

Knowledge evaluation test as a tool for the accident prevention in livestock housing

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Abstract

Several investigations on the accident causes in animal housing have revealed that the risk reduction is strongly related not only to the objective conditions of the operational means (buildings, machines and plants) but even more to the subjective modes adopted in using such means by workers. To face this problem an interactive tool for training has been realized, capable of producing a personalized evaluation of the farm operators about the level of knowledge on accident prevention, with specific reference to the working procedures.

Such a tool has been promoted by the INAIL (Italian Institute for Workers Accident Insurance) that granted the realization and diffusion of a CD-ROM aimed at promoting the knowledge of the proper accident-preventive procedures among the subjects operating with various roles in animal farms.

The main and innovative part of this product is consisting of an automated evaluation test based on various lists of questions, with multiple fixed answers among which the user has to choose those (not necessarily just one) that he considers correct. At the end a score is given determining a level of sufficiency (or not) with respect to a predetermined minimum standard and the wrong answers are put into evidence.

Keywords: livestock housing, safety, knowledge, evaluation test.

Introduction

Though the number of work accidents in agriculture is decreasing in Italy year by year the rate per worker is still increasing due to the continuous decrease of the working people. In particular the number of the heavier injuries is decreasing slower than the total.

A survey on the cases occurred in the nineties revealed that the incidence of the activities connected to the animal breeding is about 25% of the total of the accidents in agriculture.

A research carried out in the northern regions (Brugnoli, 2000) showed that the main "risk factors" are: the geographic altitude, the rate of mechanization, the type of production, the age of the workers, the incidence of family farms and of animal breeding. On the contrary, one of the main "protection factors" is the professional knowledge of the workers. Which includes, obviously, the knowledge about the safe working procedures.

Various surveys carried out by ourselves in animal farms have revealed that the possibility of reducing the risk of accidents is depending not only on the "objective" farming conditions (building, plant, machines) but even more on the way the workers do in practice their job.

Whilst the first aspect can be easily ascertained by experts following specific check lists, the second aspect can be only evaluated by examining the working procedures in a direct relationship with the workers. Furthermore when the satisfaction of the objective inadequacies of the operational means can be easily verified with on farm inspections, the improvement in the knowledge or care of workers about safety needs a specific and interactive instrument.

The relevance of an action aimed at evaluating the lack of practical advice and promoting the awareness about safety among workers in a direct individual relationship has become more and more evident in recent years. In particular various interactive training procedures to be executed in automatic way by means of dedicated software have been produced in various countries (Federal Government of Manitoba, Canada; University of Minnesota USA; Unionsafe by the Australian Ministry of Work; Michigan State University (USA)).

For these considerations we turned our attention to create means aimed at implementing the knowledge of people employed in animal housing (cattle, pig and poultry breeding) about the safe working procedures. To this purpose we deemed it useful to create a training interactive procedure capable of automatically measuring the degree of knowledge of the farm operators and favouring the fulfilment of the lacks individually ascertained.

This lead us to ask the INAIL (National Institute for Insurance of Work Accidents) to support the realization of a CD ROM containing an educational system for the evaluation and improvement of the workers attitude towards the proper working procedures in animal housing.

Material and Methods

The main and most innovative part of the CD ROM consists of an evaluation test, being carried out in autonomous or guided way, based on various lists of questions, with multiple fixed answers, among which the user has to choose those (not necessarily just one) that he considers correct. The test is arranged in four different versions addressed to the different farm operators involved in safety (Workers, Workers Representatives, Employers,



Figure 1. The opening page of the CD ROM

Agents of the protection and prevention service) and is organized in blocks according to three thematic sections: machines, buildings and plants, farm organization.

At the end a score is given and a judgement of sufficiency (or not) with respect to a predetermined minimum standard is pointed out.

Figure 1 shows the various options that can be chosen by the users at the introduction of the CD with the respective contents.

Figure 2 shows the different versions of the self evaluation test to be selected in order to accomplish it.



Figure 2. The various alternative blocks of test questions

The calculation of the final score of the test (per block) and the determination on the level of knowledge (sufficient or not) is quite a complex process (see an example in Fig. 3).

Every question has assigned a level of gravity (1, 2, 3) and presents more possible answers some of which are right when selected and some when not selected. Every answer has a specific score based on its relevance which is standardized in order that the answer “don’t know” has a score of 1; then a score is obtained by multiplying the standardized score by the gravity assigned to the respective question.

The fulfilment of the test for each block of questions is measured by subtracting from the sum of the scores of all the answers the scores of the wrong ones (i.e. those not selected if they should have or vice versa). The result, expressed in percent, is considered satisfying if at least the 70% of the maximum theoretical score is achieved.

Furthermore the wrong answers are put into evidence and a specific training form is addressed where the user can read useful information about that subject filling his lacunae. Afterwards he can repeat the test obtaining a new score; or else simply have a look to the right answers.

The test can be performed in two ways: a simpler and faster version, comprising only the more relevant aspects, and a longer and more complete one (requiring about 80-90 min.).

The test can also be printed in a paper version to be used in a traditional way.

The CD ROM contains, in addition to the test and the respective training forms, a check list for inspections of farm inadequacies.

N°	Severity	QUESTION	Score of the selected questions	Score of the not selected questions	Standardized Score (P.S)	Total Score P.S * Severity'
1	3	Before every intervention on moving components of the machine which action should be done?				
		<input checked="" type="checkbox"/> stop the engine of the tractor	•	2	0,80	2,40
		<input checked="" type="checkbox"/> extract the key from the dashboard	•	1	0,40	1,20
		<input checked="" type="checkbox"/> insert the brake	•	2	0,80	2,40
		<input type="checkbox"/> lubrication of the components to be operated	3		1,20	3,60
		<input type="checkbox"/> don't know	2,5		1,00	3,00
2	2	When driving in a public street is it allowed to pull an equipment by linking the lower arms of the three point linkage and the drawbar? ?				
		<input type="checkbox"/> yes	2		2,00	4,00
		<input checked="" type="checkbox"/> not	0		0,00	0,00
		<input type="checkbox"/> don't know	1		1,00	2,00
3	1	If the stamping that you can read on a drawbar eye is 14tV2, what means the number 14?				
		<input checked="" type="checkbox"/> the maximum pulling force(tons)	0		0,00	0,00
		<input type="checkbox"/> the maximum vertical load (tons)	2		2,00	2,00
		<input type="checkbox"/> dont'know	1		1,00	1,00
		If the stamping that you can read on a drawbar eye is 14tV2, what means the number 2 ?				
		<input type="checkbox"/> the maximum pulling force (tons)	2		2,00	2,00
		<input checked="" type="checkbox"/> the maximum vertical load (tons)	0		0,00	0,00
		<input type="checkbox"/> dont'know	1		1,00	1,00
4	2	Driving in a public road with the pneumatics filled of water is it allowed ?				
		<input type="checkbox"/> yes	2		2,00	4,00
		<input checked="" type="checkbox"/> not	0		0,00	0,00
		<input type="checkbox"/> yes in some cases (when indicated in the circulation certificate)	2		2,00	4,00
		<input type="checkbox"/> dont'know	1		1,00	2,00

Figure 3. The evaluation scores of the test questions

This product has been distributed to about one thousand institutions concerned with work safety in agriculture all over Italy.

A website was also set up to allow the download of the test, the exchange of information and the acquisition of updating.

Conclusion

A final balance of this experience is far to be accomplished. Certainly this initiative found some interest among the farm advisors as it could be deduced by the requests of CD copies. However the use of the website as an instrument of continuous feedback for acquisition of results and check of the test feasibility and appreciation was much below the expectation. Probably more education and practice with computerized procedures should be still promoted among farm operators to achieve the maximum potential of computer and Internet opportunities.

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