

Training on safety of using the products for children

Szkolenia z bezpieczeństwa użytkowania wyrobów dla dzieci

Key words: safety of using the products for children, training for entrepreneurs.

Słowa kluczowe: bezpieczeństwo użytkowania wyrobów dla dzieci, szkolenia dla przedsiębiorców.

Streszczenie

Zapewnienie bezpieczeństwa użytkowania wyrobów dla dzieci wprowadzanych na rynek jest uwarunkowane jest odpowiednim poziomem wiedzy ich producentów.

Postęp techniczny i technologiczny w procesie wytwarzania wpływa na intensyfikację zmian w wymaganiach dotyczących bezpieczeństwa użytkowania określonych dla tej grupy produktów, przyczyniając się do potrzeby ustawicznego uzupełnienia wiedzy przez przedsiębiorców.

W artykule przedstawiono metodykę prowadzenia szkoleń z zakresu bezpieczeństwa użytkowania zabawek opracowaną przez Instytut KOMAG, ukierunkowaną na skuteczne pozyskanie wiedzy przez odbiorców.

Introduction

Products for children are the important part of consumers' market due to amount of users (over 15.6% of population in European Union). They support physical and mental development of children as well as they help to take care of children. There are the following products: feeding and drinking equipment, care articles, equipment for transportation, for rest and hygiene (car seats, wheeled child conveyances, reclined cradles, playpens, changing units, units, as well as playground and sport equipment and toys. Often, they have complex structure and different materials used for their manufacture (Grynkiewicz-Bylina, 2013).

Introduction of new products for children on the market is an expensive process for the companies. This is due to the need for market analysis, research and development of products and technologies for their production, advertising and protection of intellectual property. This particularly applies to manufacturers and importers placing products on the market under their own name. Requirements for products for children are specified in the following Directives: 2001/95/EC and 2009/48/EC as well as in the cited legal act and in the harmonized standards. They are the base for conducting tests in accredited laboratories in European Union. Within the years 2006–2014 the safety requirements for using the products for children became significantly stringent. New standards and legal acts extended the scope of testing and criteria for their assessment. Data on number of children accidents and injuries associated with using dangerous products were the reason of changing the regulations.

Increasing responsibility and the costs associated with a limited staff in the micro and small enterprises are one of the barriers to access to knowledge about the safety of products for children. It also increases the need for using multiple not organized documents, mostly in English, such as guides, guidelines and decisions of the European Commission and payable standards, which are constantly changing. These sources usually provide only basic knowledge on safety. They do not contain specific requirements and their unambiguous interpretation, including those related to the assessment of the safety of children, its progress and results. Business knowledge is mainly based on the experience gained during inspections carried out by the Trade Inspection and fragmentary information, often conflicting, coming from Internet sources. Lack of such knowledge affects not only level of safety of children's products, but it is also associated with financial consequences for the entrepreneurs such as fines put by Trade inspection, cost of withdrawal of dangerous products from the market and limitation in trading especially as regards export.

Trainings are the only effective method for extension of special knowledge for entrepreneurs (Andrzejczak, 2010; Mikołajczyk, 2011; Rae, 2012). Analysis of training offers available on the Polish market have indicated for small number of centres offering training in such a scope, and their programmes focus always on main requirements for toys safety. It has also shown that trainings performed by such organizations do not allow for acquisition of practical knowledge on assessment of safety use of products and associated procedures.

The results of the research project realized in KOMAG Institute of Mining Technology: „Training as the key tool in acquisition of knowledge on children products safety of use for entrepreneurs commercializing the products” are presented (Gryniewicz-Bylina, Rakwic, 2014). The training includes experience of the Laboratory of Material Engineering and Environment, the accredited body, which specializes in testing and assessment of safety of children products use.

Training methodology

The research project consists in two parts. In the first part, information on trainings conducted by the KOMAG's Laboratory of Material Engineering and

Environment on safety of using the products for children within the years 2008–2011 addressed to the entrepreneurs commercializing the products for children, including manufacturers, importers, suppliers, is given. Within this period, 196 persons from 138 companies were trained (Table 1).

Table 1. Trainings on safety of using the products for children conducted by KOMAG within 2008 – 2011

Item	Training symbol/year	Title of training	Place of training / number of companies
1	S1 / 2008	Testing the toys safety	Branch Traders Forum, I International Games & Toys Fair/ 12
2	S2 / 2009	Testing the toys conformity with the safety requirements	Branch Forum Safe Toy, II International Games & Toys Fair / 22
3	S3 / 2010	Safe toys, which ones?	Premises of plastic toys manufacturer / 1 company – 50 persons
4	S4 / 2010	Safety of toys use	Premises of plush toys manufacturer / 1 company – 10 persons
5	S5 / 2010	Safe toy – how to test toy safety for conformity with the requirements of the standards harmonized with 88/378/EEC Directive ?	Branch Seminar, III International Games & Toys Fair / 42
6	S6 / 2011	Testing the safety of products for children	II International Fair of Toys and Products for Children / 32
7	S7 / 2011	Testing the toys for conformity with the requirements of new 2009/48/EC Directive	Seminar „Safe Toy”, IV International Games & Toys Fair / 28

The trainings were conducted in a form of lecture with multimedia presentation of movies and pictures from testing the products for children. Discussion of training participants with the trainer ended each lecture. Due to characteristics of training place – small rooms on fairs and in the factories as well as limited time, no other training methods were applied.

The collected data including the problems reports by training participants, were the basis for development of methodology for the training on safety of use of products for children, given in part two. Algorithm of the training methodology is given in Fig. 1.

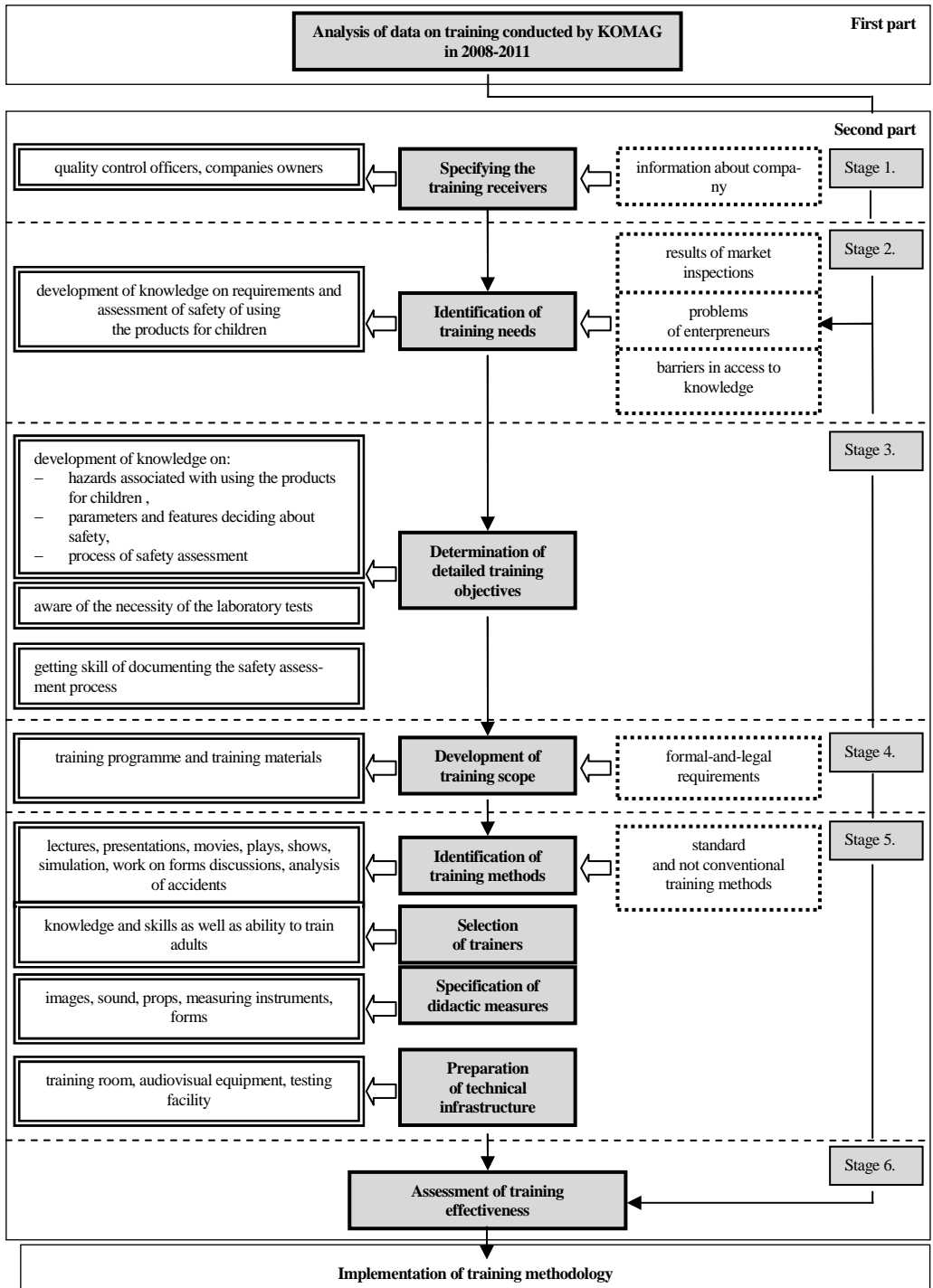


Fig. 1. Algorithm of methodology for training on safety of using the products for children

Analysis of information about Polish enterprises involved in manufacture, import and distribution of products intended for children was made in stage 1. Input information for the analysis was as follows: list of members of the Polish Toy Association, branch magazines, including: „Świat Zabawek” and „Branża Dziecięca”, information and reports from the Office of Competition and Consumer Protection and from the Central Statistical Office of Poland, websites, as well as data collected by the KOMAG’s Laboratory during testing and information obtained from entrepreneurs during annual fairs, i.e.: „Kids' Time” Int'l Fair of Toys and Products for Mother and Child in Kielce, Poland and „Games & Toys” in Łódź, Poland. Analysis referred to the size and structure of employment, including a separate division / person responsible for control of quality, and to the types of commercialized products. Companies owners and quality control officers were selected for trainings.

Needs for training were identified in stage 2. Data from the body responsible for market control as well as from the RAPEX system (European Communities, 2013) were analyzed as regards nonconformity of commercialized products intended for children with the safety requirements. It was found that in most cases the training needs result from the use of dangerous designs of products intended for children, hazardous materials and chemical substances, as well as improper warnings and instructions for use (Office of Competition and Consumer Protection, 2010; 2014; Gryniewicz, 2012). Questions and problems reported by the entrepreneurs to the KOMAG’s Laboratory of Material Engineering and Environment in 2006÷2014 were also analyzed, especially as regards acquisition of knowledge on the safety requirements for products intended for children. Large number of legal acts and their continuous changes as well as lack of unified knowledge sources were mentioned. Specification and analysis of the requirements were an important part of the work. It was shown that general requirements for the products intended for children are specified in sixteen legal acts of directives and regulations of the European Parliament and Council importance, and 38% of the these acts were changed more than ten times – Fig. 2.

Detailed safety requirements, which are the basis for designing and assessments of products, were included in twelve standards harmonized with the GPSD Directive (Directive, 2001) and eleven standards harmonized with TSD Directive (Directive, 2009). In the case of toys, for which most of standards are harmonized, more than fifty amendments and corrections were made within ten years – Fig. 3. It should be emphasized that selection of detailed safety requirements is more difficult for products, for which there are no harmonized standards. In this case, assessment of safety is associated with analysis of (Gryniewicz-Bylina, 2013):

- many voluntary Polish standards, which are the transposition of the European standards, published in the Official Journal of the European Union,
- standards developed in a member state, in which the product will be sold,
- recommendations of the commission setting the guidelines for assessment of safety of a given type of product,

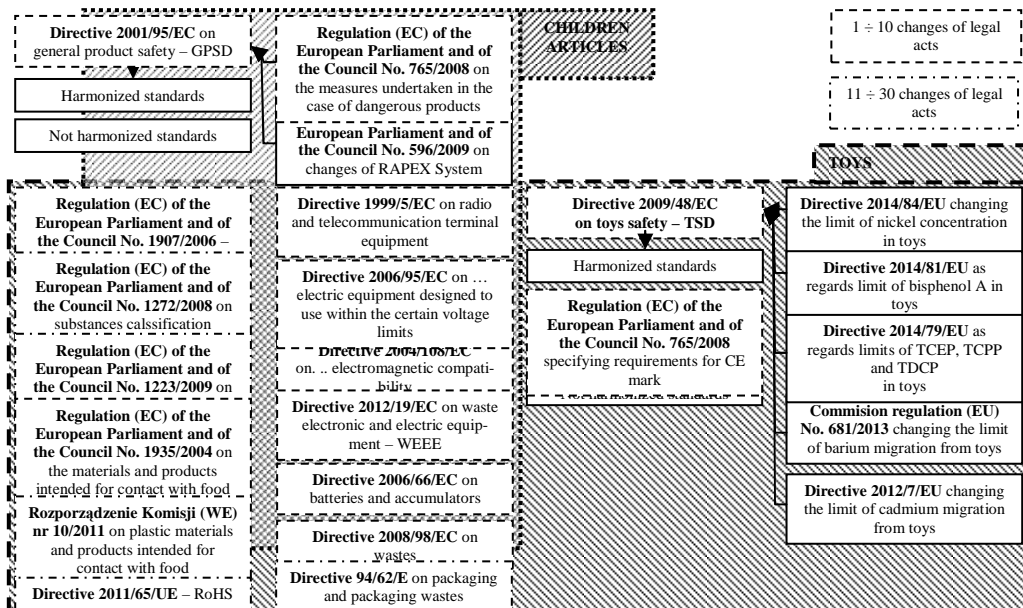


Fig. 2. List of legal acts and standards specifying the general safety requirements for children products

- principles of good practice that are in force in a given sector and that refer to product safety,
- state of the art and level of technology,
- accidents and lists of hazardous products.

At the stage 3, main and detailed educational training objectives were specified. Development of knowledge on main duties and responsibility of training participants resulting from commercialization of products for children in the aspect of legal-and-formal requirements is the main objective.

Development of knowledge in the following scope is required:

- sources of the following hazards associated with using the products: physical, chemical, fire and biological as well as their impact on children’s health and safety,
- parameters and features of products, which decide about their safety, including those that refer to design, method and conditions of use as well as materials and chemical substances, which were used in manufacture of these products, specified in harmonized and non-harmonized standards,
- assessment of products safety and assessment procedures, as well as scope and method of documenting the procedures.

It was assumed that the knowledge acquired during the training would enable the participants to gain the following abilities:

- determination of detailed safety requirements for the commercialized products,
- identification of potential hazards in safe use of products intended for children and determination of methods for their assessment,

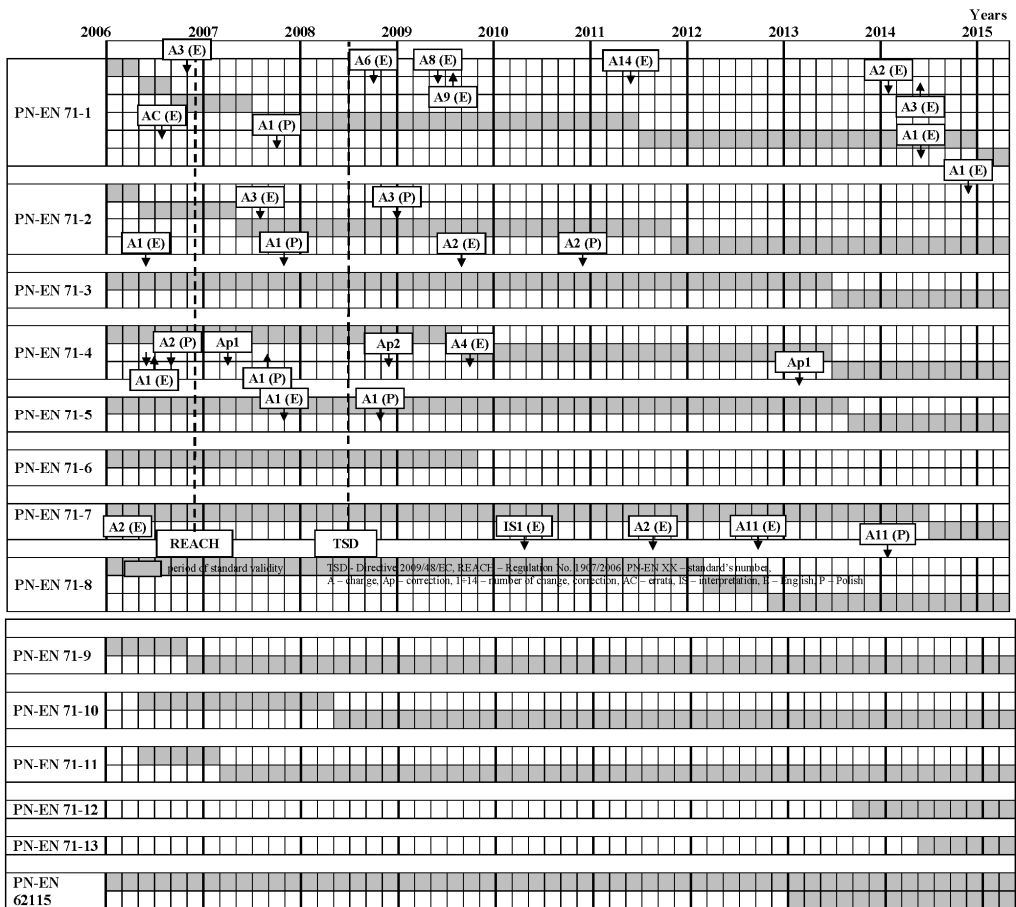


Fig. 3. Changes in the standards on safety of using the toys within 2006–2015

- documentation of the procedure for assessment of products safety and its results as well as to update the assessment in the light of changing formal-and-legal requirements and modification of technology,
- proper marking the products intended for children, as well as selection of content and form of warnings placed on the products in the case of certification for CE mark.

The training participants should become aware that in the case of most of hazards (mechanical, chemical, electrical, magnetic, flammability, biological) the assessment can not be made only by the entrepreneur. Each possible hazard should be checked, according to the requirements of safety standards, only at the special test stands. Moreover, complex testing the hazards, which was presented during the trainings, should make the training participants aware that it is necessary to asses the safety with participation of accredited testing laboratories, which have a proper testing infrastructure and competent personnel, to guarantee the accuracy and repeatability of test results.

In the stage 4 the scope of trainings and training materials, were determined and the training programme should include as follows:

- basic terms and definitions in the field of safety of use,
- formal-and-legal requirements as regards duties of entrepreneurs, who commercialize the products intended for children, including those associated with assessment of safety,
- documenting the assessment of products' conformity with the requirements,
- marking the products for children – content, form of warnings and instruction for use,
- scope and methods of laboratory tests, which are the basis for analysis of hazards as an important part of assessment of products' safety,
- identification and assessment of hazards in the laboratory tests,
- examples of good practices in assessment of products' safety.

Training methods used to increase the qualifications were reviewed in the stage 5. The review included standard training methods based on the lectures wykładowych (Knowles, 1980; Kowalik, 2007; Clark, 2008; Andrzejczak, 2010; Sloman, 2010; Oleszak, 2011; Mikołajczyk, 2011; Kozak, Łąguna, 2012; Marcinkiewicz, 2013) and unconventional methods, which are the result of active forms of learning (Urban, 2010). Regarding the unconventional methods, special attention was paid to those methods, which use different types of props and advanced technologies as well as physical exercises of participants also during play – natural learning method. Training methods and objectives are given in Table 2.

Table 2. Training methods and objectives

Type of training	Method objectives
lectures	conveying the knowledge on assessment of safety of using the products for children as well as duties of entrepreneurs associated with products safety
presentations, movies	graphical and audio presentation of the lectures content to increase effectiveness of conveying the knowledge
discussions (planned and spontaneous)	learning through expression of own opinions and exchange of experience of training participants on meeting the requirements for products safety
case study	learning of proper procedure during assessment of products safety, including identification of hazards, selection of criteria as well as assessment methods and tools of the selected examples
work with forms	using the theoretical knowledge in practice by own solving or in group the problems of identification and assessment of hazards as well as of proper marking the products for children
shows, simulations	increase of practical knowledge of training participants by observation of procedure for testing the possible hazards on the laboratory stands
play in form of experiments	activating the training participants to draw more attention to conveyed knowledge by activates associated with products testing with use of testing objects

Requirements for trainers as well as guidelines on didactic measures and preparation of technical infrastructure were specified. It would be necessary to appoint the training coordinator, which would be responsible for training essential matters. The coordinator should have adequate knowledge and many year experiences in carrying out trainings on safety of using the products for children. He should also lead a group of specialists selected for the training to use activating methods. Competences in testing and in assessment of hazards should be a criterion for selection of those specialists.

Due to domination of methods for activation of training participants in training programmes, including non-conventional methods, a special attention was paid for selecting the didactic measures as well as for preparation of technical infrastructure. For that purpose attention was drawn to the props which should be adequate to the subject of training as well as collection of proper materials for the case study and products for analysis. For identification and assessment of possible hazards as well as proper marking the products for children, the proper forms should be prepared. The experiments with use of laboratory stands and instruments for identification of mechanical, electrical, chemical hazards and flammability require creation of scenarios demonstrative samples.

In the stage 6, two following methods for assessment of training effectiveness were developed: the first one based on the analysis of tests verifying the knowledge acquired during training (Kunasz, 2006; Bramley, 2011) the second one assessing the training in a long term perspective with use of U parameter, suggested by the authors. Implementation of U parameter allows simplified assessment without intervention in detailed data of training participant. U parameter was determined as percentage share of number of trainees ordering the tests to total number of training participants. It was assumed that ordering the testing procedure after training is equal to assessment of safety of products for children and it means that training objectives were satisfied, including its effectiveness (by the training participant we mean company and not number of employees sent to the training). The criteria for assessment of effectiveness of training conducted with use of the above mentioned methods, were developed. In the case of the method based of verification tests, it has been assumed that positive result of training is when the training participant gives at least 70% of correct answers. For assessment with use of U parameter the following values were used: $U > 30\%$ – satisfying value, $U < 30\%$ – not satisfying value – not effective training, which requires modification of training methods and/or training tools. Assessment of training effectiveness in long-term perspective can be done 3 years after the training, due to implementation of proper procedures in the company.

Verification of the training methodology

The developed methodology was verified in 2014 during two trainings organized by the Laboratory of Material Engineering and Environment at KOMAG. The needs of organization ordering the training concerned increase of knowledge on safety requirements and assessment of children products safety of use as well as on duties of

entrepreneurs who commercialize the products. The coordinator and a group collaborating specialists of required competences were assigned for organization and conducting each training. In total, 57 persons were trained.

Due to short time, which passed after the trainings, their effectiveness was assessed with use of verification tests. Test forms with one proper answer were used. Questions concerned the problems discussed at each stage of the training. The results of verification tests showed that in the first training, participants gave proper answers to 80% of questions. In the case of second training, the participants did not agree for the verification tests. They found the training to be well done.

The method with use of author's U parameter was verified on the basis of data collected 3 years after the completion of training. In table 3, training participants, entrepreneurs ordering the tests with division into micro and small/medium enterprises are listed.

Table 3. List of training participants ordering the tests with number of orders within 3 years from training completion

Symbol of enterprise	Years													
	2008		2009		2010				2011			2012	2013	2014
	S1	B	S2	B	S3	S4	S5	B	S6	S7	B	B	B	B
mP1	<input type="checkbox"/>	1												1
mP2										<input type="checkbox"/>	6	11	2	
mP3										<input type="checkbox"/>	6	1	2	2
mP4	<input type="checkbox"/>	1												
mP5							<input type="checkbox"/>	3						
mP6										<input type="checkbox"/>	1			
mP7										<input type="checkbox"/>	2			
mP8			<input type="checkbox"/>											2
mP9	<input type="checkbox"/>	1		3										
mP10							<input type="checkbox"/>	2	<input type="checkbox"/>			1		1
mP11										<input type="checkbox"/>	1	1		
mP12										<input type="checkbox"/>	1	7		
mP13							<input type="checkbox"/>			<input type="checkbox"/>	1			3
mP14										<input type="checkbox"/>		46	17	
mP15										<input type="checkbox"/>		1		3
mP16										<input type="checkbox"/>			1	1
mP17										<input type="checkbox"/>			1	1
mP18			<input type="checkbox"/>	1										
mP19							<input type="checkbox"/>	4						
mP20										<input type="checkbox"/>	2			
mP21							<input type="checkbox"/>					2		
mP22							<input type="checkbox"/>					4		
mP23							<input type="checkbox"/>					1		
mP24							<input type="checkbox"/>							2
mP25	<input type="checkbox"/>													2
mP26							<input type="checkbox"/>							8
mP27							<input type="checkbox"/>							6
mP28							<input type="checkbox"/>							4
mP29							<input type="checkbox"/>							4
mP30										<input type="checkbox"/>				2

Symbol of enterprise	Years													
	2008		2009		2010				2011			2012	2013	2014
	S1	B	S2	B	S3	S4	S5	B	S6	S7	B	B	B	B
mP31								□						1
mP32								□						2
mP33								□						3
mP34									□					8
mP35			□	8										
mP36							□	2						
MŚP1			□		□		3			2				
MŚP2			□	1							1			
MŚP3							□	1					4	
MŚP4							□	1					1	
MŚP5									□		1	8		
MŚP6							□						1	1
MŚP7							□	45						
MŚP8			□								9			
MŚP9							□					3		
MŚP10							□					2	1	
MŚP11									□					4
MŚP12	□	2	□	1							3			
MŚP13			□	95	□			79			25	47	85	106
MŚP14							□	15			3	4		69
MŚP15			□	23				32			33	83	27	81
MŚP16							□	6			3			
MŚP17							□	1	□		1	1		
MŚP18							□	1				6		
MŚP19									□	75	87	7	6	
MŚP20									□	□	1	86	86	104
MŚP21									□	39	11	12	27	
MŚP22									□	26	8			
MŚP23			□							2	5			
MŚP24									□	4	53	7	4	
MŚP25									□	4	3	7		
MŚP26									□	28		48		
MŚP27							□				24	2	8	
MŚP28							□				13		24	
MŚP29									□		31	75		
MŚP30									□		8			10
MŚP31									□				29	17
MŚP32							□						3	18
MŚP33							□						1	2
MŚP34	□	2												
MŚP35			□	3										
MŚP36			□	2										
MŚP37			□	7										
MŚP38			□	1										
MŚP39							□	3						
MŚP40							□		□	□				
MŚP41									□				1	
MŚP42									□					8

Symbol of enterprise	Years													
	2008		2009		2010				2011			2012	2013	2014
	S1	B	S2	B	S3	S4	S5	B	S6	S7	B	B	B	B
MŚP43									☐					3
MŚP44									☐					3
MŚP45									☐				2	1
MŚP46									☐				3	2
MŚP47	☐	6												
MŚP48									☐					1

symbols: mP – micro enterprise, MŚP – small/medium enterprises, S1÷S7 – training, B – ordered tests

Results of analyses showed that 84 enterprises ordered the tests required in the process of assessment of safety of products for children.

Assessment of training with use of U parameter was done only for trainings S1÷S2 and S5÷S7, in which more than one entrepreneur did participate. Value of U parameter, determined for trainings S1÷S2, S5÷S7, is presented in Fig. 4.

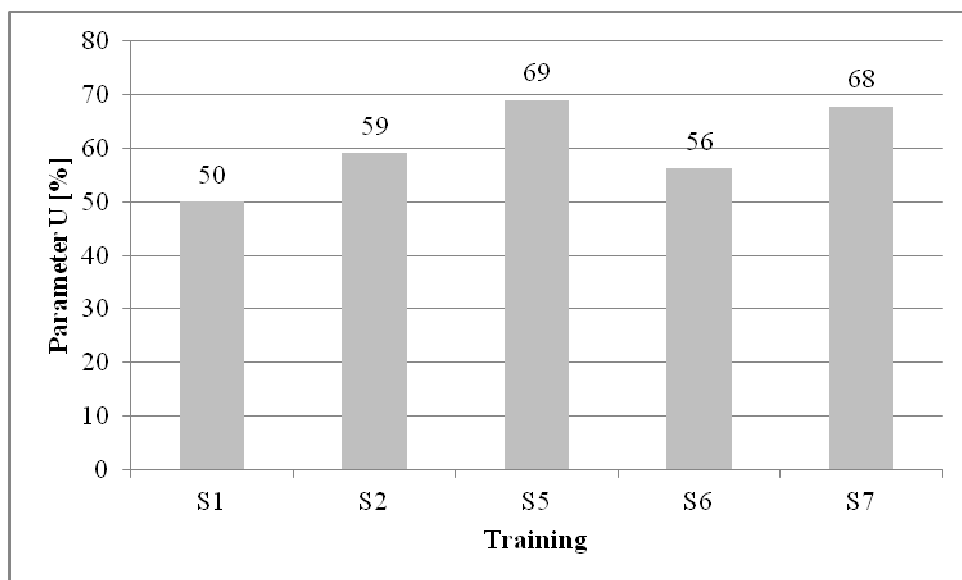


Fig. 4. U parameter for trainings S1÷S2, S5÷S7

Assessment of S1÷S2 and S5÷S7 trainings showed that their U parameter exceeds 50%, what means that it satisfies the criterion for effective training.

Summary

Dynamic development of market for children products is determined by changing expectations of clients as well as by change in regulations regarding the requirements for safety use of the products. We observe intensification of changes in requirements

for the companies commercializing the products for children especially in the last decade. More duties and higher cost of the companies from the children's products branch, especially micro and small/medium enterprises indicate that trainings are the only tool to develop knowledge in this area.

Methodology, based on knowledge and experience gained by the KOMAG's Laboratory of Material Engineering and Environment as the accredited institute, specializing in testing and trainings in safety of use of children's products, developed within the research project, specifies the procedure for the effective training. Use of not only formal-and-legal requirements, but also the principles of proper assessment of safety based on the results of laboratory tests, documentation of its process, presented on practical examples, is the important elements of the methodology.

Possibility of training in the laboratory with direct watching the tests on special laboratory testing facilities positively affects of shaping the awareness of entrepreneurs i.e. the necessity of ordering tests of children's products in the process of their assessment of safety.

Use, during the training the non-conventional methods as the play in a form of experiments with props as well as presentations and simulations in the laboratory conditions, enable acquiring the practical knowledge by playing a role of researcher.

The suggested author's method for assessment of training effectiveness using the U parameter is the proposal to complement the used methods of analyses, which require information about company's financial and organizational data from the last few years. The method requires development of a correction of U parameter in the case of participation of the entrepreneur in few trainings of the similar subject within 3 years of ordering the testing.

Verification of the methodology proved the correctness of assumptions, including using the proper tools and didactic supplies. Positive opinions of training participants as well as high number of positive answers in verification tests confirmed trainings effectiveness.

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