

INTEGRATED MANAGEMENT SYSTEM OF A TRANSPORT COMPANY

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Subject review

The improvement of products and services as precondition for the business success on the market means an increase in the need for efficient management systems which in turn results in intensive development of standardization. It is in the interest of one's own market position to monitor the shift in the development of standards and the resulting changes. Quality, environment, occupational health and safety management systems represent a modern way of organizing work and company administration so that the management of every organization, including transport companies, encounters a problem which is here set as a task. The subject of research in this paper is the analysis of the possibilities and methods, advantages and drawbacks of introducing the systems and organizing work according to the requirements of international standards applied to a transport company, from the perspective of its management. The requirements of single items of the standards have been described in order to study the concrete applicability in the transport company. The paper is a presentation of a sufficient number of clear and concise pieces of information in one place, and it has been conceived as kind of a guideline for the transport company management during decision-making about the introduction of the system pursuant to the requirements of the standards.

Keywords: *environment management system, integrated system, ISO 9001, ISO 14001, occupational health and safety management system, OHSAS 18001, standards, transport company management, quality management system*

Integrirani sustavi upravljanja u prijevozničkim tvrtkama

Pregledni članak

Unaprjeđenjem proizvoda i usluga kao preduvjeta poslovnog uspjeha na tržištu, raste potreba za efikasnim sustavima upravljanja što rezultira intenzivnim razvojem normizacije. U interesu je vlastitog tržišnog položaja praćenje pomaka u razvoju normi i promjenama koje one donose. Sustav upravljanja kvalitetom, okolišem, zdravljem i sigurnosti na radu predstavlja moderan način organiziranja rada i upravljanja tvrtkom pa se menadžment svake organizacije, tako i prijevoznike tvrtke, susreće s problemom koji je ovdje postavljen kao zadatak. Predmet istraživanja ovog rada je analiza mogućnosti i načina, prednosti i nedostataka uvođenja sustava i organiziranja rada prema zahtjevima međunarodnih normi primijenjenih na prijevozničko poduzeće, a iz perspektive njegovog menadžmenta. Opisani su zahtjevi pojedinih točaka normi radi istraživanja konkretne primjenjivosti u prijevozničkom poduzeću. Rad je prezentacija dovoljnog broja jasnih i sažetih informacija na jednom mjestu a zamišljen je kao svojevrsna smjernica menadžmentu prijevoznčkog poduzeća prilikom odluke o uvođenju sustava sukladno zahtjevima normi.

Ključne riječi: *integrirani sustav, ISO 9001, ISO 14001, OHSAS 18001, menadžment transportnog poduzeća, norme, upravljanje kvalitetom, upravljanje okolišem, upravljanje zdravljem i sigurnosti na radu*

1 Introduction

In general an organization means deliberate integration in order to fulfil a set objective. Therefore, it is characteristic for a human as an intelligent being and it represents one of the characteristics of the human development. From the very beginnings the humans have used organization in order to fulfil their objectives more easily, e.g. in the organization of hunting, all the way to the present times when they are facing very complex and demanding goals. The organization of work in any market-oriented company is the assumption of success and good results, and sometimes also of survival. The basic advantages of the organization include an increase of individual power of the individuals and acceleration of the processes, and reduction of the costs necessary to achieve this result. For the organization to fulfil the set objectives the necessary means and resources need to be defined and they will be used to perform certain tasks, as well as methods and procedures that will give an answer how these tasks are to be realized. The purpose of the paper is the study of the management system elements that the transport company management sets as a task before making a decision on the introduction of the work organization according to the requirements of the international ISO standards (*ISO - International Standard Organization - International Organization for Standards*). The general methods of advanced organization can be realized by introducing the system and certifying the company according to the international quality management standard ISO 9001. The norm or standard in

goods production means a series of concise and precise definitions, technical specifications and criteria, measures, rules and characteristics that describe the materials, products, processes and systems. The official definition according to ISO/IEC GUIDE 2:2004 (*Standardization and related activities – General vocabulary*) says:

"A standard is a document for common and repeated use, established by consensus and approved by a recognized body that provides rules, instructions or characteristics of activities or their results, aimed at the achievement of the optimum degree of order in a given context.

Standardization is the activity of establishing the provisions for common and repeated use which refer to the existing or potential problems in order to achieve the best degree of order".¹

¹ ISO/IEC GUIDE 2:2004 (*Standardization and related activities – General vocabulary*)

At the international level the most significant organization that is involved in the development and publication of standards in the field of quality management is ISO - *International Organization for Standardization*, Geneva, Switzerland. Its best known and most applicable standard accepted by the Croatian standardization under the designation HRN EN ISO 9000:2008 is the original: ISO 9000:2005 *Quality management systems - Fundamentals and vocabulary*. This is the fundamental standard in the field of quality management in the series of ISO 9000 standards. The executive standard which contains also the requirements according to which the quality management systems can be certified is HRN EN ISO 9001:2009, *Quality*

Management Systems - Requirements (ISO 9001:2008; EN ISO 9001:2008). The number of ISO 9001 users who harmonized their quality management system with the requirements from that standard today at the world level exceeds the number of one million. This clearly indicates the fact that the standard has been accepted in a wider scope by numerous users and in different branches. Based on the *Vienna Agreement* realized between ISO and CEN (*European Committee for Standardization*, Brussels, Belgium) the standards published by ISO in this field have been accepted as the European standards. In the Croatian standardization the *Croatian Institute for Standards* has adopted in the Croatian standardization such European standards as the Croatian standards.

The professional and theoretical knowledge about the mentioned standards have been collected also during the seminars at which the structural and functional methods are used to study the facts, structure and requirements for every standard i.e. system, and for the adaptation to the new version of ISO 9001:2008 standard. The scientific knowledge appears as an upgrade to the professional knowledge by monitoring the scientific work and papers as well as professional journals in the field of standardization. The methods used while working on this paper included the collection of new data by reading and analyzing the contents of professional literature. The methods used were those of observing the work of the auditors from the certification agencies during the certification and periodical audits, surveys and discussions with the consultants from the companies involved in consultation business in introducing and implementing the system according to ISO standards, and the organization of seminars for training of internal and lead auditors. The methods of logical deduction and combining of the collected information by structuralized methods were used to input in this paper the facts that give a cross-section of the past research of applying the international standards in the operation of market-oriented companies or other types of organizations, in this case applied to a transport company.

2 Advantages and drawbacks of introducing integrated management system

The introduction of the integrated system for managing quality, environment as well as occupational health and safety at work contributes many positive influences within and outside the company. The direct advantage obtained by company certification is the improvement of marketing through several aspects; inclusion in the register list which confirms the certificate accreditation which enables potential participation on the European Union market, i.e. on the world markets and refinement of the memorandum with the symbol of the certificate. The obtained certificates prove the high-quality structure of management, and indirectly an increase in profit is expected as a consequence of better efficiency. A good management system results in the reduction of time losses of working processes and standstills, constant control of business processes that affect the quality, environment, occupational health and safety at work, and in general a presentation of good business practice of a company. In a developed business

environment the advantage is reflected in direct reduction in insurance premiums. It should be noted that the benefits for a company as a result of the introduction of the international management system in compliance with the ISO standard requirements are multiple and they certainly exceed the costs incurred by their introduction and implementation. The implemented requirements often repay themselves through the system, e.g. by reduction of downtimes, scrap and waste in the production. Recently, in Croatia the government organizations that stimulate economy and entrepreneurship have subsidized the introduction of the system so that the companies have no direct costs at the very beginning when certifying the system. The company certification can open up new markets, especially export, and stimulate the users to establish partnership relations. It should be mentioned that with the introduction of a certified system, especially in the management of the environment, occupational health and safety at work, the users harmonize their business with the legislation which is also the concrete requirement of the respective standards, and consequent compliance with these requirements as a rule reduces the expensive inspection procedures. It is very important to mention that the positive effects of applying the certified management systems given here are long-term ones and the effects are as a rule visible only after several years of implementation. The studies have shown that the majority of companies and organizations have achieved greater efficiency and productivity, higher satisfaction of customers, employees and other interested parties with the reduction of costs, i.e. in general, better success of business keeping a positive image about the company. Thus, from today's aspect the introduction of the management system according to ISO standards requirements provides the customer only with the strategy of a successful company or organization. When the management systems are implemented in the transport company, the benefits are in the first place noted on the marketing plan. The information on having a certified system gives the potential customers undeniable information about the structured approach to transport service provision. With consequent implementation the benefits should appear in the long run in the sense of increased business volume because the integrated system results in the reduction of delivery times and better organization of the use and maintenance of the fleet. The customer surveys are used to realize the service with higher quality aspects which eventually results in a more competitive price of the service. By the implementation of the environmental management system requirements the compliance with the legislation is achieved where because of the greenhouse gas emissions the wider community appears as the stakeholder. With the integrated management system of quality, environment, occupational health and safety at work, the employees become the stakeholders who will perform their tasks with greater satisfaction in an organized business system during operation and realization of transportation services. The company management certainly finds important the aspect of reducing the operation costs e.g. through fleet maintenance, and there is also a series of benefits that will be shown further in the text.

As any other system, the management systems according to ISO standard requirements also bring some negative influences and phenomena. First, here is the fact that the procedure of implementing and maintaining the management system creates additional costs and it can be inappropriately expensive. Poor preparation phase and inexperienced consultation during the implementation of the standards requirements as a rule results in a very expensive, inefficient, non-flexible and excessively bureaucratized system. Such a system has bad influence on one of the basic ideas of systemic management, and that is the rate of change. This bad influence is reflected also in the problems of prolongation of certificates during the control of certification agencies at periodical audits. Poorly conceived system and respectively poor company organization create significant time consumption of a large number of employees, and consequently also financial costs that could have been directed to some other development possibility. The negative influences create resistance by employees towards the system-implemented changes, objective and subjective difficulties during the implementation and difficult maintenance of long-term employees' enthusiasm for the management systems. One of the biggest and most frequent drawbacks of the introduced systems according to ISO standards in companies and organizations in the Republic of Croatia is the ownership of certificates that serve only as an entry ticket for certain markets, i.e. only for the presentation and marketing purposes. In such cases the company management has mainly spent a lot of money for a wrong objective, achieving only a short-term result. For the invested capital, regarding direct costs of fees charged by the certification agencies for the certification process and costs of engagement of employees in the requirements implementation, has not reached the long-term sense of the introduction of the system according to ISO standards.

3 Transport company system management according to the standards requirements

The general structure of a company is taken as an example of the implementation of the transport company management system. It consists of the administrative and executive transportation part, but there are also examples of implementation approaches in the case of owning and managing logistic processes as well. In the analysis the focus is on the interpretation of the requirements through a brief description of the approach to the standards implementation and documentation of the system. In order to document the system of managing quality, environment, occupational health and safety at work, or some other management system, it is necessary to develop a documentation system that consists of several levels of documentation. Every document is produced with the aim of defining a certain procedure as part of the company business activities. The integrity of the objectives of defining and organizing the documentation represents the ultimate function of an enterprise whereas the function of a major document has to be supported by the objectives and the function of the lower rank documentation. The requirements that refer to the documentation have been described in Clause 4.2 of the ISO 9001:2008 standard:

"The quality management system documentation shall include

- a) *Documented statements of a quality policy and quality objectives,*
- b) *A quality manual,*
- c) *Documented procedures and records required by this International Standard, and*
- d) *Documents, including records, determined by the organization to be necessary to ensure the effective planning, operation and control of its processes."* [1]

The documentation system of the transport company, as well as of any other organization which implements the ISO standard requirements, is characterized by the documentation hierarchy at the top of which is the *Quality Manual* (for the quality management system) or *Rules of Management Procedure* with the management's statements about the management policy and objectives that describe the social and economic purpose of the enterprise. Further are described the *Documented Procedures* which define the general tasks and processes, all the way to specific individual tasks and processes described in the *Working instructions* or *Operative Instructions*. In establishing the system in the transport company it is most important to define and set the objectives at the beginning of all activities, from the top to the levels of specific tasks that are described by the documentation system. Without such provisions the system management is incomplete because negative influences can be caused and the system can be set from the base as an administrative load to business operation and dissatisfaction of employees and system users, and a slow and inefficient system can be created. In the ISO 9001 standard requirements it is called the *Quality Manual*, and when it refers to the integrated management system which meets the requirements of several standards, it is better to call it *Rules of Management Procedures*. It refers to an umbrella document of a system in which the requirements of Clause 4.2.2 have to be satisfied, which for ISO 9001:2008 says:

"The organization shall establish and maintain a quality manual that includes

- a) *The scope of the quality management system, including details of and justification for any exclusions (see 1.2),*
- b) *The documented procedures established for the quality management system, or reference to them, and*
- c) *A description of the interaction between the processes of the quality management system."* [1]

A very general requirement describes the need to define the system and documentation by describing the company in which the system is being implemented. For a company involved in the transportation service the types of services and methods of transportation, target customers and business methods, company organization and the necessary resources should be documented. The Rules of Procedure has to contain the Management's statement about the respecting and consequent compliance with the requirements and throughout the document the concrete implementation according to standards clauses has to be shown, which forms the

original document of the management system. In a shortened version because of the description of the orientation of the company towards the fulfilment of the standard requirements, a short version of the *Quality Policy*, i.e. *Management Policy* is written on one page. This document is highlighted, framed on the walls of the premises, set on the web site of the company, i.e. made available to all the interested parties. For the transport company the *Management Policy* needs to define the strategic objective of business operation and services it is involved in, the statement about the Management's orientation towards harmonization according to the requirements of the standard and system improvement, and provide the framework to determine and control the general and individual objectives. By implementing the requirements ISO 14001 or OHSAS 18001 there is explicit requirement in the document that will be available to all the interested parties, for harmonization with the legislation of the respective country in which the business is performed. In this way it is insured that the needs for changes in the business procedures due to the changes in legislation will be continuously recognized. The documented procedures are parts of the documentation system which describe all the necessary activities of individual business processes. They determine and control every important process in the enterprise in a transparent and controlled way. The documented procedures determine the flow of a certain main process; it is recommendable to keep to a unique and systemic structure of the document in which a graphical presentation of the flowchart is very useful. The flowchart is used to determine and stipulate the steps in the process, the sequence of the steps, persons responsible for execution or control of single steps, input and output parameters and records from each step and logical decisions in single parts of the process. After the flowchart it is necessary to describe every process step in more detail so that the customer could find the instruction precise or a reminder for the method of carrying out the process. The document organized in this manner enables in a transparent manner the control of performing the processes during everyday work, as well as control during internal audits by internal auditors or external audits by the representatives of the certification agencies or customer representatives. The lower level documentation includes Work Instructions and Operative Instructions as well as forms on which the system records are created. The Work Instructions are documents of lower level than the Documented Procedure since they are intended to define a certain procedure within the activity. They are mainly used for precise description of single processes or instructions for the usage of specific means for work or specific work procedures. The systemic approach understands reference of the documented procedures to work instructions where applicable. Operative instructions have the same meaning and value as the work instructions. The difference is reflected in the appearance: The contents of the operative instructions is summarized and short, and on one sheet of paper shown at the place of use. In Clause 6 Resources Management, the company is required to manage human and material resources. The management means the purchase of material means i.e. insurance of the necessary number of professional and

qualified employees. Insuring of the necessary number of professional and qualified employees in the transport company is described by the following requirement:

"The organization shall

- a) *Determine the necessary competence for personnel performing work affecting conformity to product requirements,*
- b) *Where applicable, provide training or take other actions to achieve the necessary competence,*
- c) *Evaluate the effectiveness of the actions taken,*
- d) *Ensure that its personnel are aware of the relevance and importance of their activities and how they contribute to the achievement of the quality objectives, and*
- e) *Maintain appropriate records of education, training, skills and experience."* [1]

The quoted requirements show that the standard deals with the need of the company for educated and professional employees in employment, as well as permanent in-service education. In transport companies it is important in all the processes that define the quality of transportation service to employ qualified employees. For the organization to know which qualification is necessary for a certain workplace, it is necessary to make an analysis and a record, i.e. a Catalogue of Workplaces with the accompanying organigram which graphically presents the company structure. A part of the requirements regarding qualification of the transport company employees comes from the legislation, so that the employees involved in transportation, drivers, have to have adequate levels of driving permits, employees controlling motor forklifts have to be professionally qualified for the job, etc. The definition of the mentioned requirement by means of the system can have as a function the control of the compliance of the company i.e. testing of the necessary qualification of the employees. Additional training of the employees can be done in external institutions, whereas education inside the company means acquiring knowledge about the operation methods by means of the documentation system. For every training it is necessary to have records in the form of Certificates or records on training that can have a model in a system form. The training of employees along with acquiring professional knowledge results in achieving of and raising the awareness level of every employee about their importance in the processes of performing the transportation activity. Clause 6.3 of ISO 9001:2008 standard shows the requirement which speaks in favour of insuring the infrastructure necessary to perform the business tasks:

"The organization shall determine, provide and maintain the infrastructure needed to achieve conformity to product requirements. Infrastructure includes, as applicable,

- a) *Buildings, workspace and associated utilities,*
- b) *Process equipment (both hardware and software), and*
- c) *Supporting services (such as transport, communication or information systems)."* [1]

For a transport company this is one of the most important clauses because it requires, and the company

insures by implementation, all the necessary infrastructure and material resources necessary to perform business processes of the transportation service. This first of all means purchase of transport means as well as insuring their proper work. The recommendation from the requirements of this Clause is to produce a documented procedure which can be used to stipulate the organization of fleet maintenance. Furthermore, the requirement imposes all other modes of insuring infrastructure such as administration offices, warehouses, transport means, garages, workshops and all other applicable and civil engineering facilities that are owned by or let for use to the company.

The planning of the transportation service is performed at several levels, and these are at the level of strategic objectives and annual plans, and at the level of planning the realization of the concrete, individual service.

"Top management shall ensure that quality objectives, including those needed to meet requirements for product [see 7.1 a)], are established at relevant functions and levels within the organization. The quality objectives shall be measurable and consistent with the quality policy." [1].

The novelty in the latest revision of ISO 9001 standard is that the objectives have to be defined so that at the end of the planned period it is possible to determine the level of realization. This means that the objectives have to be measurable, or in the concrete case of a transport company the objective can be: to increase the number of transport by 10% compared to the previous year, or: to reduce the total fleet maintenance cost. For both objectives it is necessary to appoint a responsible person, so that for the first objective the responsible person should be a person contracting jobs, and for the second example the responsible person would be the head of maintenance. The risk that is possible in both objectives is the collapse of the entire result and the increase of the number of transports, but at a lower cost or, in the case of the second example, the reduction of maintenance costs but with an increase in the number of standstills and goods delivery times. Therefore it is necessary to set individual goals at the annual level with more precision, as well as to require the responsible person to elaborate the individual objective.

This requirement of the standards Clause shows the need to define the level of service which has to be in correlation with the company resources. The transport company management should find target businesses in compliance with their possibilities and to determine the methods of monitoring the realization of this service. By controlling the realization of the transportation service, the management can control the processes through records that provide insurance of the proof that the service has been performed. In this way and precisely with these records and data analysis, the management can control well and successfully the transport company. An example of the simplest records are the fulfilling of work or travel orders which provide information about the person who drove the transport means, type of goods, and transport substrate, beginning of loading, beginning of transport, ending time of transport, average speed and standstills, end of unloading and return to garage. Clause 7.2 *Customer-Related Processes* of ISO 9001:2008 standard

describes the need to determine and review the requirements that refer to the product, i.e. service:

"The organization shall determine

- a) *Requirements specified by the customer, including the requirements for delivery and post-delivery activities,*
- b) *Requirements not stated by the customer but necessary for specified or intended use, where known,*
- c) *Statutory and regulatory requirements applicable to the product, and*
- d) *Any additional requirements considered necessary by the organization." [1]*

In this Clause the transport company faces the task of defining the customer requirements ranging from those that they have articulated themselves to those indicated by the processes in order to satisfy the stated requirements or those stipulated by the legislator.

In the analysis of the market requirements the transport company should review the transportation service requirements. This refers first of all to the possibility of performing the transportation service and the definition of records that describe the service. The customer requirements have to be determined and accepted in the form in which they insure unambiguity, transparency and precision in every sense. Usually, the oral agreement about the realization of a transportation service is converted into the agreement record or written order which contains all the data for relevant business determination. In Clause 7.2.3 *Customer Communication*, ISO 9001:2008 standard requires and concretizes the issue of defining the requirements for the product i.e. transportation service:

"The organization shall determine and implement effective arrangements for communicating with customers in relation to

- a) *Product information,*
- b) *Enquiries, contracts or order handling, including amendments, and*
- c) *Customer feedback, including customer complaints." [1].*

After having set the planned results of individual transportation service, the standard has set the requirement to assess the realized jobs. The standards requirements go to the level of a case when the processes cannot be validated beforehand, but rather only upon the realization of the transportation process, that is, upon the conclusion of the business. In this case the responsible persons have to perform the assessment before the beginning of the business realization. The example for this is the very process of transport service realization where the time of delivery of goods cannot be guaranteed with full certainty because of a series of objective difficulties in traffic that may be encountered by the executors during the operation. The described concrete problem has to be approached by the transport company management with maximal dedication of high-quality service planning and by minimizing the problems of standstill. This is achieved by the planning of the best route, regular fleet maintenance and systemic prevention of using the transport means that had not passed the stipulated everyday controls and other methods of process assessment. The regular controls regarding proper

functioning of the transport means, selection of the best routes and other aspects of preparatory activities in the transport service planning are proven by means of timely records which are used to transfer information to the operative business executor, as well as to the responsible persons for the checking and assessment of the planned, i.e. realized activities. High-quality analysis and processing of data and information obtained from the records make it possible for the management to manage the processes and constantly improve the business, and raise the quality of service. The standard has therefore concretized also the requirements in Clause 5.6 *Management Review*, performed by the management.

"Top management shall review the organization's quality management system, at planned intervals, to ensure its continuing suitability, adequacy and effectiveness. This review shall include assessing opportunities for improvement and the need for changes to the quality management system, including the quality policy and quality objectives. Records from management reviews shall be maintained." [1]

This Clause refers to the document and record of the management system that is usually called *Management Review* which on a series of examples of companies that own a certificate, has been defined by the system at the annual level, which is the minimal requirement regarding scheduling.

"The input to management review shall include information on

- a) *Results of audits,*
- b) *Customer feedback,*
- c) *Process performance and product conformity,*
- d) *Status of preventive and corrective actions,*
- e) *Follow-up actions from previous management reviews,*
- f) *Changes that could affect the quality management system, and*
- g) *Recommendations for improvement."* [1]

The standard determines precisely the input data for *Management Review* thus determining the categories of company operation which have to be analysed within a defined period. Using the required information at the annual level, if thus defined, a cross-section of the transport company business is given in which the management will collect all the relevant data about the success of business in the respective year. This defines also the minimal need of operative inclusion of the top level of transport company management in the analysis of the business data.

"The output from the management review shall include any decisions and actions related to

- a) *Improvement of the effectiveness of the quality management system and its processes,*
- b) *Improvement of product related to customer requirements, and*
- c) *Resource needs."* [1]

With the definition of annual management objectives, the mandatory part of the *Management Review*, at the same time the final one, refers to output data. In them the management and the company top management, each in their own scope of responsibility, make concluding plans

and guidelines related to the improvement of efficiency of the entire system of managing quality, environment, occupational health and safety at work. Based on the customers' complaints the conclusions are made and the activities determined to improve the method of transport service realization, and the necessary human resources in the sense of the need for new employees or their professional qualification i.e. material resources in the form of transport means, office buildings or other types of equipment. A very important aspect and requirement for the transport company that has to be stipulated by the system documentation is the relation towards the transported goods. The requirement is defined by Clause 7.5.4 and it says:

"The organization shall exercise care with customer property while it is under the organization's control or being used by the organization. The organization shall identify, verify, protect and safeguard customer property provided for use or incorporation into the product. If any customer property is lost, damaged or otherwise found to be unsuitable for use, the organization shall report this to the customer and maintain records." [1]

For the implementation of the standard in the transport company the specific characteristic of the requirement could be determined by the documented procedure about the transport service realization. Careful handling of the goods and items during transportation is one of the basic preconditions for the realization of a high-quality transport service. In case of accidents the transported goods are mainly insured at the insurance companies, but the organizers of the work procedures are expected to do all the necessary preparatory work to stipulate the working methods. Thus it is necessary before the beginning of the transport process to use a protocol that would perform the control of the procedures of insuring the goods from damaging or from other condition changes from the required one. In any case, the management system should set the frames to satisfy the requirement of this Clause of ISO 9001:2008 standard since the required condition of goods during delivery is assessed by the quality of service realization. The requirements of ISO 9001:2008 standard clearly indicate the need for continuous communication with the customer. One of the most important reasons is to determine the level of customer satisfaction with the aim of analysing the failures in the approach and decision-making by the management for the improvement of the transport company service quality.

"As one of the measurements of the performance of the quality management system, the organization shall monitor information relating to customer perception as to whether the organization has met customer requirements. The methods for obtaining and using this information shall be determined." [1]

Since the local community and the wider public are interested in the requirements of ISO 14001 standard, it is difficult to contact individual persons in the way described by the requirement of the quality management system, so that as continuous obligation in Clause 4.5.1 *Monitoring and Measurement*, the following requirement appears: *"The organization shall establish, implement and maintain a procedure(s) to monitor and measure, on a regular basis, the key characteristics of its operations that*

can have a significant environmental impact. The procedure(s) shall include the documenting of information to monitor performance, applicable operational controls and conformity with the organization's environmental objectives and targets." [2]

In the occupational health and safety management system, the most interested party is the employee. The OHSAS 18001 standard requirement says that the organization has to allow the employees to participate in identifying and reporting of all the possible threats in the working process and to participate in insuring the safe working conditions in an organized way through Boards for Safety at Work. A very important requirement of the process evaluation at the transport company, related to environmental management according to ISO 14001 standard, appears in Clause 4.5.2 *Evaluation of Compliance*. This Clause requires from the transport company and its management to perform constant evaluation of the compliance with legal demands. The same requirement appears also in the Clauses of OHSAS 18001 standard.

"4.5.2.1 *Consistent with its commitment to compliance, the organization shall establish, implement and maintain a procedure(s) for periodically evaluating compliance with applicable legal requirements.*" [2]

For the needs of internal audit the transport company should insure the training of a sufficient number of internal auditors in compliance with the introduced management systems, since in Clause 8.2.2 *Internal audit* of ISO 9001:2001 standard the following requirement is set: "The organization shall conduct internal audits at planned intervals to determine whether the quality management system

- a) *Conforms to the planned arrangements (see 7.1), to the requirements of this International Standard and to the quality management system requirements established by the organization, and*
- b) *Is effectively implemented and maintained.*" [1]

The requirements indicate the need to make a documented procedure which will define the frequency and all the activities during the internal audit. The significance of the audit lies in determining the compliance of the transport company operation with the set requirements of the standards and objectives set by the administration, management, or a certain management level. In determining the compliance with the set objectives in the environmental management systems, the following requirements have been set:

"The organization shall ensure that internal audits of the environmental management system are conducted at planned intervals to

- a) *Determine whether the environmental management system*
 - 1) *Conforms to planned arrangements for environmental management including the requirements of this International Standard, and*
 - 2) *Has been properly implemented and is maintained, and*
- b) *Provides information on the results of audits to management.*" [2]

During the internal audit, the auditing team has a very important task, and that is to provide information to the administration and the management about all the non-

conformities with the standards requirements and with legal requirements. Based on this information the management makes the decisions about the levels of compliance of the enterprise activities and, satisfying the requirement of one of the interested parties, manages positive changes and compliances which represents one of the significant advantages of the introduced system of managing quality, environment, occupational health and safety at work in the transport company. Since non-compliances in the operation of a transport company determine also the non-conformities of the processes during service performance, and accepting the fact that the term product is made equal to the term service, the quoted requirements should be recognized in performing the service and certainly a documented procedure should be made in which action undertaken in case of a detected non-conformity should be described. The introduction of ISO 14001 and OHSAS 18001 standards is usually used to apply the approach which speaks of *non-conformities management* which in a wider context of meaning covers also the non-conformity of all the transport service processes:

"The organization shall establish, implement and maintain a procedure(s) for dealing with actual and potential nonconformity (ies) and for taking corrective action and preventive action. The procedure(s) shall define requirements for

- a) *Identifying and correcting nonconformity (ies) and taking action(s) to mitigate their environmental impacts,*
- b) *Investigating nonconformity (ies), determining their cause(s) and taking actions in order to avoid their recurrence,*
- c) *Evaluating the need for action(s) to prevent nonconformity (ies) and implementing appropriate actions designed to avoid their occurrence,*
- d) *Recording the results of corrective action(s) and preventive action(s) taken, and*
- e) *Reviewing the effectiveness of corrective action(s) and preventive action(s) taken.*" [2]

For the identified non-conformities in the processes of transport service performance, their impact on the environment or non-conformities according to the requirements of the systems for managing occupational health and safety at work, it is necessary to start removing the non-conformities by performing corrective or preventive action:

"8.5.2 *Corrective Action.*

The organization shall take action to eliminate the causes of nonconformities in order to prevent recurrence. Corrective actions shall be appropriate to the effects of the nonconformities encountered. A documented procedure shall be established to define requirements for

- a) *Reviewing nonconformities (including customer complaints),*
- b) *Determining the causes of nonconformities,*
- c) *Evaluating the need for action to ensure that nonconformities do not recur,*
- d) *Determining and implementing action needed,*
- e) *Records of the results of action taken (see 4.2.4), and*
- f) *Reviewing the effectiveness of the corrective action taken.*

8.5.3 *Preventive action*

The organization shall determine action to eliminate the causes of potential nonconformities in order to prevent their occurrence. Preventive actions shall be appropriate to the effects of the potential problems. " [1]

The requirement describes the need to make documented procedures which will stipulate the procedure method, the responsible persons and deadlines for removing the non-conformities. The management of non-conformities means the analysis of non-conformity, detection of causes, prevention of recurrence, determination of the method of removal, and assessment of the performed actions. In order to systematically approach the analysis of the types of non-conformities in the transport company it is necessary to make records which define individual steps and the responsible persons in performing the corrective or preventive action. The difference between the mentioned types of actions lies in the fact that the preventive action is undertaken to act on the process, repeated or additional qualification of the operative executor or the means of work in order to stop the non-conformity from occurring. In case of corrective action one acts directly on the non-conformity or cause of non-conformity, thus acting also preventively, so that very often it is difficult to determine a strict border and clear difference between the corrective and preventive action. However, a strict division and differences are not what is meant by the requirements of these standards clauses, but rather the removal of the identified non-conformities of business operation using the system for the management of quality, environment, occupational health and safety at work of a transport company.

4 Research results

Past research has indicated the big drawback of the implementation of ISO standard requirements in the Republic of Croatia, which is the introduction of the management system, primarily of quality, and the holding of ISO certificates which serve only for the presentation and for the marketing purposes, or, indeed, as an advantage i.e. meeting of the conditions when competing for a certain job. The company management invested then as a rule the capital and created cost to realize short-term objectives, not having recognized that the engagement of the employees and direct cost of certification could achieve a longer-term result which is the original reason of using a management system according to the ISO standard requirements. In compliance with these conclusions, the introduction of the quality management system or of other aspects into an enterprise is not an end in itself. The implementation and meeting of the ISO standard requirements represents a strategic guideline of the increase in efficiency and productivity, company profit and the living standard of its employees. It is precisely for this reason that the dynamic consideration of implementing the quality system and of other systemic managements, confirms that positive effects overcome the negative ones. For the result of such processes in the world, and in the Republic of Croatia as well, we mark a continuous increase in the number of companies that implement the requirements of the respective standards and have one certificate, or within an integrated system several certificates. In the Republic of Croatia at the

beginning of 1999 there were 141 enterprises holding a certificate ISO 9001 *Quality management systems*. A year later, 205 enterprises had the certificate. In March 2001, there were 316 companies with a certificate, and in the mid-July there were 359 such enterprises. The overview of the certified companies according to ISO 9001 of 2004 is given in Tab. 1. Further in the paper a graphical presentation is given and statistical analysis of the studied values is performed. The prognostic trend model of the development dynamics of the studied values (only statistically significant models are presented) has been obtained by means of the computer program MS Excel and it is determined by the equation of the linear trend model and the coefficient of determination (R^2) as a measure of representation level, and the dynamics has been graphically presented.

It should be noted that apart from the sample size which has been analysed in the paper ($N = 7$) the following holds: when the value of the coefficient of determination R^2 is greater than 0,569 the conclusion is that the determined mathematical model of the prognostic trend of the studied variable is statistically significant with the risk level of $p < 0,05$, i.e. if R^2 is greater than 0,765 with risk level $p < 0,01$. [10]

Table 1 Overview of annually certified companies according to ISO 9001 in the Republic of Croatia in the period from 2004 to 2010

Year	2004	2005	2006	2007	2008	2009	2010
Total number of ISO 9001 certificates	295	324	370	470	235	254	294

Source: Annual reports of HR Survey 2010 and the Croatian Society for Quality 2011

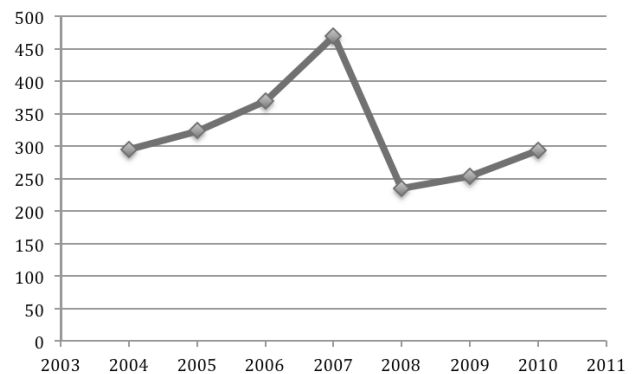


Figure 1 Data on the number of certified companies and the number of certificates in the Republic of Croatia; Source: Tab. 1

Tab. 1 and Fig. 1 show that the number of introduced certificates oscillates per years. The growing trend of the number of certified companies and organizations according to ISO 9001 from 2004 to 2007 marked a continuous increase, and then with the decline from 2008 showing again the same trend. On the whole, this did not reflect on the reduction but rather the cumulative trend can show a constant increase in the number of certified companies and organizations according to ISO 9001 standard, which is presented in Tab. 2, i.e. the respective graphical presentation.

Table 2 Cumulative overview of totally certified companies according to ISO 9001 in the Republic of Croatia in the period from 2004 to 2010

Year	2004	2005	2006	2007	2008	2009	2010
Total number of ISO 9001 certificates	963	1287	1608	2078	2313	2567	2861

Source: Annual reports HR Survey 2010 and the Croatian Society for Quality 2011

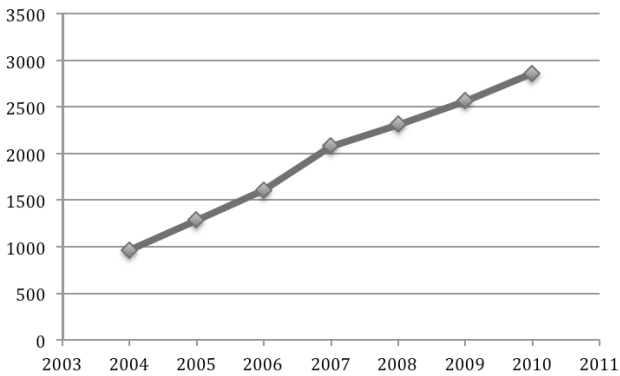


Figure 2 Dynamics of increase of the number of certified companies and the number of certificates in the Republic of Croatia; Source: Tab. 2

Note (valid for all further equations of mathematical prognostic trend models): $x = 1$ for the year 2004

$$Y = 319,96x - 640214 \quad (1)$$

$$R^2 = 0,992 \quad (p < 0,01) \quad (2)$$

Table 3 Overview of annually certified companies according to ISO 14001 in the Republic of Croatia in the period from 2004 to 2010

Year	2004	2005	2006	2007	2008	2009	2010
Total number certificates ISO 14001	33	40	64	75	78	126	122

Source: Annual reports HR Survey 2010 and the Croatian Society for Quality 2011

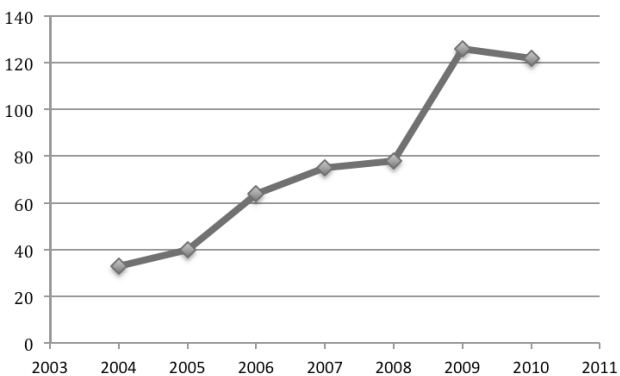


Figure 3 Dynamics of annually certified companies according to ISO 14001 in the Republic of Croatia in the period from 2004 to 2010; Source: Tab. 3

$$Y = 16,179x - 32394 \quad (3)$$

$$R^2 = 0,972 \quad (p < 0,01) \quad (4)$$

Tab. 3 and Fig. 3 show a rising trend in the number of certified companies for the environmental management system of 2004 and a big jump in 2009. In 2010, the number of certificates was somewhat lower than the number from 2009, but the cumulative overview shows a very regular growing trend in the period from 2004 to

2010. The tabular and graphical presentations lead to a conclusion that the companies that have high needs for compliance with the legal regulations because of accession to the European Union, introduce the environmental management systems, or more frequently integrate the ISO 14001 standard requirements into the existing quality management system according to ISO 9001, as assistance. The fall in the number in 2010 did not disrupt the trend but was the consequence of the economic crisis in the Republic of Croatia, where the economic subjects have turned to a greater extent to fighting for survival on the market, and to a smaller extent to the strategic decisions about the improvement of the company management.

Table 4 Cumulative overview of totally certified companies according to ISO 14001 in the Republic of Croatia in the period from 2004 to 2010

Year	2004	2005	2006	2007	2008	2009	2010
Total number of ISO 14001 certificates	84	124	181	265	343	469	591

Source: Annual reports HR Survey 2010 and the Croatian Society for Quality 2010

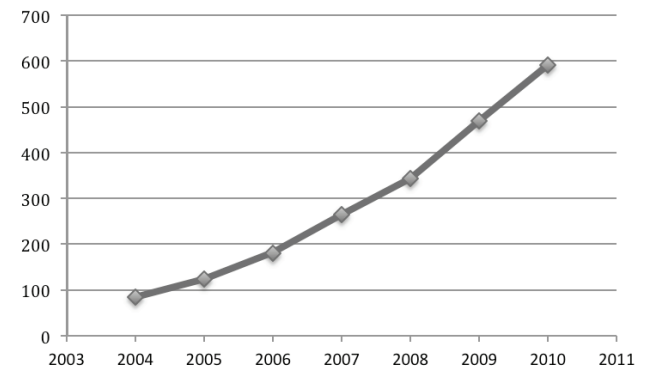


Figure 4 Cumulative overview of overall certified companies according to ISO 14001 in the Republic of Croatia in the period from 2004 to 2010; Source: Tab. 4

$$Y = 84,75x - 169799 \quad (5)$$

$$R^2 = 0,968 \quad (p < 0,01) \quad (6)$$

Table 5 Overview of annually certified companies according to OHSAS 18001 in the Republic of Croatia in the period from 2004 to 2010

Year	2004	2005	2006	2007	2008	2009	2010
Total number of OHSAS 18001 certificates	4	5	14	7	8	22	28

Source: Annual reports HR Survey 2010 and the Croatian Society for Quality 2010

Note: the overview shows the certificates issued by the certification bodies with and without accreditation.

Tab. 5 and Fig. 5 show the fluctuations per years. The increasing trend in the number of certified companies and organizations according to OHSAS 18001 of 2004 marked in the cumulative a continuous growth, which is presented by Tab. 6, i.e. the respective graphical presentation.

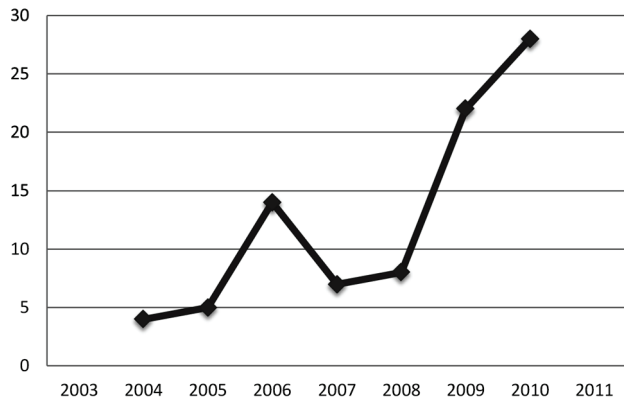


Figure 5 Overview of annually certified companies according to OHSAS 18001 in the Republic of Croatia in the period from 2004 to 2010; Source: Tab. 5

$$Y = 3,57x - 1,7143 \tag{7}$$

$$R^2 = 0,698 \ (p < 0,05). \tag{8}$$

Table 6 Cumulative overview of totally certified companies according to OHSAS 18001 in the Republic of Croatia in the period from 2004 to 2010

Year	2004	2005	2006	2007	2008	2009	2010
Total number of OHSAS 18001 certificates	12	17	31	38	45	67	95

Note: the overview shows certificates issued by the certification bodies with and without accreditation. Source: Annual reports HR Survey 2010 and the Croatian Society for Quality 2010

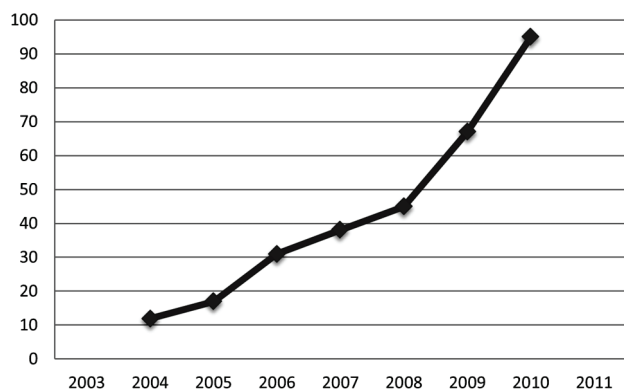


Figure 6 Cumulative overview of totally certified companies according to OHSAS 18001 in the Republic of Croatia in the period from 2004 to 2010; Source: Tab. 6

$$Y = 10,5x - 21033 \tag{9}$$

$$R^2 = 0,972 \ (p < 0,01). \tag{10}$$

5 Conclusion

Today in practice we can often encounter a large number of different reasons why a company or organization, i.e. its management or owner want to implement the requirements of the international standards and introduce the system of managing quality, environment, occupational health and safety at work. The first most common reason lies in the requirements set by the customers who want to do business exclusively with the certified companies, and the second lies in the desire to hold an internationally acknowledged certificate that will open up for the marketing and sales numerous possibilities of making business and enable the enterprise

to bid for public tenders. Rarely can we meet a case in which the management or the owner of an enterprise want the system because of more efficient operation or to meet the changing customer’s requirements as fast and as efficiently as possible. The majorities are only interested in obtaining the certificate and showing it then to their customers, which should simply mean that they are a well-organized enterprise and that they do business in a high-quality manner. However, when the company management or the owner want the certificate just to meet someone’s formal requirements, and if the management system has been implemented without real understanding of all the standards requirements, then the holders of the respective certificates obtained only a piece of paper, and not the system which would represent crucial improvement of their competitiveness on the market. The objective of studying the application of the standards in the operation of a transport company and the implementation of requirements represent determining of the level of benefit these companies have from owning the management system. The company management has to use the given information and assess the benefits of implementation in facing the everyday problems as well as by defining the strategic tasks in the operation of the transport company, and the guidelines for this may be found in this paper. This may lead to the conclusion that the transport company, as well as some other type of organization which introduces the management system according to international ISO standards fully respects with their activities the general standards of managing and organizing the company as well as of setting the objectives. Furthermore, ISO standards represent the tools that can be used to manage an organization in order to realize the objectives. The tool is useful at all levels within the organization since it simplifies the approach to realizing the operative tasks, managing of processes and control of realization. The mentioned activities improve the quality level of the product, i.e. the service, which is certainly in compliance with the strategic goals of all the organizations, even those that failed to explicitly include quality as part of their objectives.

The research results speak in favour of introducing the management system in a transport company for several reasons: Organization of the transportation process in which everybody knows exactly what, why, who, how and when something needs to be done in order to realize the business plan; The task of transport is planned, realized and at the same time the records are being made; The procedures of every employee are documented – which are then easy to handle by a new employee if the current employee for any reason is not able to perform the task anymore; Should a failure occur in the transport procedures or generally in the operation of the transport company, it will be easy to identify the point at which it occurred and everything will be undertaken to stop it from occurring again; The operation of the transport company will be realized according to the model of the predecessor, and in case of the need for change or improvement this will be done in the stipulated manner, and the documentation system will become the record of the total knowledge of all the transport company employees; Every transportation event can be reconstructed by following the document that describes it,

and the records of the transport company operation can confirm that the activities were done in favour of the customers, suppliers, employees, owner or any other stakeholder; The transport company employees are informed that they work at the same level at which the best world organizations are operating nowadays and they will be proud of this fact.

By working in compliance with the stipulated documentation system, they open up for the company and for themselves as well, a path to a safe future. Managing a company using the management system is a complex process which, apart from the discipline of the working procedures, means also a sociological impact, which contributes strongly and strategically to the humanization and harmonization of the relationships among the employees within a company. In this sense it also influences the achievement of personal authority of every employee in relation to other employees. The specialist areas and organizations such as local authorities, health-care, and education have been developing the management systems based on the quality management systems and ISO standards, so that the trends of expanding the implementation of standards into various fields of activities have continued. Regardless of the area and the environment in which they operate, the companies or organizations can, but need not, adopt the respective management systems and ISO standards requirements. The decision on the implementation of the management system is the subject of assessment of the company management or the owner, and the introduction of the management system results in a situation full of self-critiques and analyses, which is the assumption of competitiveness. Studying the dynamics of the increase in the number of certified companies and the number of issued certificates in the period from 2004 to 2010 a statistically significant permanent growing trend has been determined (with $p < 0,01$). The implementation of the system for managing quality, environment, occupational health and safety at work indicates transparently the fact that nothing is so good that it could not be even better. In order to achieve this, it is necessary to create an environment in which the culture of interdependence between the employees and the management in the company will be developed. The most important message which appeals to the necessity of the system for managing the quality, environment, occupational health and safety at work is that without the respect of all the process participants there is no continuous advancement in any sense, either economically or regarding the development of humankind.

6 References

- [1] Hrvatska norma HRN EN ISO 9001:2009, Sustavi upravljanja kvalitetom - Zahtjevi (ISO 9001:2008; EN ISO 9001:2008), Hrvatski zavod za norme, Zagreb, 2009.
- [2] Hrvatska norma HRN EN ISO 14001:2009, Sustavi upravljanja okolišem - Zahtjevi s uputama za primjenu (ISO 14001:2004; EN ISO 14001:2004), Hrvatski zavod za norme, Zagreb, 2009.
- [3] BS OHSAS 18001:2007 Occupational health and safety assessment series, Occupational health and safety management systems -- Requirements, BSI British standards, London, 2007.
- [4] Hrvatska norma HRN EN ISO 9000:2008, Sustavi upravljanja kvalitetom – Temeljna načela i terminološki rječnik, Hrvatski zavod za norme, Zagreb, 2008.
- [5] Bahtijarević-Šiber, F.; Borović, S.; Buble, M.; Dujanić, M.; Kapustić, S. Organizacijska teorija, Informator, Zagreb, 1991.
- [6] Injac, N. Mala enciklopedija kvalitete, I. dio, Oskar, Zagreb, 1998.
- [7] Juran, J. M. The Quality Trilogy: A Universal Approach to Managing for Quality. // Harry Ivan Costin: Strategies for Quality Improvement, The Dryden Press, Harcourt, Brace College Publishers, Rorth Worth, 1999.
- [8] Lazibat, T. Upravljanje kvalitetom, Sinergija, Zagreb, 2009.
- [9] HR Survey 2009, Hrvatski pregled certifikata sustava upravljanja za 2009. godinu, Hrvatsko društvo za kvalitetu, Osijek, 2010.
- [10] Serdar, V.; Šošić, I. Uvod u statistiku (Introduction to Statistics), Školska knjiga, Zagreb, 1998, pp. 47-107, pp. 406-407.

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The aim of ECCG5 is to represent the wide variety of topics connected with Crystal Growth, with a multidisciplinary approach able to answer the demands of the society in different fields of modern life, such as microelectronics, photonics, pharmaceutical and chemical material production, healthcare and cosmetics to name few.

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