

SAFETY AUDIT IN PRODUCTION PROCESS

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Summary. The objective of this monographic is to audit the safety of the selected organization. This paper describes the current issues in the field of safety and health at work and presents the importance and significance of risk management applications. The main objective of this work is its own safety audit, which we have done at the selected Machinery Komax Kappa 310, which is specialized in the production of cable harnesses used in the automotive industry. Through the safety audit, we have identified several shortcomings in safety and the resulting risk. Through the design of appropriate corrective measures we seek to minimize these risks and increase the level of comprehensive security in the organization. The audit can serve the organization as an inspiration for systematically addressing safety issues that will contribute to the optimization of work processes, lower accident rates and, finally, improving the quality of working life. It can also serve as a basis for risk analysis using other methods.

Key words: safety audit, automotive, safety, risk

INTRODUCTION

However, industry globalisation and consolidation, product complexity and the increasingly sophisticated requirements of customers were already leading to a greater emphasis on ensuring that losses were not incurred due to adverse market conditions, counter party failure, or inappropriate controls, systems or people [4, 5, 10, 11, 14].

These factors led to increased regulation, and banking and financial institutions now have to adhere to the principles of banking regulation advocated by the Basel Capital Accord. They must strengthen internal controls, enhance disclosure and transparency of financial information and ensure effective supervision, in order to maintain the sound operation of the banking and financial markets. This includes identifying and quantifying various risks in advance, as well as establishing and carrying out effective risk management.

Audit is a systematic and, wherever possible, independent examination to determine whether activities and related results conform to planned arrangements and whether these arrangements are implemented effectively and are suitable to achieve the organization's policy and objectives [3].

Safety audit is carried out to ensure that unsafe acts and unsafe conditions are brought to a minimum level so that there is a safe work environment. The pur-

Table 1. Example of checklist for safety audit

No.	Question	Status	Notation	Evaluation, (%)
1.4	Is an enterprise OHS policy accessible and known to all employees and stakeholders?	P	Some employees are unfamiliar with the OSH policy, despite the fact that it is publicly available (e.g. Wall).	50

pose of safety audit is to ensure that there are definitions and safe procedures for works and the set definitions and safe procedures are practiced.[15-17,19,20] Components of a safety audit may depend upon the type of occupancy but it surely indicates that the management has an attitude towards safety [6-9].

The aim of this work is to perform a security audit on a specific workstation of cable harnesses.

In this paper, we have focused only on the evaluation of the machine itself.

MATERIAL AND METHODS

Selection and characterization of the object of the audit - The first step taken as part of own work consisted of the selection object in which we conduct the safety audit. We selected the object, which is engaged in the assembly and manufacture of cable harnesses used in the automotive industry.

The object of our characteristics was also automated machinery Komax Kappa 310 with which several members of selected department comes into contact.

Preparing for the audit.

Setting objectives, type, date of the audit and creation of auditing collective - Among the most important activities necessary for the successful implementation of a security audit is thorough and careful preparation. One of the first steps constitutes a determination of audit objectives, which are identical in order to work in Section 2.

Study of documentation - The main emphasis, at the stage of preparation for the audit, was devoted to consistent study of the documentation related to the audit. Consistently we have become familiar with legal requirements, especially with the Act. 124/2006 on OSH as well as other legislation, as listed in the references. Information on the legislation was acquired mainly from the Collection of Laws and on-line resources available (web JASPI). We also became acquainted with the contents of the standard OHSAS 18001 and its requirements. We were inspired by the standard STN EN ISO 19011, which provides guidance on auditing management systems (in our case safety management).

Preparation of audit questionnaires - We have devoted a lot of effort to the development auditing matters and creation of questionnaires. Questionnaires represent an important and useful tool that allows us to facilitate audit (table 1).

Serial number (No.) - due to the simple identification of various issues, areas and wholes, we chose marking method consisting of two numbers separated by a period (1.4). The first number represents the area ("OSH Policy") from which the question originated and the second number indicates the order of question in this area (questionnaire).

Question - This box contains the text of question concerning the examination area within the security audit.

Status – alternative evaluations (Y, P, N) expresses the degree of fulfilment of a specific criterion (question), where yes (Y) is used when evaluation by the audit meets the criteria in full (100% corresponds to the one in field of percentage evaluations). Evaluation partially (P) we used when evaluation by the audit fulfilled the criterion only partially but the risk arising from the lack of it is acceptable (10 to 90% inclusive). Evaluation not (N) we use when evaluation by the audit absolutely does not fulfil the criteria or very serious deficiencies are detected (0%).

Notation - further expresses the deficiencies found in the audit stage, its content may also express positive findings or may be left blank.

Evaluation (%) - percentage expressing the degree of compliance, where a higher score represents a higher level of compliance with the requirements. Box complements state and numerically specifies the degree of fulfilment in the specific criteria (question). Maximum representing 100%. Evaluation is round up to tens of percent, the appropriate box may therefore contain an assessment of 0, 10, 20, 30, 40, 50, 60, 70, 80, 90 or 100 (%).

The assessment is of course largely subjective but the assigning of percentages in the final evaluation was based on the rating scale shown below, which largely increases credibility, optimization and rationalization. Assigned values and ranking system was also consulted with certified safety technician in pursuit of most objective results.

Evaluation scale:

100 (%) - all the requirements are met, there were no disagreements,

70, 80, 90 (%) - minor disagreements were identified although does not have a major impact on the function of the system (failure to fulfil minor requirements to the required extent, date, form, etc.),

40, 50, 60 (%) - detection of more significant defects, but the basic system function is maintained (activities and practices are implemented, but poorly documented, etc.),

10, 20, 30 (%) - Identifying major nonconformities, the system performs its function only minimal (large deficiencies are detected in the documentation and at the same time a lack of procedures realization, activities, etc.),

0 (%) – there is no knowledge about the given request or is not fulfilled at all.

Carrying out the security audit

At this stage, we have collected information and facts concerning the examination of objects, objectives and scope of the security audit.



Fig. 1. Device Komax Kappa 310

Acceptable cut surface (depending on the characteristics of wire)	0,02 – 6 mm ²	
The maximum outside diameter of wire	10mm	
Cut precision of the wires (deviation)	± (0,2% + 1mm)	
Range of the usable length of the wire	1mm – 700 000 mm	
Maximum sliding speed of wire	4m/s	
Maximum value of stripping length	continuous stripping	Side 1 100mm Side 2 40mm
	partial stripping	Side 1 999mm Side 2 999mm
	multiple stripping	Side 1 999mm Side 2 999mm
	„Short mode“	It can be on/off
USB	Standardly (2x)	
interface IOCS	2 (4)	
Noise	<70dB	
Power supply	110/230V ac ± 10%	
Device dimensions (HxWxD)	465x385x460 mm	
Weight	25 kg	

Fig. 2. Characteristics of device Komax Kappa 310

We conducted our security audit at the production site, which deals with the assembly of cable harnesses. Verified workplace is officially labelled as workplace No. 2 and the main product are cable harnesses used in the automotive industry and specifically for installation in electrically operated mirrors of cars.

The object of the security audit is the automatic machinery Komax Kappa 310 (Fig. 1, 2), which is used for the sawing operation and cutting of cable conductors to length as well as the removal of unwanted insulation from the cables [1, 2].

WORK RESULT

The object of the questionnaire is automatic machinery Komax Kappa 310 which is used for the sawing operation and cutting of cable conductors to length as well as the removal of unwanted insulation from the cables. Such modified wires are then used in other manufacturing and assembly operations. The device inputs are cables and wires that are cut to the correct length, properly insulated and ready for further treatment such as crimping, engaging and installation (Table 2).

Table 2. Machinery Komax Kappa 310

No.	Question	Status	Notation	Evaluation (%)
9.1	Is the device suitably located? Has the operator sufficient space required to work with the equipment, manipulating with material and providing good access to the facility?	Y	Around the machinery is a sufficient free space.	100
9.2	Is the wiring equipment designed and adapted in order not to present a danger or explosion? Is it in good condition?	Y		100
9.3	Are precautions to reduce the risk of moving parts of the equipment carried (capture, hit, pushed, crushing of limbs or other body parts)?	Y	A positional safety cover protects moving parts.	100
9.4	Is the device and its surroundings provided with appropriate safety markings?	Y	The floor is a defined space needed for operating the equipment and a sign alerting an increased risk of electric shock.	100
9.5	Was the competent employee trained to a sufficient extent and acquainted with the operating instructions of the device?	Y	Prior working on the machinery the employee was trained and acquainted with the instructions for use of the equipment.	100
9.6	Are operating instructions of the machine available to the operator?	P	Employee knew where to find operating instructions for the machine, but the instructions are not available in the Slovak language (English and German only).	50
9.7	Does the machine operator know where the emergency switch off on the machine is?	Y		100
9.8	Was the employee to a sufficient extent trained in health and safety when operating the machine, and was simultaneously aware of the risks related to handling of the device?	P	The employee could not appoint the risks that can occur while operating the device.	50
9.9	Have employees been assigned with PPE? Are they used to a sufficient extent?	P	Worker is using work clothes and shoes, in addition, he was assigned with protective gloves and goggles, but they are not used consistently.	70
9.10	Is the device maintenance (or repair) carried out at regular intervals? Are there records of carrying out maintenance and repairs?	P	A relevant person carries out maintenance in regular intervals. From the records cannot however be determined what maintenance actions were taken.	70
9.11	Is the machine operator at the workplace and around of the machinery keeping a sufficient order and cleanliness?	Y	Employee always clean the workplace after work and otherwise as required.	100
9.12	Does the machine operator know where to find first-aid tools (first aid kit)?	Y		100
9.13	Does the machine operator know where to find fire extinguishers in case of fire at the workplace?	Y		100

The device is suitably located, is conveniently accessible and generally provides the operator with sufficient space for material handling and machine control. Electrical installation is designed reasonably and in good condition, minimizing the possibility of electric shock. Among the biggest sources of danger, include moving parts that can lead to injury especially to the upper limbs of employee (capture, hit, crushed, etc.). Countermeasures, however, is built as a positional protective cover, subject to respect for the principles of safety practically eliminates the danger. On the floor is located a safety signs defining the space required for operating the equipment as well as a safety mark indi-

cating an increased risk of electric shock. During interviews with machine operator, we found that the employee has been trained to a sufficient extent and is acquainted with the operating instructions of the device. Employees also know Where to find operating instructions for the machine and knew where an emergency off switch is located. We found that employee was trained in occupational safety and health at operating machinery, also knew where means of first aid (first aid kit) and fire extinguisher is to be found. Cleanliness and order at the workplace are exemplary; employee cleans workstation after work and at other times according to needs and circumstances.

Table 3. Recommended corrective action – Audit report 4/4

Recommended corrective action (Annex to audit report 4/4)				
No	Detected unconformity	Corrective action	Responsibility	Deadline
Machinery Komax Kappa 310				
9.6	Operating instructions for that device are only available in English and German.	Translate (within reasonable limits) operating instructions for the device in the Slovak language.	CST	September 2013
9.8	The employee could not appoint the risks that can occur when operating the device.	Re-trained staff of the risks involved with the operation on the device.	CST	July 2013
9.9	Employee while working with the device Komax uses work clothing and footwear, in addition, he was assigned with protective gloves and goggles, but they are not used consistently.	Inspect the use of PPE * and develop a system to control the use of PPE.	CST , PM ;	June 2013 (*immediately)
9.10	From the records on the maintenance and repairs is not possible to determine what maintenance operations have been carried out on the device.	Inform responsible staff (maintenance) that every repair and maintenance operations is recorded and archived in the appropriate form.	CST , Maintenance workers;	Immediately

Legend: CST – certified safety technician, PM – production manager

Among the drawbacks associated with the device, we included the fact that the instructions for operating machines were only available in German and English. The employee also did not know enough to answer the question on the risks associated with the use of equipment, even though he was trained in relevant area. Employee receives the PPE related to the performance of work on the device but only uses regular work clothes and shoes, they have assigned also protective gloves and goggles, but they are not used consistently. Certain deficiencies were related also to the device maintenance even though is carried out regularly, records of the measures (table 3) actually taken are not detailed enough.

CONCLUSION

Security audit represents an appropriate tool to use for verification, evaluation, raising awareness and continuous improvement of safety levels, which is useful in organizations of different orientation. It is one of the oldest methods that have been used mainly to identify the sources of risks, but its application is becoming more widely used also at present. Security audit as such constitutes an independent review of the functionality of the security system at a given time and phase of its operation.

The main objective of this work was to draft a questionnaire for audit of selected Machinery Komax Kappa 310.

The highest rating in the questionnaire received “Machinery Komax Kappa 310”, namely 88%, while discovered deficiencies were documentation, usage of PPE and knowledge of operator. We suggested a corrective action, so that we achieve a reduction in risk and improve safety.

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