

Safety audit in hatching company

Audit bezpečnosti v liaharenskom podniku

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Abstract

A safety audit in a hatching company in order to improve the hatching quality and poultry breeding, poultry products and production by reducing risk factors and improving safety was performed. In the article is discussed the safety audit consisting of several parts such as an audit questionnaire and FMEA methods (analysis of causes and consequences of failures) where there are specified potential risks arising at work. These risks are evaluated, and corrective measures are defined to reduce the formation of potential risks. It examines the process of retraining employees on occupational safety and health, personal protective equipment and fire protection. To optimize the production, a compound feed production programme was designed.

Keywords: agriculture, control risk, hazards questionnaire, FMEA, safety audit

Abstrakt

V liaharenskom podniku bol vykonaný audit bezpečnosť za účelom zvýšenia kvality liahnutia a chovu hydiny, hydínových produktov a výroby hydínových výrobkov, a to znížením rizikových faktorov a zlepšením bezpečnosti. Je tu navrhnutý a vykonaný audit bezpečnosti, ktorý pozostáva z niekoľkých častí, ako dotazník auditu a metódy FMEA (analýza príčin a následkov porúch), kde sú hľadané a stanovené možné riziká, ktoré vznikajú pri práci. Tieto riziká sú následne vyhodnocované a sú stanovené nápravné opatrenia, ktoré znižujú vznik týchto možných rizík. Preskúmava sa postup preškoľovania zamestnancov v oblasti BOZP, OOPP a požiarnej ochrany. Pre zefektívnenie výroby bol navrhnutý výrobný program výroby krmných zmesí (VKZ).

Kľúčové slová: poľnohospodárstvo, ohrozenia, riadenie rizík, dotazník, FMEA

Detailed abstract

Audit je systematické a tam, kde je to možné, nezávislé preverenie na určenie, či činnosti a príslušné závery sú v súlade s plánovanými opatreniami, či sú tieto opatrenia zavádzané účinne a či sú vhodné na dosiahnutie politiky a cieľov

organizácie. Audit bezpečnosti a ochrany zdravia je štruktúrovaný proces zhromažďovania nezávislých informácií o efektívnosti, účinnosti a spoľahlivosti celkového systému riadenia bezpečnosti a zdravia a vypracovanie plánov nápravných opatrení. Audit skúma jednotlivé stupne v systéme riadenia bezpečnosti a zdravia v súlade s vyvíjanými ovládacími prvkami organizácie s konečným cieľom posúdiť ich účinnosť a platnosť pre budúcnosť.

V liaharenskom podniku bol vykonaný audit bezpečnosti za účelom zvýšenia kvality liahnutia a chovu hydiny, hydínových produktov a výroby hydínových výrobkov. Navrhli sme a vykonali audit bezpečnosti, ktorý pozostáva z niekoľkých častí, ako dotazník auditu a metódy FMEA (analýza príčin a následkov porúch), kde sú hľadané a stanovené možné riziká, ktoré vznikajú pri práci. Tieto riziká sa následne vyhodnocovali a stanovili sa nápravné opatrenia, ktoré znižujú vznik týchto možných rizík. Analýza príčin a následkov porúch (FMEA) je postup pre identifikáciu všetkých možných zlyhaní v dizajne, výrobnom alebo montážnom procese alebo výrobku či služby. Pomocou FMEA sme kvantifikovali mieru rizika a zistili jeho veľkosť a vplyv na človeka, stroj a prostredie.

Preskúmal sa a stanovil postup preškoľovania zamestnancov v oblasti BOZP, OOPP a požiarnej ochrany. Audítorský dotazník zohľadnil skutočný stav vo firme. Bol zostavený vo forme otázok týkajúcich sa bezpečnosti strojov, BOZP a dodržovania pracovnej disciplíny. Tento stav sme porovnali so stavom, ktorý by mal zodpovedať platným legislatívnym predpisom v danej spoločnosti a v danom čase.

Rozdiely sa presne formulovali a navrhli sa opatrenia na ich minimalizovanie, príp. odstránenie. Tieto závery boli vydiskutované so zodpovednými riadiacimi pracovníkmi organizácie. Najvýhodnejšie je, keď sa so závermi a odporúčaniami audítorov stotožní aj manažment organizácie.

Pre zefektívnenie výroby bol navrhnutý výrobný program výroby krmných zmesí (VKZ). Celkový prínos práce bol v zefektívnení výroby, v zlepšení pracovných podmienok a BOZP a v neposlednom rade vo zvýšení kvality liahnutia a chovu hydiny a hydínových výrobkov. Navyše organizácia získala trvalé skúsenosti s aplikovaním auditu bezpečnosti a riadením rizík.

Introduction

Agriculture is a sector of economy the main task of which is to ensure food for the population. Important agricultural products mainly include meat, milk, eggs, and cereal grains. Hatching increases its importance as an agricultural sector. Hatching companies are more powerful and effective than hens. In recent years, the need for protection of the environment as well as human and animal health, the safety of machines, systems and manufactured products is being multiplied. This leads to economic efficiency or fewer poor quality or spoiled products. And we use an audit for it.

Audit is a systematic, independent and documented process of obtaining and evaluating audit evidence about fulfilment of audit criteria (Slovak Technical Standard – STN EN ISO 9000, 2006).

The term “safety audit“ reffers to verifying the status of an enterprise, a company or any part of a coherent organizational unit. It includes experience gained by managers and professionals in the field of safety and health at work during company

inspections, inspections of workplaces and technical equipment as well as during training and seminars.

Occupational health and safety (OHS) management audits are used to evaluate workplaces' OHS management structures and processes. Audits typically determine whether the organization is compliant with one or more standards such as its own policies and procedures, applicable legislation and regulations, or another standard external to the organization (e.g. OHSAS 18001; OHSAS Project Group 2007). OHS management audits may also examine the OHS management effectiveness. Auditing is considered to be an important component of OHS management systems (ANSI/AIHA, 2005; OHSAS Project Group, 2007; ILO, 2001) and up to 95 % of Fortune 2000 companies perform them (Nash, 2005). Auditing is less prevalent in smaller firms, but is relevant to them too (Grant and Brown, 2005). Typically, the processes carried out by auditors include the following steps: (1) gathering evidence through systematic data collection, usually by reviewing documentation, conducting interviews and observing worksites; (2) evaluating the evidence against audit criteria; and (3) summarizing and reporting the results.

An important step is the collection of questionnaire data (Cacciabue, 2005). The audit's structure is given by the questionnaire that should be developed for this purpose. It covers criteria for all the elements of management under basic instructions (e.g. BS OHSAS 18001). The OHS management audit should include a detailed evaluation of OHS procedures effectiveness, the level of compliance with procedures and practice, and should specify corrective measures, if necessary. Results of OHS management audits should be recorded and reported to management on time (Šolc, 2009). Management should actively support the complete preparation as well as audits running (Hrubec, Virčíková et al., 2009; Virčíková and Šolc, 2012).

The objective of this paper is to perform the safety audit in Liaharenský podnik, a.s. (joint-stock company). The audit is focused on safety and health at work as well as the use of personal protective equipment (PPE) by workers on semi-automated machines. (The quantification part of the audit is still very experimental.

Nevertheless, this step forces the auditors to make detailed assessments first and then aggregate these to the level of delivery systems. These global assessments are initially fed back to the company for response, which often results in useful comments. This whole chain of steps assures that the audit team does not jump to premature conclusions having no validity whatsoever) (Guldenmund et al., 2006).

Materials and Methods

The safety audit of premixtures mill was performed in Liaharenský podnik, a.s. Nitra, Vráble establishment. The company is primarily focused on the breeding and sale of poultry, poultry products and eggs.

The audit focused on the safety and health protection of employees performing manual work while operating semi-automatic machines as the most part of compound feed production, including grain drying, is fully automated by means of fully automated equipment operated from a central place of production. All these machines producing compound feed as well as drying machines are subject to periodic inspections and regular maintenance and must meet the required regulations. When checking, these machines met the required criteria, that is why the

main part of audit was focused on manual tasks performed by employees while operating semi-automated machines.

As part of the safety audit, the following has been specified: an object where the audit is to be performed, the aim supposed to be reached, the date of audit, the type of audit, or an auditor or audit team (Sinay, 1997).

Methodology

- Characteristics of the company.
- Policy of safety and health at work.
- General requirements for machinery.
- Training the staff in OSH.
- Providing personal protective equipment.
- Questionnaire – audit questions.
- Application of questionnaires to objects.
- Evaluation of questionnaires.
- Risk analysis using the FMEA method.
- Acceptance of protective measures.

To optimize the production, a compound feed production programme (CFP) was designed.

Results

The first step in the security audit was instructing the employees in OSH in accordance with Art. 5 to Art. 10 of the Act No 124/2006 of the National Council of the Slovak Republic on safety and health at work, as amended. The employer is obliged to comply with obligations set forth in the Act No 311/2001 of the National Council of the Slovak Republic to ensure the safety and health at work. They set the rights and obligations of employees and employers and the general requirements for machinery and technical equipment – high-power bucket elevators (from 32 t*ph⁻¹ to 120 t*ph⁻¹).

- Redler for horizontal transport of grain.
- OŠK 250 worm transporters.
- Aspirator.
- Aspiration system.
- Pre-purifier of grain and separator.
- Control centre in the room of drying-plant.
- Conveyors.

To inform the employees adequately about OSH, there have been determined the types of training and the extent of validity of individual courses, the providing of personal protective equipment and a list of employees' claims for providing personal protective equipment within the company (Tab. 1). The programme of compound feed production (CFP) was prepared (Fig. 1, Fig. 2).

Table 1: Employees' claims for providing personal protective equipment within the company (example)

Tabuľka 1: Nároky zamestnancov pre poskytovanie osobných ochranných pracovných prostriedkov v rámci organizácie (príklad)

Position at work Pracovná pozícia	Claim for PPE Nárok na OOP	Operating life Životnosť
warehouseman	twill suit – two-piece overalls	6 months
power master	T-shirt	6 months
doorkeeper	protective cap with front	6 months
maintainer	boots – leather	6 months
operation of motor trucks	3/4 quilted hoody coat	24 months
	protective leather gloves	PP1
	ear protector	PP4
	clear goggles	PP3
	helmet	PP4
	respirator	PP2

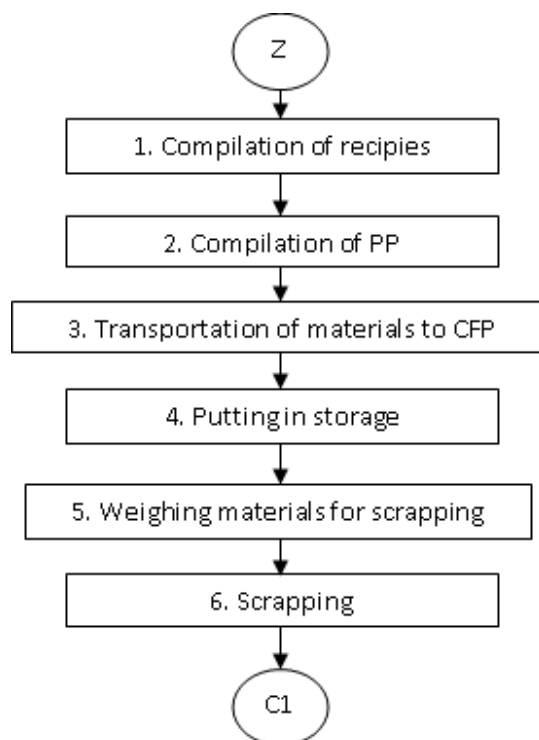


Figure 1: Technological scheme of compound feed production (CFP) (where PP – production programme, C1 – contiguity, unfinished process)

Obrázok 1: Technologická schema výroby kŕmnych zmesí (CFP) (kde PP – výrobný program, C1 – pokračovanie, nedokončený proces)

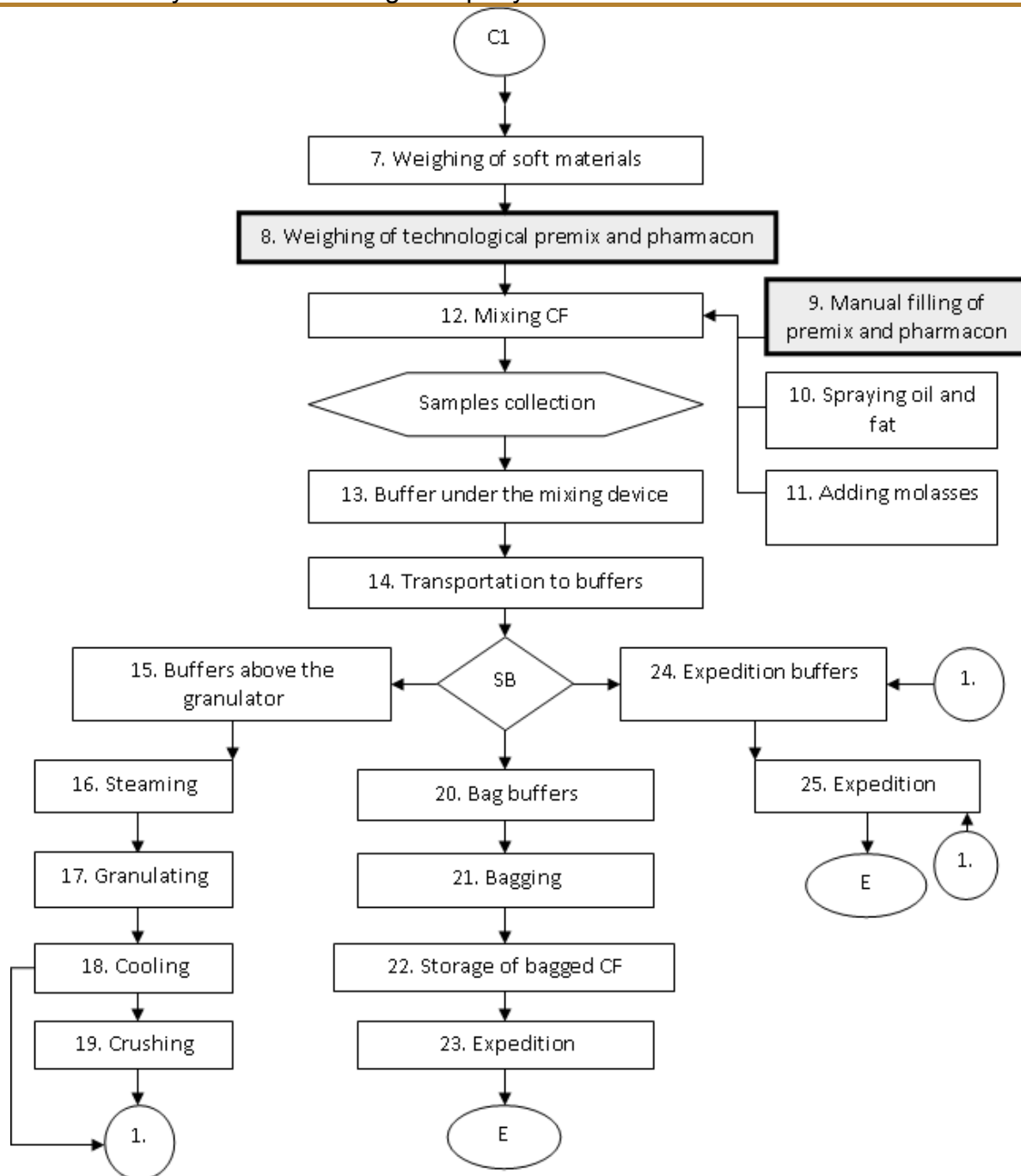


Figure 2: Continuation of Figure 1. Technological scheme of CFP (where SB – sorting buffer, CF – compound feed, E – end)

Obrázok 2: Pokračovanie obrázku 1. Technologická schéma výroby kŕmnych zmesí (kde SB – triedenie zmesi, CF – kŕmna zmes , E – ukončenie)

An audit plan was compiled.

1. Audit number: 03/01 (serial number of the audited operation / audit number in the given operation).
2. Type of audit: planned safety audit (focus on OSH).

3. Materials for audit: company guidelines (OHS; PPE; regulations for safety, operation, servicing and maintenance; technical documentation of various pieces of technical equipment; fire evacuation plan).
4. Audit objective: recording and evaluating of manual work (during the operation of machines) by company's employees.
5. Audited entity: premixtures mill.
6. Head of audited entity.
7. Audit team.
8. Date of audit: 40th–41st week.

The audit questionnaire for the hand-filling of premix and pharmacon (Fig. 3) was compiled. The questionnaire was designed not only to take into account the OHS of employees or machine safety but also to increase the quality in poultry breeding and poultry products (Tab. 2). The audit is evaluated in Tab. 3.

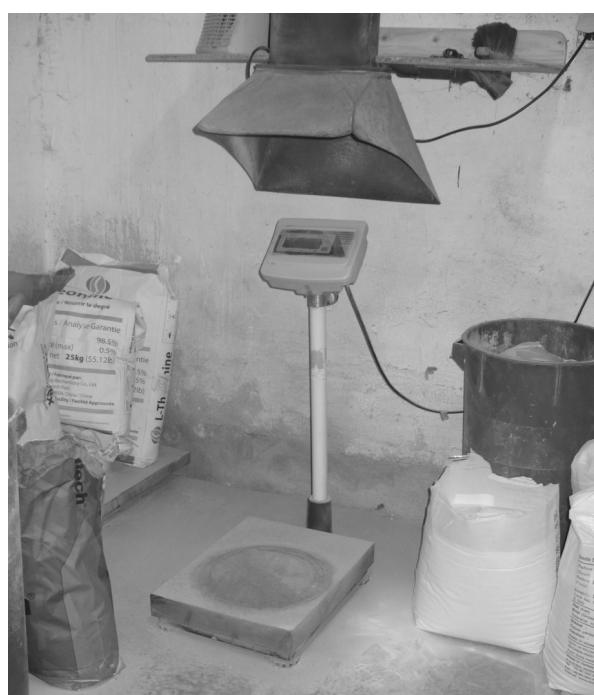


Figure 3: Workplace 2 – hand-filling of premix and pharmacon

Obrázok 3: Pracovisko 2 – ručný násyp a premix liečiva

Table 2: Audit questionnaire

Tabuľka 3: Dotazník auditu

Serial No Číslo	Question Otázka	Evaluation (1-10) Hodnotenie (1-10)		Comment Poznámka
1.	How has the worker been acquainted with machine operation?	10	100 %	The worker has been trained to operate machinery.
2.	Does he know where the machine emergency stop is?	10	100 %	The worker knows where the emergency stop button is.

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3.	Does he know where to find the user's manual for the machine?	10	100 %	The worker knows where to find the user's manual.
4.	How has the worker been trained to work?	10	100 %	The worker attended training on the job.
5.	Has the worker been trained in safety and health at work?	10	100 %	The worker has been trained in OHS.
6.	How has the worker been acquainted with the principles of the first aid?	6	60 %	The worker attended a skull session but did not understand all the principles of the first aid.
7.	How has the worker been acquainted with the operating instructions of the machine?	10	100 %	The worker has not been acquainted with the operating instructions of the machine.
8.	Has the worker been assigned the personal protective equipment?	10	100 %	The worker has been assigned all the PPE needed for his work.
9.	Which PPE does the worker really use?	6	60 %	The worker uses boots and overall but does not use the goggles, gloves and respirator.
10.	Does the worker maintain his workplace clean?	9	90 %	The worker cleans up after each day of his work.
11.	Does the worker know where fire extinguishers are in case of fire?	10	100 %	The worker knows where fire extinguishers are.
12.	How often does the worker carry out the machine maintenance?	10	100 %	Maintenance is performed by a designated person at regular intervals.
			84.17 %	

Table 3: Evaluation of the safety audit questionnaire

Tabuľka 3: Vyhodnotenie dotazníku auditu bezpečnosti

Serial No Poradie	Description of discrepancies and deficiencies found Popis zistených nedostatkov a nezrovnalostí	Risk classification (1-10) Klasifikácia rizík (1-10)	Corrective measures Nápravné opatrenia	Responsible Zodpovednosť
1.	The worker does not know where to find the instructions.	2	The worker must be notified where to find the instructions.	HPP
2.	The worker does not know all the principles of the first aid.	5	The worker should be re-trained in the first aid.	HPP
3.	The worker does not use the goggles, gloves and respirator.	8	The worker should use all the PPE without exception (including the goggles, gloves and respirator).	HPP
4.	The worker does not clean up his workplace enough after each day.	3	The worker should care more about the cleanliness of his workplace – sweeps the floor but does not remove dust from other parts of the workplace.	HPP
HPP – head of premixtures production				

Applying the FMEA (Barends et al., 2012) method (Tab. 4), we first determined the risks of potential errors that can occur when working with the machine and fulfilling the duties having a direct impact on the quality of compound feed produced. Afterwards, another FMEA table was drawn up describing potential risks directly threatening a worker so it has a direct human nature and does not describe any other entity.

Table 4: Risk analysis of the workplace of hand-filling of premix and pharmacon by the FMEA method

Tabuľka 4: Analýza rizík pracoviska ručného násypu a premix liečiva metódou FMEA

Serial No / Poradie	Possible threat Možné Ohrozenia	Error consequence Dôsledky chýb	Error cause Príčiny chýb						Corrective measures Nápravné opatrenia					
				Severity / Význam	Occurrence / Výskyt	Detection / Odhaliteľnosť	RPN / Rizikové číslo	%		Severity / Význam	Occurrence / Výskyt	Detection / Odhaliteľnosť	RPN / Rizikové číslo	%
1.	Machine malfunctioning – scale	Inability of the machine to perform the required function Scale measurement	Scale power failure	3	3	2	18	1.8	Inability of the machine to perform the required function Scale measurement	3	2	1	6	0.9
			Scale indicator damage	5	3	2	30	3		5	2	1	15	1.5
			Short circuit in wiring	3	3	2	18	1.8		3	2	2	12	1.2
2.	Faulty weighing	Incorrect composition of compound feed	Worker error – incorrectly weighed mixture	8	3	4	96	9.6	Regular training of workers on the production of compound feed and implementation of continuous control	8	2	2	32	3.2
			Depreciation of compound feed (e.g. contamination)	8	1	1	8	0.8		8	1	1	8	0.8

There were two possible threats occurring when the worker was pouring premixes. The most serious cause of a potential threat is a worker's error – incorrectly weighed mixture with the value of 9.6 % (Fig. 4). Therefore, corrective measures were made in order to reduce nearly all of the values of risk rate (RPN).

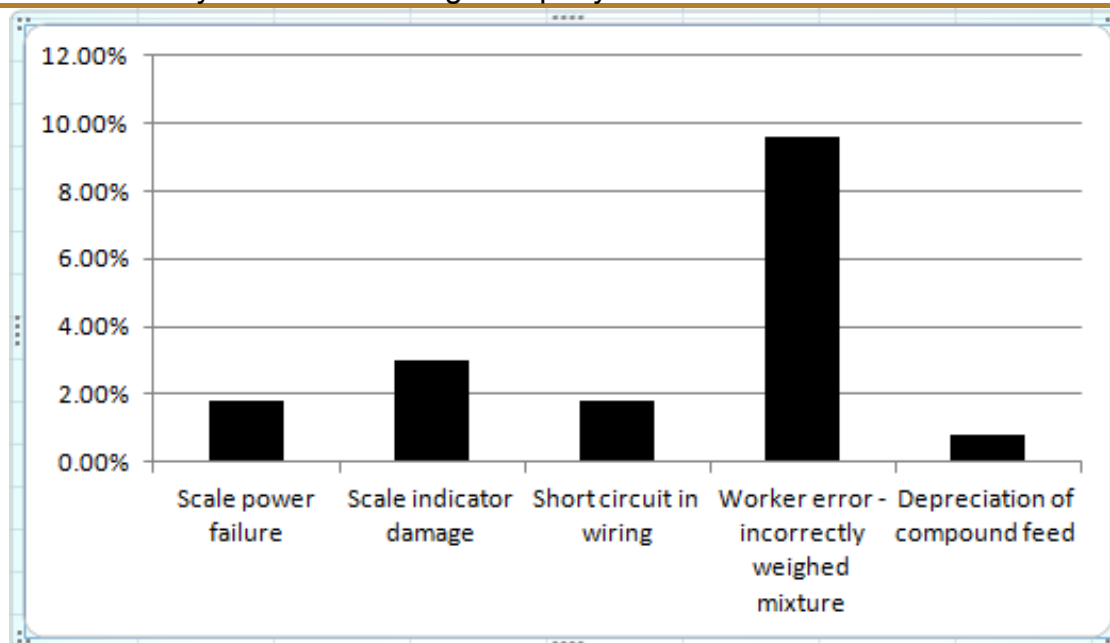


Figure 4: Hand-filling of premix and pharmacon

Obrázok 4: Ručný násyp a premix liečiva

Conclusions

The work deals with the safety audit in Liaharenský podnik, a.s., Vráble establishment. It was successfully performed in order to improve the quality of poultry breeding and poultry products. There are safety issues at work and risks related to work activities in the company discussed here. That is why the work is of a significantly application nature (Paulíček et al., 2011, 2012; Burda et al., 2012). It can be used not only as a report on a specific company but can also provide guidance for other manufacturing organizations with a similar or different production orientation.

References

- ANSI/AIHA, (2005) American National Standards Institute, American Industrial Hygiene Association (AIHA).
- ANSI/AIHA Z10, (2005) American National Standard for Occupational Health and Safety Management Systems.
- Andrássyová, Z., Hrubec, J., Kotus, M., Daňko, M., (2011) Application of method Poky Yoke in quality control. In: Contemporary aspects of production engineering : XX international students scientific conference, Warsaw, 25 May 2011. Warsaw: Szkoła Główna Gospodarstwa Wiejskiego.
- Barends, D.M., Oldenhof, M.T., Vredenburg, M.J., Nauta, M.J., (2012) Risk analysis of analytical validations by probabilistic modification of FMEA. *Journal of Pharmaceutical and Biomedical Analysis*, 64–65, 82–86.
- Burda, M., Čičo, P., Kotus, M., Daňko, M., (2011) The risk assessment by FMEA at workplace. *Processes Improvement*. Tripsoft: Trnava, 116–125.

- Cacciabue, P.C., (2005) Human error risk management methodology for safety audit of a large railway organisation[Online]. Warsaw: Warsaw University of Life Sciences. Available at:
<http://www.sciencedirect.com/science/article/pii/S0003687005000943>.
[Accessed 12 Jun 2013]
- Chiesa, V., Coughlan, P., Voss, CH.A., (1996) Development of a technical innovation audit. Original Research Article Journal of Product Innovation Management, 13(2), 105–136.
- Grant, J., Brown, D., (2005) The inspector cometh. Canadian HR Reporter, 18, 13–17.
- Grant, J., Bricker, R., Shiptsova, R., (1996) Audit quality and professional self-regulation – A social dilemma perspective and laboratory investigation. Auditing: A Journal of Practice & Theory, 15(1), 142–156.
- Guldenmund, F., Hale, A., Goossens, L., Betten, J., Duijm, N.J., (2006) The development of an audit technique to assess the quality of safety barrier management. Journal of Hazardous Materials, 130(3), 234–241.
- Hrubec, J., Virčíková, E. et al., (2009) Integrovaný manažérsky systém (Integrated management system). 1st Ed. Slovenská poľnohospodárska univerzita v Nitre: Nitra.
- Guidelines on occupational safety and health management systems, (2001) Geneva: International Labour Office.
- Korenko, M., Kaplík, P., Bulgakov, V., (2010) Implementation of 5 S approach in the manufacturing organization. Naukovij visnik Nacionalnogo universitetu bioresursiv i prirodokoristuvanja. Ukrajiny. Kijiv, Nacionalnyj univesitet bioresursiv i prirodokoritsuvanja Ukrajiny, 5, 59–64.
- Nash, J.L., (2005) Who is auditing your safety auditors? Occupational Hazards, 67, 31–34.
- OHSAS Project Group, (2007) OHSAS 18001:2007. Occupational Health and Safety Management Systems – Requirements. London: British Standards Institute.
- Pauliček, T., Burda, M., Andrássová, Z., Kotus, M., (2012) Aplikácia metódy FMEA na proces znižovania poruchovosti termálneho kvapalinového kolektora : Application of FMEA method for reducing the failure of thermal liquid collectors. In: Informačné a automatizačné technológie v riadení procesov. Nitra: Slovenská poľnohospodárska univerzita v Nitre, 133–136.
- Robson, L.S., Macdonald, S., Gray, G.C., Van Eerd, D.L., Bigelow, P.L., (2012) A descriptive study of the OHS management auditing methods used by public sector organizations conducting audits of workplaces: Implications for audit reliability and validity. Safety Science, 50(2), 181–189.
- Šolc, M., (2009) Význam auditu v systéme manažérstva informačnej bezpečnosti (SMIB). Bezpečnosť práce, 9(8) 35-39.
- Virčíková, E., Šolc, M. (2012) Integrované manažérske systémy. 2. preprac. vyd. Košice: Technická univerzita.