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[1.] Štefan VALNČÍK, [2.]Tomáš STEJSKAL, [3.]Ľuba BIČEJOVÁ, [4.]Ján KMEC, [5.]Miroslav GOMBÁR

BACKGROUND AND ACTIVITIES OF THE PROCESS RECONSTRUCTION OF SAFE TOOL MACHINE

[1,2.] TECHNICAL UNIVERSITY OF KOŠICE, FACULTY OF MECHANICAL ENGINEERING, LETNÁ 9, 042 00 KOŠICE, SLOVAKIA
[3,5.] TECHNICAL UNIVERSITY OF KOŠICE, FACULTY OF MANUFACTURING TECHNOLOGIES, DEPARTMENT OF TECHNICAL DEVICES DESIGN, ŠTÚROVA 31, 080 01 PREŠOV, SLOVAKIA
[4.] UNIVERSITY OF PREŠOV IN PREŠOV, FACULTY OF MANAGEMENT, KONŠTANTÍNOVA 16, 080 01 PREŠOV, SLOVAKIA

ABSTRACT: *The paper presents a complex of information aimed at automated production systems structures and simulation. For production systems intergrated structures formation it uses logistic principles for making the internal material flow among various logistic nodes more precise and effective, including respective information flow, here e. g. with use of integrable and compatibile handling and technological systems, as well.*
KEYWORDS: *modular and multifunctional production system, structure formation, production logistic chain*

INTRODUCTION

Under the influence of competitive pressures and the globe has become a core business strategy of innovative development and speed of time-oriented innovation strategy (time-based strategy). Efforts to get yields from advance and ensure a leading position in emerging markets accelerate the use of sophisticated equipment mechanics and electronics to improve the effectiveness too and efficiency of work in all phases of enhanced recovery [7]. These ideas lead to the fact that the technical basis of recovery and economic conditions are becoming increasingly essential means for realizing the strategic goals of manufacturing companies. Necessity becomes a topic related to ensuring availability and safety of machines and equipment.

BACKGROUND THE PROCESS OF RECONSTRUCTION

Design, manufacture, install and make operational the renovated manufacturing machine is a very difficult feat that requires parallel actions in three areas. The first is the construction of hereditary mechanical parts, electrical wiring and supply of media to another, then renovated and new construction machinery parts, energy and information devices, especially in terms of design and technology links, and then to the third risk management, which aims to ensure meet all legislative requirements placed on the safety of the reconstructed machine.

These three areas (Figure 1) are irreplaceable whole. It is a complex issue so that teamwork is essential in the design and process engineering.

The following considerations are based on [2] [3] and [7]. The present knowledge of the experts involved in the detection of security in various fields are undoubtedly prove, that all processes in the real world are burdened with certain risks - the risk to an insignificant risk intolerable. The purposes of risk management is a systematic search of the risks associated with specific processes, analyzing the risks identified and their complete elimination, or at least reduce the level of marginal risk selection and implementation of appropriate security and safeguards.

The most frequent and significant elements of risk management is it also verifying the effectiveness of protective measures and learning from mistakes. In terms of security risk management strategy puts emphasis on a consistent preference for risk prevention and security measures intended purpose is primarily to identify and remove as many sources of danger or hazard already at the stage of conceptual design process, before protective measures designed to only reduce the risk that is due to avoidable hazards.

Only by adhering to safety regulations' relating to specific processes is in terms of risk management is inadequate, since it is confined only to reduce existing risks through protective measures. It is necessary to increase fault tolerance by reducing the probability of creating a safety margin, which can be understood as a safety feature.

According to ISO / DIS 31000 [1] risk management process involves the application of logical and systematic steps. Risk management is here defined as the systematic application of policies, procedures and techniques of management roles dealing with the determination of the context, detection, analysis, evaluation, assessment, treatment, monitoring and communicating risks to them in a way that allows the organization to minimize losses and maximize the opportunities of cost effective manner. To achieve maximum benefit, it is necessary to risk management activities (hazard identification, risk

assessment, treatment risks, monitoring risks ...) can be initiated in the first stage of the project and continue to risk management in all other stages.

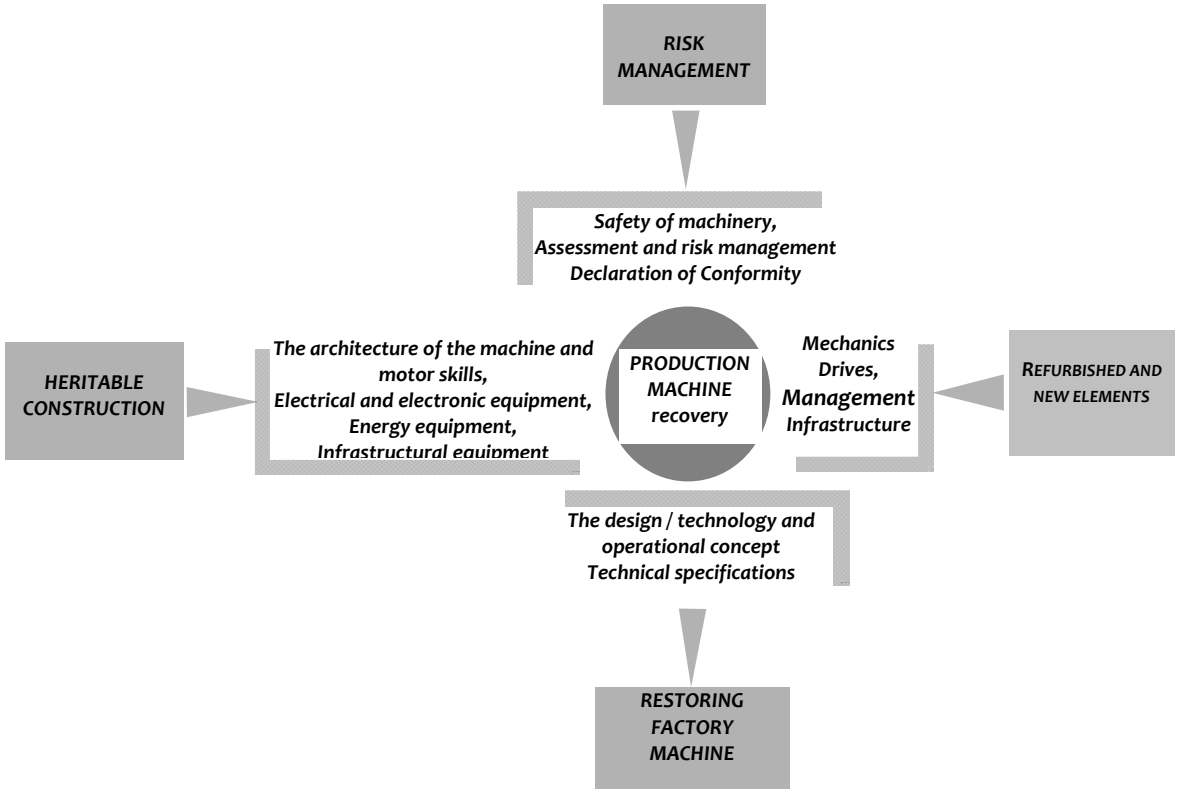

Figure 1. The areas involved in the recovery process of the production machine

For security of production machines can not see the risk of a chance to succeed. Such an approach would be simply unacceptable health hazard as the lives of users of these devices, as well as prosperity of the company, which would be dangerous machines launched or in operation. Described above a general risk management is therefore not absolutely applied to detect the safety of production costs and needs to be modified in such a way to answer legislative requirements with regard to safety of machinery and therefore the relevant harmonized standards relating to safety of machinery.

All activities associated with the development of new and refurbished production machine, ensuring the quality, safety, hygiene and ecology are associated with larger or smaller risks. The task of management of technical risks is time to identify all the hazards, assess (evaluate) the associated risk (i.e. risk levels deriving from machine design, management, establishment, maintenance, operation, liquidation, etc.).

And, if appropriate, develop and implement remedial measures to risk reduction. Figure 2 presents the broad scope of management of technical risks. The most important areas of technical risk management is ensuring the safety of machinery in terms of their structure and behaviour throughout their life cycle and further ensure the functional safety of control systems (electronic, pneumatic, hydraulic).

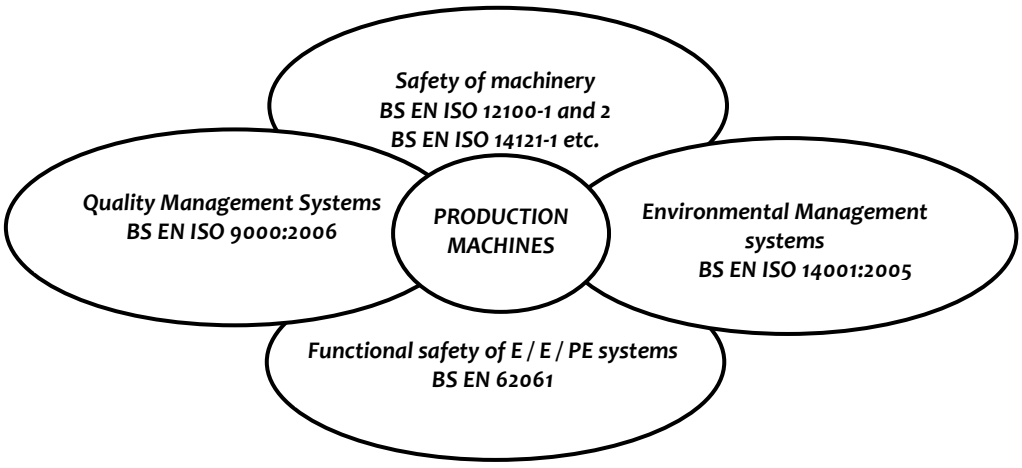

FIGURE 2. Spectrum management of technical risks

Quality management systems are useful in demonstrating how the parameters are identical for all products of similar type to the enterprise in production, so the general management of risks during the provision of product development in terms of fulfilling the particular rogue and the customer wishes.

Environmental management systems then find their application in solving parsimony requirements throughout the life cycle of machinery for the environment.

The risk is necessary in the management of technical risks seen as a threat to peace, which is determined by a combination of importance (severity of) potential damage and the likelihood of damage (Figure. 3). The spectrum of consequences (i.e. risk assessment scheme) activity is a summary of the potential consequences (C - Consequence) and the corresponding probabilities of occurrence of these effects for the chosen time unit (p - probability). In Figure 3 shows the general structure assessment of risk schemes.

The risk associated with a specific activity must be therefore determined on the basis of identifying all hazards associated with this activity and the probability of damage to these dangers. It's generally defined as:

$$Risk = C_1 \bullet p_1 + C_2 \bullet p_2 + \quad + C_k \bullet p_k \qquad (1)$$

where:
Ci – the consequence (C – consequence),
pi – probability of occurrence.

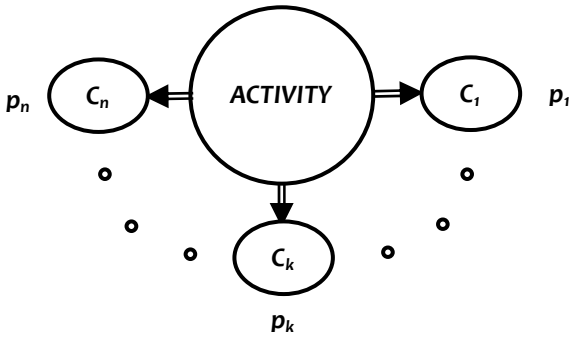

Figure 3. The general structure of risk schemes

ACTIVITIES MANAGEMENT OF TECHNICAL RISKS IN THE MANUFACTURING MACHINE

System methodology management of technical risks in the manufacturing machine is based on standard methods and quality assurance tools and production machines such modifies It belongs to a sequence of activities necessary to achieve the security machinery.

The risk management in business is primarily the responsibility of top management, which has seen the need for risk management and they must create favorable conditions for its successful implementation. This means that the level top management of company must be clarified policy of risk perception. Perceptions of policy and risk management by senior management and the relevant directives should be drawn up and agreed upon by experts especially for the implementation of operational risk management, whose role is to:

- *compile table's severity of hazardous events,*
- *define the risk category with focus on*
  - *the importance of damage to health,*
  - *number and duration of exposure to danger,*
  - *the likelihood of hazardous events,*
  - *the possibility of averting or reducing damage,*
- *draw up a chart of risk assessment and determine the boundaries of acceptability of risk.*

The overall approach to managing technical risks in the manufacturing machinery is clearly shown by the flowcharts in Fig. 4. Third it is divided into the following steps:

I. SYSTEM ANALYSIS. In which falls:

1. *Planning analysis and risk assessment. Prior to the analysis of the risks created by the planning done, especially the need to gather relevant information on:*
   - *the current state of science and technology,*
   - *an overview of accidents for comparable machines,*
   - *the risks of treatment with comparable competitive machines,*
   - *a list of applicable laws and regulations,*
   - *the list of harmonized standards.*

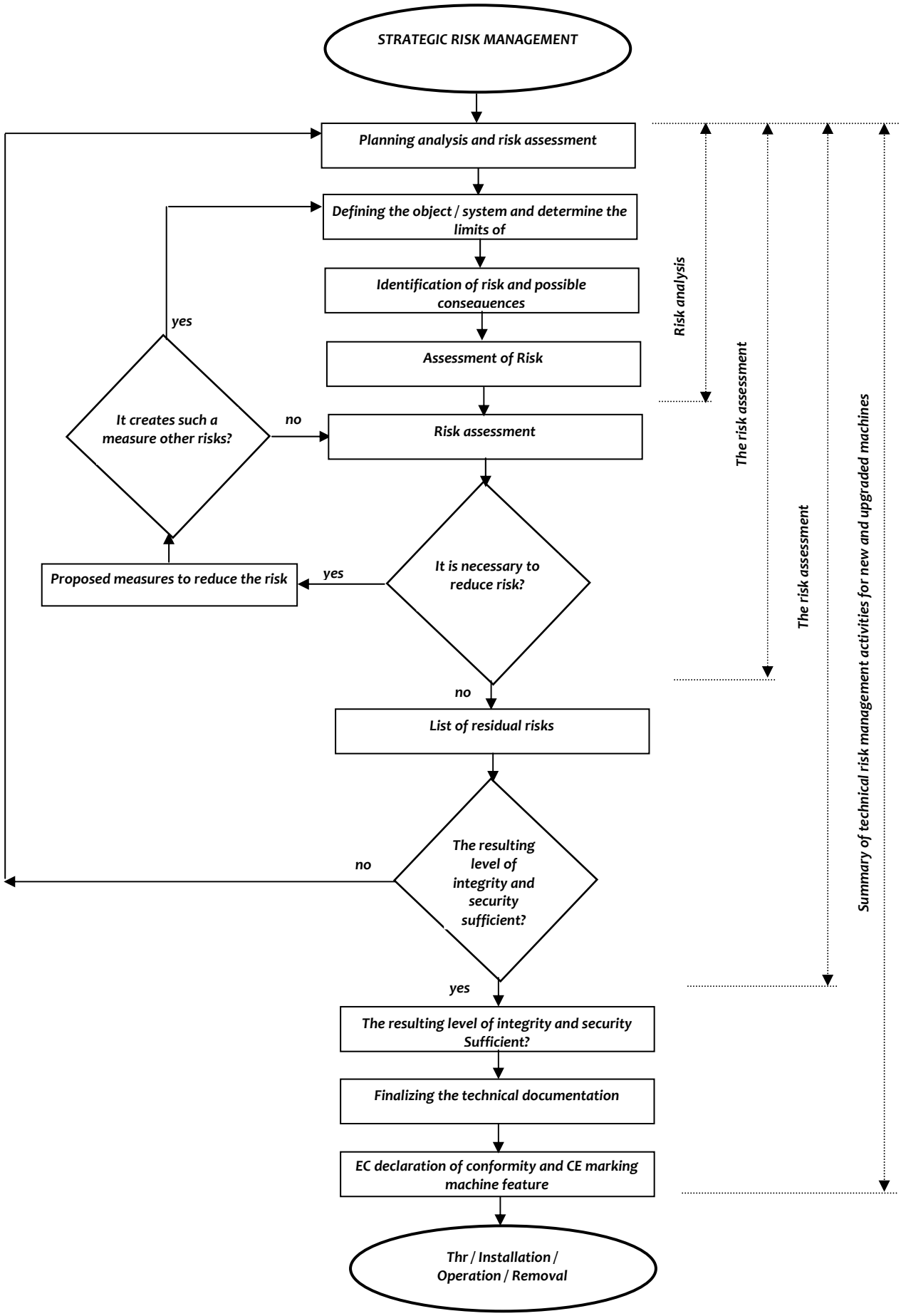

Figure 3. Flow chart of management of technical risks in new and upgraded production machines

2. *System analysis machinery. For the purpose of hazard identification and risk assessment is important to understand the basic concept and principle of the machine under consideration by the next phases of activities:*
   - *creating a block diagram of the production machine,*
   - *identify the relevant hazards associated with construction of the production machine,*
   - *identify hazardous areas of machine manufacturing.*

II. RISK ANALYSIS, such as.:

1. *Determine the limits of the machinery. Then what we have on the block diagram describes the principle and function of the production machine is necessary to determine the extent of risk analysis (eg. inclusion of process hazards, environmental hazards or external effects in the hazard analysis). The following three factors should be taken into account in determining the course of complete cut-off values for the intended use of the machine:*
   - *limits use,*
   - *spatial limits,*
   - *time limits.*
2. *Identification of significant hazards. The machinery is made in accordance with the Slovak and European technical standards EN ISO 14121-1 [5] EN ISO 12100-1 and EN ISO 12100-2 [4], and the entire life cycle of the machine. This means that the identified relevant dangerousness fixed during system analysis add further machinery similarly identified hazards generated during all phases of the life cycle of the machine and selecting the most important (serious) hazards that need to implement risk reducing measures.*

III. ESTIMATED AND RISK ASSESSMENT:

1. *A risk assessment. Estimate the size of the risk should be done by graph to estimate the risk for all identified significant risks included in the "Overview of identified significant hazards" [2]. If these risks occur in several places of machinery, it is necessary to carry out a risk assessment for all the places of their occurrence in separate forms. First, take an initial assessment of risk to the level of risk, which occurs in machinery if they are not used any preventive action to reduce this risk. The risk for machinery remains even after taking all possible precautionary measures, called residual risk.*
2. *Risk Assessment. This step is Necessary to Decide Whether a risk is found acceptable. For this decision, we can use pre-defined boundaries of acceptability of risk. If the level of risk is unacceptable, it's to propose action to reduce this risk. If the level of risk is acceptable approaches to risk assessment is another important risk.*

IV. RISK REDUCTION STRATEGY:

1. *Proposal for action to reduce risk. If unacceptable risks to propose preventive measures, it's to reduce to acceptable levels. Such measures are mainly structural, technical and safety risk mitigation measures (including members warning the user). To increase transparency, documentation, technical risk management process should be shown a detailed verbal description of preventive measures. This action must be taken in the following priority order:*
   - *risk reduction measures built into the structure of the machine,*
   - *reduce the risk of security,*
   - *reduction of risk information to use machinery.*
2. *List of residual risks. After each implementation of risk reduction is again made its assessment. If there is no significant additional risk to unacceptable levels of risk are concerned, the summary results of the assessment process and risk reduction, summarize the information on identified risks and create a so-called list of residual risks. List of residual risks is an important output of the assessment process and risk reduction. It is important for assessing the safety of the resulting machine company management and user information required for the production of the machine with the persistent dangers of residual risk.*
3. *The level of integrity and security of the resulting machine. The integrity of safety is the likelihood that the machine system or subsystems perform the required performance (working) function is completely safe for all specified conditions. Integrity also implies that the safety integrity of safety management (hardware, software) as well as structural integrity of the safety management system and resistance to systemic failure, i.e. such a disorder, which clearly caused by a specific cause can be eliminated by modifying the design, production or operational procedures and the like (the systematic safety integrity). The resulting safety of machinery may be assessed as to the final size of the risk associated with the examination of equipment and the overall residual risk after the adoption and implementation of all proposed measures. The size of the resulting risk of the machine can be determined as the sum of individual risks, or the sum*

of the likelihood of a dangerous combination of events and the importance of the consequences of this dangerous event.

4. *List the measures taken. For greater transparency and control the results of the assessment process and risk reduction should be taken to draw up a table with a transparent reference to the number of significant risks that this measure decreases.*

V. TECHNICAL AND LEGISLATIVE DOCUMENTATION:

1. *Finalizing the technical documentation of the production machine. At this stage, risk management, provide complete technical documentation of the production machine (within the meaning of Directive 2006/42/EC), which was within the risk management continually refine and complete the course.*
2. *An EC declaration of conformity and marking machine manufacturing CE mark. The last step in the process of assessing and risk reducing of exposure to the EC conformity are declaration and requirements of current applicable legislation. This statement must contain the following information:*
   - *business name and full address of the manufacturer or authorized representative and,*
   - *name and address of the person charged with preparing technical documentation, and that person must be resident in the Community,*
   - *identification and description of the machinery, including a general indication, function, model, type, serial number and company name,*
   - *sentence, which expressly declares that the machinery complies with all relevant provisions of Directive 2006/42/EC, and possibly similar sentence declaring the conformity with other Directives or relevant legislation to which machinery replies.*

   These references must refer to the texts published in Journal of the European Union, central:
   - *where appropriate, reference to harmonized standards,*
   - *where appropriate to other technical standards and specifications,*
   - *place and date of declaration,*
   - *the identity of the person authorized to draw up a declaration on behalf of the manufacturer or his authorized representative and his signature.*

In completing the assessment process and risk reduction equipment manufacturing machine is CE mark (Conformité Européenne from France) before being placed on the market or put into service.

CONCLUSIONS

The proposed modified risk management of new machines, which is based on the general principles of risk management and systemic risk assessment methodology, clearly highlights the important role of corporate management in the overall assessment process and risk reduction. Successful security solution developed by the machine is in any case can not be made without the support of top management of the company to be enough to perceive the importance of this process and create favourable conditions for its implementation.

The lack of or inappropriate management of the risks of new machines will just lead the company responsible for the consequences of untreated enough risks that may stop a dangerous event. Damage in this case can be life or health of users or it can create damage to their property i.e. that may end up as damage the machine.

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