaning and content are not transmitted and perceived in a desired way, it means that an error has occurred in the process of communication. Body language, then, is the solution, i.e., the communication bridge. In many cases, non-verbal signals are at an advantage compared to the verbal ones, as they are prejudice free.

Every speaker's aspiration is to harmonize the basic means of expression - voice, gesture, speech, statement and posture. The gesture is sometimes used to supplement, explain or illustrate the text. On the other hand, the movement can be in contradiction with

the text – as a sign that expresses a deliberate, targeted contradiction. The relationship between a gesture and a text can be seen in mutual conjunction of several ways:

- When the text is dominant, content and voice constants show all the speaker's intentions. The gesture is reduced, minimal, expressed through the motions of seeing and mime;
- The gesture complements, highlights the text, that is, the purpose is to supplement and interpret;
- The gesture only follows the emphasized parts of speech, the focus of the argument. The attention of a listener is drawn to the most important place in the speech. The movement acts as a figure of gradation and the voice constant loudness may be accompanied by energetic gestures;
- The movement is emphasized, especially manual gestures. The function of gesture is explanation, not a personal crutch, but a deliberate gesture.
- Sudden, unexpected, spontaneous movement acts as a moment of deceived expectations, as an improvisation in a place of speech in which it is least expected. The movement can be quick, abrupt. The essential argument is usually emphasizes by movements such as standing up, walking, moving from one place to another, etc.;
- Disciplined action is actually part of preparation and strategy for a show. These are the movements of the whole body, that is, the body language.

The choice of means of non-verbal communication depends on the area, of the environment, time available, as well as the number of participants, or listeners. Addressing a wide audience in the larger space requires larger, wider gestures, whereas the dialogue with one participant in a smaller space and political speeches require careful choice movement, gestures and poses, as well as their alignment with speech act.

This essay will explain the three types (levels) of non-verbal communication. These are:

- a) conscious
- b) unconscious
- c) manipulative non-verbal communication.

Conscious non-verbal communication represents a conscious and controlled movement, aimed at the listener, a verbal flow and specific space. This type of communication does not mean practicing movements to perfection although sometimes there is some practice to be used in complex negotiations. The conscious control of one's body movements and, taking a particular position in space and free, spontaneous movement in space means that there is a controlled selection of potential non-verbal signals.

Business people need to know the specific standards, and the personal creativity and imagination will dictate how individuals use them and transform. Standard, for example, covers how to sit (upright, not too reclined, or on the edge of the chair). It is understood that there should be the movements of getting up, greeting, welcoming clients, etc.

Unconscious non-verbal communication is a series of movements, often involuntary. The breathing muscles move—there is breathing in and breathing out, then the muscles in the mouth move, which means the activation of facial musculature. Breathing is itself a movement, as well as the voice. Frown, licking, swallowing saliva, eyebrow lifting,

twisting and twitching of the lips –these are the movements that are involuntary and unconscious. Extremely negative aretics - nasty, petty, repetitive, involuntary movements. Involuntary actions like moving, exaggerated gestures, “wandering” look, peeking back and forth, wildly spinning, etc., interfere with verbal communication and reveal an insecure and frightened person or else, a person unprepared for the interview or performance.

There are details of dress and behaviour that give away a person. Overstressed makeup, for example, gives away a heightened desire to be liked. Promotion and wearing jewellery is often referred to as splurge, while colourful socks with classic men's suits reveal negligence. These are the details that either point to a certain insecurity that is covered by the exterior decoration or negligence. A negligent behaviour, dress and movement point to under-concentration.

Many complex situations can block the nervous system and movement, which then become forced, agitated, tight, excessive, nervous, etc. For this reason there should always be a self-control and conscious management of behaviour and body movements.

Manipulative non-verbal communication is used with the intention of practicing non-verbal communication to perfection in order to present a certain pattern of behaviour that needs to seem natural and relaxed. With this kind of behaviour we give the listener a wrong picture, deliberate misinformation and the desired, intended impression in order to achieve a certain goal. The aim of this calculated conduct is to confuse the caller. These kinds of behaviour can be noticed in polemical discussions, debates in court, in meetings, in meetings of statesmen or leaders of large companies. During the latter meeting the seating arrangements, division of the space and posture are taken into account. The territory is usually “defended” by one team in the negotiations sitting at one side and the other team on the other side of the table. As for the negotiations that are taking place in the office, the negotiators can sit facing each other, side by side, on the diagonal, very far from or opposite each other.

Arranging the position of the parties in the area expresses a “good tone” when guests are welcomed in a friendly, hospitable, warm manner. Spatial distribution is often used with a quite opposite intention, when it comes to important negotiations, for example, buying large companies. Then, the negotiators are deliberately put at a disadvantage by giving them specific seats, or specific places to stand. A variety of forms of behaviour that aren’t usually part of the established patterns of business etiquette is used. If respondents or clients use other forms of behaviour in negotiations, some additional psycho-social elements, especially guidance and persuasion are included. In these cases non-verbal communication is necessary.

Non-verbal communication includes all forms of non-speech human behaviour and expression of thoughts and feelings such as: a handshake, a position, i.e., body posture, a shoulder position, facial expression, breathing, expression and eye movements, view focus, leg and arm movements, gestures, tics, touching parts of the body, the distance of the interlocutors, the overall appearance-a salesman’s look (dressing, body hygiene, etc.), as well as non-verbal signs in speech behaviour.

A good relationship between verbal and non-verbal communication leads to active participation in communication at the level of the conscious and the unconscious. The elegance and attractiveness of the movement or of dress provokes our unconscious desire to be with that person in contact and to maintain and extend the communication with him/her.

The system of non-verbal communication consists of a sequence of movements such as:

- Directing the view;
- Mime expression –facial expression;
- Listening;
- The hand movements;
- Movement in space;
- The position of the body in space;
- Group arrangement in space.

3. VIEW FOCUSING

Watching as the permanent movement that fully reveals a personality isn't thought of enough. Watching presents an orientation to the other party, and signifies that both parties in the dialogue care about communication. Fixing the gaze, however, is not free, it is frantic behaviour, while a wandering glance presents unfocused viewing.

When you meet, recognize, re-meet a person, etc., eye contact is a signal by which we give a partner the sign that we want to make contact, and that there is recognition. Also, if you avoid making an eye contact - the caller is given the sign that there is a disconnection. Distractions are used in order to avoid an unpleasant partner in communication. Unconscious blinking, winking, a wandering glance, give away a deconcentrated or frightened person.

Pupillary signals, according to psychologists, are indicators of mood changes, i.e., the expansion and contraction of the pupils are signs that can indicate an argument, a conflict, sympathy and so on. We look at each other when:

- 1) we meet for the first time;
- 2) we greet one another;
- 3) we exchange information;
- 4) we listen actively;
- 5) we show interest and attention;
- 6) we observe our partner's reaction.

It is especially important to synchronise watching and listening.

4. MIME - FACIAL EXPRESSION

Statistics show that facial muscles make thousands of movements while we watch, laugh, cry, talk, etc. The facial expression is a hallmark of personality. A person may seem as light, dark, ice, shameful, friendly, etc. Mime is a direct gesture such as movement of the eyes, cheeks, lips, cheek muscles, etc. Some faces reveal everything: emotions and thoughts, mood, state of mind. Others are motionless, like masks.

Expressive gestures, like laughter or a smile, make communication casual, pleasant and natural, only if really honest, cheerful tones and mood prevail. In the case when personal insecurity is covered by constant smiling, or a desire to be liked, a number of these movements can be converted into a spasm, a mask of smiles, and give the overall impression that the person is inclined to "communication flirting". A smile does not have to mean a movement of stretching and spreading lips. A smile includes eyes, as well as the entire face.

Open, friendly, smiling faces are more attractive than sombre, closed and immobile face. However, if the smile is not sincere, it is worthless and counterproductive to make movements that create a mask of smiles.

Movements of the head, above all, express approval or disapproval. Much more common movement is nodding – moving the head up and down while listening to someone. But we sometimes even unconsciously move our head slightly to the right or to the left, or wave the head in terms of disapproval and so we show the speaker that we disagree with him/ her.

American psychological research has led to the conclusion that the likes at the first meeting are due to a friendly expression (55%), to a friendly tone of voice (38%) and to the content of the message (7%).

5. LISTENING AS A PROCESS OF COMMUNICATION

Listening facilitates receiving and understanding of the message, and thus determining its meaning. Listening can be internal and external. In internal listening we listen to our own voice and words (i.e., thoughts), and external listening involves the world around us.

To listen actively means to take the role of the customer, which is not easy. It requires concentration and some effort. In active listening the “shop assistant” listens to what the “customer” says, looking at what the customer does, assesses the content of the information received, and separates the important from the unimportant.

- a) The act of listening provides that:
- b) The participant in communication fully understands;
- c) the information is properly received and decoded;
- d) the manner in which respondent sends the message is revealed ;
- e) the key issue is developed and set;
- f) the participant or speaker is supported.

Speech without listening is a one-way street. To hear someone does not mean to listen to them. The very listening does not mean that the words have reached the listener. Sometimes the rhythm of listening is faster than the rhythm of speech, and "the listener" is left some time for his/ her own thoughts. Sometimes "the listener" estimates that there is no benefit from listening, and is rather amused by his/ her own thoughts.

Basically, active listening is a need to understand and march towards a common goal. When you listen carefully, you show understanding for people, care and compassion. When the partners listen actively in any kind of communication, they gain mutual trust, it is easier to communicate and solve a problem. Non-verbal signals, facial expressions, body position, motions of approval, show our partner in communication that we listen carefully. Listening can be compromised by the manifest aggression coming from any side. Aggression is always a consequence of placing one, two or more parties, in the first place in communication, emphasizing the individual who considers him/ herself the centre of attention and who tries to impose their own topics and ideas.

6. THE ARM MOVEMENTS

Arm movements, hand or finger movements that are expressed unconsciously or consciously do the talking, informing and explaining. Arms and hands are used for “painting”, “drawing “what is explained, almost pantomimic gesture underlines a

statement. Manual gesture is significant, but exaggerated gestures interrupt the flow of communication. Movement can divert attention from the words-a topic and verbal part of the process, the information flow, so that the focus is finally lost in the constant motion. Some people have exaggerated gestures during a speech, which gives the communication a too theatrical feature. On the other hand, some people are quite relaxed, their arms crossed on their chest, and the third party, however, are those who are still and immobile during the act of speaking or listening.

Banging with a hand on the table, crossed arms, turning thumbs are so- called " signs of barriers". These distracting gesture raise an invisible wall between the participants, and they can mean a kind of tension. The movements of finger-pointing, slamming with a hand, getting too close, face to face with a person, act as aggressive behaviour that cannot attract and convince the partner in communication, as it could by force of will and positive energy.

Gesturing movement should be consistent with the verbal act, it should emphasize a word or be a replacement for it. Abrupt movement of the arm (hand) can interrupted a monologue, a dialogue, etc. Psychologists emphasise manual gestures in particular and explain the importance of different movements: arm, hand, fingers in both hands, part of arm from the elbow, shoulder, etc. Thus, they state the following:

- a) the palms facing up indicate that the partner in communication is ready and open for discussion –and getting closer;
- b) the palms facing down mean closing, the refusal of dialogue –and getting further;
- c) tapping with one or both hands means emphasizing and highlighting certain words or phrases;
- d) hand palms facing each other are a signal of reflection - hesitation;
- e) half-folded hand, palm facing the chest of the speaker means of referring to themselves;
- f) the palm open towards the other party with half-stretched arm at the elbow means stopping participant.

The finger language is also very interesting and may show certain conditions (for example, restless fingers express uncertainty, nervousness; intertwined fingers - contemplation; widespread - confidence, self-esteem). Clenched fist means anger, and fear. Arms and hands should be peacefully resting on a table or in your lap, against an armchair or chair. This emphasizes the relaxed and comfortable position of a person who is sure of him/ herself and takes a natural stance and posture.

It is very important that the hand movements are not inconsistent with the spoken text.

7. MOVEMENTS IN SPACE

Movement in space should be thoughtful, organized and controlled. Depending on the size of the area and the reason for gathering, the range of motions change, as well as posture and movement in space. Movement in the space of the office is kept to a minimum, unlike the sequence of movements when, for example, giving presentations or lectures in large halls, auditoriums and so on.

Eye contact should be taken in account, regardless of the number of listeners. It is important to take into account the distance in the space that we occupy in relations with others, since the distance reflects the type of connection and relationships. This rule does not apply equally for every situation. There are some differences in encounters with Asians, Americans or Europeans. When meeting strangers, introducing or meeting in the

open space, the distance between people should be about 120 cm. This distance is what the Europeans considered decent distance, and points out that the people do not know each other well, or that they have just met. When people meet in a smaller space, the distance is 80 cm. At this distance, closer ties establish. The third type is a distance of 50 cm and indicates that partners know each other well and that they are in good business contacts.

8. BODY POSITION IN SPACE

Active movement consists of a series of movements that lead to poses and change of position, location and direction of movement. Motion control involves perceptual moment, i.e. spotting the distance at which people or objects are, and also the speed of performing certain movements. Motion control means repetition, i.e. repetition of certain movements. Movement control can be tracked by the phases of motion:

- a) initiating movement;
- b) the duration of the movement - the determination of the speed of movement;
- c) emphasizing of the movement or maintaining it;
- d) the completion of the movement;
- e) transfer to another movement or rest.

Movements give away nervousness and do well in many situations. The accuracy with which the movements, postures and changing positions are performed, reveals not only the harmony and security, but it also assures the partner of the credibility of the person with whom he/she gets involved in different types of relationships. Disorientation in space, i.e., a wrong place, position or a way of sitting, puts the individual in a subordinate position from which he/she cannot respond, nor participate actively in the communication process.

There are predictable movements - forms, e.g. of greeting, meeting some old friends and acquaintances (hugging, kissing, etc.). It is offensive if you refuse these predictable movements, but, nevertheless, you should avoid too intrusive and heartfelt gestures in a discreet way, and even reject such movements, as well as the inarticulate gestures. In this sense we should concentrate on following the movements of people who we communicate with.

9. GROUP ARRANGEMENT IN SPACE

Group arrangement can be spontaneous, which is not very common in business communication. In business communication group arrangement in space is specified by certain rules. Spontaneous gathering and grouping can be observed when traveling, seminars, tours, etc. And in these situations grouping is predictable in a way and it can, if organized by a skillful organizer, look spontaneous.

In other cases, the movement and arrangement in space are determined by profession, tasks and goals. In organizing the conference presentations and negotiations, the biggest concern of the organizer is how to design the space, how to fill it and ennoble it. Otherwise there is chaos, disorientation and dissatisfaction of participants and guests. Etiquette in the allocation of space should be observed, not only during the negotiations, but also at the luncheon.

When arranging groups in space, you should take into account the status of the participants, hierarchical relationships, and you should use any information about the eventual interpersonal relationships of the participants in the event.

10. CONCLUSION

Any experienced negotiator must know his/her goals and abilities in order to be able to determine their expectations. Negotiation is not to impose your will, neither is the aim of communication to serve your goals exclusively. Negotiation tactics must not be negative neither should it be reduced to persuasion.

The goal of negotiations should be a mutual agreement. Only cooperation and compromise will lead to a conclusion acceptable to all participants in the negotiation. Negotiation is the art of adaptation and as such is in fact the art of communication. The above facts clearly demonstrate the importance of developing communication skills for successful negotiations.

REFERENCES:

- [1] Brajša, P. (1993), Managerial Communication, Information Society Library, Zagreb
- [2] Fox R. (2001) Business Communication, English University Press, Zagreb
- [3] Jovanovic M., Zivkovic M., Cvetkovic T. (2003) Organizational behavior, Megatrend University Belgrade
- [4] Maksimovic M., Damnjanović Z. (2012), Interpersonal communication in different contexts, EMIT-Economics management information technology, Volume 1/Number 3/ 2012, ISSN 2217-9011, str.167-174, Bor.
- [5] Micic P. (1990), How to run a business negotiation, NIO Poslovna knjiga, Belgrade
- [6] Plevnik D. (1986) Information and Communication, Information Technology, Zagreb
- [7] Reardon K. (1998) Interpersonal Communication, Alinea, Zagreb.
- [8] Rumenčić N: (2008), Business negotiations with foreign partners, Građevinskaknjiga, Belgrade.

POSSIBILITIES FOR THE DEVELOPMENT OF THE CONCEPT OF GREEN LOGISTICS IN SERBIA ACROSS THE TRANSPORT SECTOR

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Abstract: *The concept of Green logistics represents a phase in the evolution of logistic sector which in fact means efficiently undertaking logistic activities with less pollution and harmful influence on the environment. Regarding logistic activities, the European and world trends put the largest pressure on the transport sector, which needs to become more energy efficient, more sustainable and better connected with a higher level of environmental protection. In this survey, we are dealing with a challenge and possibilities for the system, that will be intermodal, efficient, integrated, sustainable and harmonized with the needs of future development in the market of transportation sector.*

Given the undeveloped infrastructure of the environmental acceptable types of transport, actions of the government of Republic of Serbia which are directed towards the development of transport services and investments in modernizations of infrastructure would not be enough for future development of the Green logistics concept. It is necessary for local communities to take part in identifying advantages and development potentials of building intermodal terminals, and participation of industry and private companies that will see an opportunity in accepting green concepts as a way for improving their competitiveness. With coordinated action at all three levels it is possible to include successfully Serbia in modern flows of transport.

Key words: *Green logistics, Intermodal transport, Republic of Serbia.*

1. INTRODUCTION

Logistics as a way of managing complex operations that covers flow of goods, people, information and resources, from the starting point to the final destination represents a key function and part of modern transportation system. Modern technology and spatial development have affected costs, efficiency and reliability of freight and passenger transport system. At the same time, negative impacts of transport on the environment have become a key question of sustainability.

With a development of ecological awareness, the brand new subsector of transport emerged, Green logistics, that uses new models and tools of managing logistics. Green logistics aims at achieving maximal efficiency of logistics operations with minimizing harmful impact on the environment. This survey presents some of the ways how we can achieve that by using logistics operations via sector of transport.

The European Union project, the Green corridors, was introduced in 2007 with the aim to allow development of integrated, efficient and ecological friendly transport of cargo through main lines and on relatively long distances, and it supports an EU agenda aimed at maximizing energy efficiency and reducing influence on the environment through reducing CO₂. Such corridors will gradually be introduced in all the major transport routes through Europe. They represent the improved transport corridors and they should be used as a platform for future development of global logistics management system in Europe. EU has supported this initiative through the set of new laws, which represents an effort to develop

a necessary environment for their easier implementation and for development of a brand new intermodal network that uses modern transport technologies.

In EU regions with poorer and underdeveloped economy, the green way of thinking has not been developed yet. This is especially true for the Western Balkans region. The main reason for this is that the funds, which are necessary for the development and modernization of existing transport infrastructure and equipment, are limited. However, the inevitable global trend of development and adoption of Green logistics becomes present in every sphere of national industry, especially in manufacturing and transport. Countries in the Western Balkans region will soon be forced to develop a green conscience and to use green technologies regularly. European integrations just build up pressure on the development of transport infrastructure and states in the region are forced to adopt the long-term strategies of development. As a result, intermodal and green transport will further develop to sustain a platform for rapid development of Green logistic concept.

2. THE DEVELOPMENT OF INTERMODAL TRANSPORT AS A KEY FACTOR FOR INTRODUCING GREEN LOGISTICS INTO SERBIA

The economic situation in Serbia is not nearly good as the situation in developed countries in western or northern parts of Europe. The whole region of Balkans is economically underdeveloped, and that has an influence on transport infrastructure. The Republic of Serbia invested great efforts and resources in the development and modernization of highway infrastructure, but at the same time the railway infrastructure is old and it is more than obvious that it needs modernization as well as the river routes. The intermodal transport in Serbia, in comparison to the other EU countries can be observed as severely underdeveloped. One can conclude this if we compare the complete number of transported TEU units (intermodal containers of standard length - 6,1 m), percentage of intermodal transport, the level of infrastructure development, but also the degree of required legal regulations, standards and state transport policy related to the field.

Regarding transport infrastructure and general economic situation, the development of intermodal system is necessary. The biggest barrier in the development of Green transport and Green logistics is a fact that the railways, river ports and terminals are still owned by the state and therefore are subjected to state development strategy policies. On the other hand, the domination of road transport in the sector of freight transport in Serbia is a consequence of limited financial resources for investment in modernization of alternative infrastructure that is more environmentally friendly, such as railway and river transport. The percentage of road freight transport, in t/km, is higher in the Southeast Europe than in the region of North Europe that results in higher CO₂ emissions and bigger cost of transport. Serbia has been ranked fifth within the European biggest polluters, with a yearly emission of CO₂ per capita of 6.2 t which is twice than average of other countries with similar income or level of development. The transport sector, with its 15 % of all CO₂ emission, represents one of the biggest polluters of the environment. Intermodal development is considered as the element that can reduce fuel consumption and emission of CO₂ by 50% per kilometre.

Green logistics concept is based on the development of environmentally friendly ways of transport, railway and river transport, which must be developed as a key solution for the transport between intermodal terminals (node). These terminals must be built so that they can function as a modern intermodal logistics platform. On the other hand, road transport should be used only for short destinations.

Serbia is located on the Balkan Peninsula, at the intersection of major transport Corridors between East and West. Therefore, it has a strategic importance in the field of transport, logistics and communication in the region. Its territory is connected with Western Europe, Middle and Far East. Given the global development trends, it is necessary to increase its participation in intermodal transport in the nearest future.

Development and modernization of railway network, mainly on Corridor X, will enable the increase of container transport via railway network and relief on roads, that have to be used only for start and final container transport. This is important because of the fact that in Serbia still dominates container transport by road. Although railway has the largest share in all the transported goods in Serbia during recent years, those figures are still minor and do not lead to higher utilization of capacity of Serbian Railways.

Observed from the aspect of the environment, railway transport represents the most energy efficient mode of land transport and the CO₂ it produces is the least of all of the modes of transport. Railway transport emits on average three times less CO₂ than the road transport and five times less than the air transport. The railway freight transport is eight times over energy efficient than freight transport by road.

Intermodal transport represents obvious choice because it allows an increase in use of railway transport, while we can easily manipulate with intermodal units in short period, which generate savings in cost. At the same time, the security of cargo is placed at a higher level that can reduce damage in freight and packaging in transport.

At the same time, thanks to navigable rivers and channels, Serbia has natural conditions for further development of river traffic. Pan European Corridor VII – river Danube, represents a significant European river highway. On the river, Danube about 85% of total transfer of goods is conducted on the inner river roads of Serbia. In the future, river Danube will gain on its importance, because it will open great possibilities of cheap river traffic of goods.

Despite one of strategic priorities of traffic policy of EU that is increasing of inter water transport, as more efficient and environment friendly, in Serbia it did not come to a significant improvement in the previous period. In the recent years, this kind of traffic of goods is in decline in overall structure of freight transport in Serbia.

Safe navigation with modern floating assets, development harbour activities, implementation of intermodal transport with a support of logistical systems can result in the increase of the transport volume and increasing the importance of river transport. Serbian economy would gain a rational, more efficient, environmentally friendly way of transport that is competitive on the market.

Governments in the region have taken some measures to establish a green agenda on macro national level, but those actions were not aggressive and clear enough so they could adequately stimulate industry as a whole. Serbia has to take active participation in establishing Green logistic strategies on a macro level, including the industrial sector. All the participants have to perceive the advantages of implementing Green logistics as a national strategy and as a corporative strategy in companies. It is vital for economy and industry to realize the advantages of Green logistic, having in mind the main goal of optimizing the transfer of goods, cutting costs, increasing efficiency and improving the quality of transport services, and inducing the increase in environmental protection.

2.1 Current state of Serbian intermodal network

Transport in Serbia is mostly performed by individual shipments by road. Development of intermodal transport is at its very beginning. In the Republic of Serbia, transport amounts up to 0, 5%, in EU countries it is 6-9% and the estimate is 16% by 2015.

Intermodal transport is mainly present in foreign exchange and it mainly consists of import of containers shipped by sea and returning them empty to naval harbours. Total volume of transport of intermodal transport units in import-export traffic was 50.000 TEU. Over 99% of containers in traffic in Serbia are the property of foreign companies. Considering that the import is higher than the export, empty containers are withdrawn to depots in region.

Swap bodies are rarely in the ownership of Serbian transport companies. The only case where the swap bodies are transported is from/to Hungary by trucks, rather than by train, and because of the lack of containers the shipping takes days. Bimodal units are not present in transport in Serbia.

Containers from Serbia are generally shipped to the USA and the Middle East, and we import from the Far East and from the USA. In Serbia, there are three terminals for reloading of containers: terminal of Railway integral transport (ZIT), located at the Main Railway station in Belgrade, Belgrade harbour and Pancevo harbour. ZIT is the only company in Serbia whose main activities are an organization of transport of containers via railway and reloading containers from train composition. Within this bimodal terminal about 80% of total reload of containers in Serbia is made.

The aforementioned terminals do not use modern technology for cargo handling, the degree of automation is very low and their capacities cannot sustain optimal process of cargo handling. Cranes on container terminals are repeatedly being repaired but they are still in function. Two out of three terminals are located in Belgrade, in central urban zone and without any possibility of spreading the terminal space. Lack of modern terminals and stations open for business with dangerous goods influenced that the dangerous good is mainly shipped by road, and a fair share of goods that required intermodal transport is being denied. Lack of modern reloading equipment and modern information technology for tracking containers in terminals has bad influence on quality of intermodal services.

Railway network in Serbia is as in the medium-level developed countries, in regards of length of railway network relationship to surface (49,2 km/1000 km²), and it is in poor condition. Railway network capacity is sufficient, but its exploitation of technical performance is inadequate for providing quality transport services. Due to the lack of funding the investments in railway transport resources, maintenance of infrastructure in the last twenty years was insufficient.

In Serbia, there are nine harbour ports of international importance. River ports are of adequate capacity for present needs, but the equipment is old and ineffective. Only the Belgrade harbour alone has the conditions for container transport, while no harbour has Ro-Ro terminals. Harbour capacities, due to the lack of goods for transport, have only 30% of utilization.

It is obvious that there is a lack of modern cargo-manipulative units, transport and reloading means, cargo units and technology that is capable with all the links in the logistic chain. Logistics services in Serbia are of low quality, in regard of time, costs of delivery, delivery reliability, without any change in logistic strategy, which affects the price and the competitiveness of product.

Some of the main reasons that lead us to domination of road transport services in Serbia are an unreliable and inefficient railway service, which is characterized by bad labour organization then long time of transit, bad condition of railway tracks and lack of capacity (locomotives and special wagons). Moreover, by low level of river transport services, which is also characterized by the lack of capacity (small number of barges and absence of Ro-Ro ships in the ownership of Serbian citizens), and the lack of operators who would implement river transport services. All this creates conditions for the implementation of Green logistics in Serbia.

Lack of infrastructural capacity needed for successful development of intermodal transport is reflected in absence of appropriate terminals. Because of that, it is necessary to identify projects of national importance that would increase the participation of intermodal transport in total transport of goods, and which is directed on development of terminals for intermodal transport units reloading.

European Commission White Book – Roadmap to a Single European Transport Area – Towards a competitive and resource efficient transport system published in Brussels on 28th March, 2011 in whole directs and supports forming of intermodal terminals especially in Eastern Europe with a purpose of cutting pollution and forming a faster, cheaper and healthier transport system in EU. European goal is the reduction of CO₂ gases which form greenhouse effect by 60% in transport sector between 1990-2050 through changes in consumption of transport fuel and in ways of conducted transport process.

In order of creation, alternatives to road transport it is necessary for State to get more involved so it would with stimulating measures make future intermodal development easier. By stimulating future development of intermodal transport with adequate national transport policies it promotes intermodal transport by adopting long term programs aimed at investments in infrastructure of intermodal transport, forming green corridors, forming intermodal terminals and connecting into viable transportation network, forming green corridors and reducing pollution in transport. In order to reduce harmful influence of transport on the environment we must provide:

- Development of environmentally acceptable intermodal transport, economic viable and safe form of transport;
- Implementing efficient international railway transport;
- Reconstruction of road infrastructure;
- Improvement quality of road transport, primarily on important international corridors;
- Increase level of safety and efficiency of river transport primarily on the river Danube.

Framework point 4.2. of development of railway, road, river, air and intermodal transport strategy in the Republic of Serbia from 2008 to 2015 gives directions for considering suitable locations and defined needed infrastructure for development of intermodal transport by the EU standards.

Potential intermodal transport routes for import, export and transit represent two very important corridors, road-railway Pan European Corridor X, which connects nine countries from Germany in the West to Turkey and Greece in the East of Europe, and Danube river road, Pan European Corridor VII, which connects ten countries from Germany to Ukraine and consist of 44 international harbours.

Terminals on these corridors have to be strategically designed and located near junctions of important transport infrastructure (road – railway – river) with flexibility and possibility of extending with the demands from the market. When considering suitable locations for initial development of terminals, in accordance with the practice and demands of EU, we have to consider railway, road and river network connections. ⁷

2.2 Opportunity of introduction a three-level concept

Development of Green logistic in Serbia has to be represented within the national strategy, whose priority would be to promote the introduction of green corridors in accordance with

the EU program and development of intermodal capacity for these corridors and with support from the economy. Green logistic can be implemented on three levels:

1. On national level, in accordance with the general Master traffic plan in Serbia – Final report – Annex V, whose realization was conducted by the Delegation of European Commission in Serbia it has been said that firstly at least three terminals have to be build – “dry harbours”, of different sizes and characteristic, in the area of Belgrade, Nis and Novi Sad. This must be done with necessary intermodal capacity that would lead to recovery of railway transport system, with clear advantages for the environment and community, and with the accordance with the EU policy. ⁸

Due to the fact that transport Corridors VII and X intersect in Belgrade, which means that the town is very important junction, Belgrade dry harbour is represented as the state priority in the general master plan. As the concentration of present and future cargo transport primarily refers to the Belgrade area, because of traffic combustion it is very hard to get to terminals ZTP and Belgrade Harbour, even with this low volume of occupancy capacity. Master Plan for City of Belgrade includes relocation of both terminals from existing locations.

So the implementation of these projects would not be limited just to the level of a project and forming state agencies or administration within the ministries, we have to find a solution for financing such projects. We can expect that the funds given from foreign credits and in the years to come have to be mainly directed to the revitalization of railways. For significant investments in intermodal infrastructure, it is necessary to find interested harbour or intermodal operators as concessionaire, so the agreed arrangement in the form of the public-private partnership would be a solution in the near future. Good strategic partnership, beside finance support, brings a transfer of knowledge, new technology and elevation of general financial efficiency.

Nevertheless, states of the Western Balkans have to elect priority transport routes that will be gradually developed as green transport corridors, together with the active participation in EU programs, which will result in more money from EU funds.

2. On the regional level, it is necessary to develop a network of smaller intermodal terminals on different locations. These terminals have to be developed mainly through Corridor VII and X, and that would be the best thing to do in the Free Zone. Terminals would contain capacity for reloading of goods, storage, loading and reloading of goods in transport units, and they have to be adjusted to modes of transport, which would decrease transport cost and cut pollution.

If we know that the budget resources for this type of project would be uncertain, local communities have to find a common interest for developing terminals, and within mutual linkage and partnership define priorities and develop projects taking into consideration their needs and projected development of transport. For the realization of projects they can apply for funds in numerous EU programs which will be available until 2014, as for the resources from funds from other countries, and from programs of cross-border cooperation of municipalities and towns. It is very important for local economies and companies to recognize advantages of intermodal transport and find interest in investing in these zones and terminals.

3. On the economic level, all the aspects of the environment become a big part of strategy of development in big companies. Companies today operate in the time when the logistic process has to be managed as Green logistics. Green concept management of logistic has to start using recycled materials in the production and usage of environmentally friendly means of transport. Serbian economy has to learn from the practice of Fiat Group, whose production and business is world class. In addition, it should be an example of how environment sustainability can add value through logistic process.

Fiat Group has accepted Green logistics and fosters it as a part of business model of world class. Fiat Group is dedicated to reducing influence of its logistic process on the environment, with a special twist on reducing CO₂ gases, using their four areas of interest:

- Increasing transport with reducing CO₂ gases,
- Usage of intermodal solutions,
- Optimization of transport capacity,
- Reduce the usage of packaging and protective materials.

Green concept of management of logistic has to start by using recycled materials in manufacturing and by using environment friendly modes of transport. This way the final product will be easier to recycle with less usage of energy and in shorter time, which will improve the producer's competitive position.

Introduction of Green logistics on the global level of a firm through the usage of environmentally friendly modes of transport and usage of recycled materials does not impose higher financial investments and does not increase overall costs, and it represents a key marketing activity, especially for markets and consumers that are green-oriented. As the increase of export is the priority for the economic development and growth of Serbia, vast publicity is given to the environment; environmental tendency can become one of the factors of identifying our economy on foreign markets.

On the other hand, European integrations will make the state intervene more aggressively and target environmental polluters. As the state of Serbian economy is very bad, costs that are created because of pollution cannot be an industrial priority, given that all the firms are under pressure to stay solvent. As a result, the road transport will still be the backbone of transportation of goods, and future investments in railway and river infrastructure will have to be postponed, because the industry is not interested in using its full potential. 4

The solution for implementation of Green logistics is possible to find in clear policy of development of intermodal transport in Serbia that has to be compatible with Europeans trends and has to reflect needs of transport market. Orientation on an intermodal transport system will depend on the existing resources and validity of future investments on one hand, and the readiness of state to get involved in the modern transport flows and trends of protecting the environment on the other hand.

4. CONCLUSION

Green logistics will change modern transport policies, business and frames of behaviour of participants in logistic operations, and it will become a start of future innovation, creating jobs, reducing CO₂ gases and creating greenhouse effect, and it will create competitive edge for users of intermodal transport.

Serbia is located on the crossroads of main transport corridors between East and West. Its territory provides natural, short and rational road and railway connections with Western, Middle Eastern and Far East countries.

Intermodal traffic in Serbia is described as insufficiently developed. It lacks institutions, network of modal intervals, obsolete cargo loading units, adjusted transport capacity of road, railway and river intermodal transport. Then, it lacks adequate logistic services, stimulus and financial mechanism for supporting the development of intermodal transport by attracting foreign investments in the infrastructure.

The development of intermodal transport in the Republic of Serbia, as a transport of wider interest, that is environmentally friendly, economic viable and safe, demands state support, in regard of giving stimulus through building a modern terminals of intermodal transport. Building terminals would have a great impact on the development of the entire system of transport and the economy as a whole, especially in less developed areas. Construction of new terminals would have to be realized on the grounds of cooperation of both the state and the private sector. Creating conditions for the usage of environmentally friendly modes of transport has to encourage industry and producers to optimize their logistic process and to use road transport just for short distances, to increase their freight capacity and reduce the number of vehicles.

REFERENCES:

- [1] Jüriado R., 2010., Greening of Transport and the SuperGreen Project, European commission, <http://www.supergreenproject.eu/docs/public/naples2010/1%20-%20Rein%20Juriado.pdf>
- [2] Dunning, J. H.; Fortanier, F., 2007., Multinational enterprises and the new development paradigm: consequences for host country development, *Multinational Business Review* 15: 25-46
- [3] Carter, C. R.; Rogers, D. S., 2008., A framework of sustainable supply chain management: moving toward new theory, *International Journal of Physical Distribution and Logistics Management* 38: 360-387.
- [4] Beskovnik, B.; Jakomin, L., 2010., Challenges of green logistics in Southeast Europe, *Promet--Traffic and Transportation* 22: 147-155.
- [5] Postkrizni model ekonomskog rasta i razvoja Srbije 2011-2020., Beograd Avgust, 2010, www.fren.org.rs, str.327
- [6] Bela knjiga saobraćaja 2011, http://www.kombeg.org.rs/Slike/UdrSaobracaj/com2011_0144en01%5B1%5D.pdf
- [7] Pozicija Republike Srbije za učešće u izradi sveobuhvatne strategije Evropske Unije za region Dunava, 2010., www.kombeg.org.rs
- [8] Generalni Master plan saobraćaja u Srbiji, Završni izveštaj, Aneks V: Intermodalni transport, Oktobar 2009, http://www.mi.gov.rs/mostovi_files/Aneks%20V%20-%20Intermodalni%20transport.pdf
- [9] Fiat Industrial Group Green Logistics Principles, <http://www.fiatindustrial.com/it-it/sustainability/overview/publicazioni/FiatDocuments/Fiat%20Industrial%20Green%20Logistics%20Principles>.

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