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“KNOWLEDGE”**

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“Vocational training of construction inspectors”***

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1. Introduction

Due to the fact that Romania is located in a strongly seismic zone particularly in the southern, south-eastern part and of the existence of other natural factors with a high-risk level as: floods, hail storms, drought, landslides, soil erosion etc. the quality of construction is defined by law, as the sum of their behavioral performances in operation, in order to satisfy, during their existence, the requirements of users and communities.

The constant need of supervision in the construction sectors imposed three main types of construction inspector jobs (more information can be found in WP2 - *National State of the Art Report of the construction inspector job - Country: Romania*):

- construction inspectors - employed by The *State Inspection in Constructions* – S.I.C., public institution having legal personality, subordinated to the Government of Romania;
- site inspectors (subject to authorization) - employed by the client;
- technical/site inspectors (subject to authorization) – employed by the contractor.

Actually, the registration of constructor inspectors is mandatory in Romania. According to the national State Inspection in Construction, the number of registered inspector is:

- site inspectors for construction materials – 217 authorized inspectors
- site inspectors for construction work - 1902 authorized inspectors

The number of construction inspectors employed by the State Inspection in Constructions was estimated as being of 750 persons, which territorially branches exist in all Romanian counties and Bucharest. The S.I.C. personnel supervise the whole activity in the construction sector. They are collaborating in implementing the construction specific laws and regulations with the site inspectors, which are representing the constructors and the contractors.

The tasks and the responsibilities of the construction inspectors are defined by the Romanian regulations in force.

Authorized specialists have the right to be inspectors of a building site in the authorized field and to perform this activity for the unities, for investors/ users-legal entities or specialized unities for consulting in the field of the quality control.

The order of the MLPTL (the minister in charge with the construction sector) nr. 488/2002, states that the construction inspector authorization is awarded in the following conditions:

- to the persons having a graduation diploma from a higher education institution,

- with minimum activity in the field connected with the authorization requested,
- which pass the examination requirements of the authorization commission.

The authorization exams are periodically organized by S.I.C. The authorizations' validity is of 4 years. The site inspectors are subjected to their knowledge re-examination once at 4 years.

As the national rules states, the main authorizations fields are presented in the table 1:

Table 1

Nr.	Domain of Construction Authorizations	Studies	Years of working experience requested to participate to the authorization exam
1.	Construction materials and articles	5 years, university degree	4 – 6 years
2.	Construction works		
	2.1. Farming, industrial and civil buildings	5 years, university degree	3 – 10 years
	2.2. Roads, bridges, tunnels, subway, tramway, flight strips, cable transport	5 years, university degree	3 – 7 years
	2.3. Railways	5 years, university degree	8 years
	2.4. Hydro-technical works	5 years, university degree	3 – 10 years
	2.5. Technical and urbanity works	5 years, university degree	5 – 8 years
	2.6. Forest construction works	5 years, university degree	5 – 8 years
	2.7. Installations adherent to construction works	5 years, university degree	3 – 8 years
	2.8. Networks	5 years, university degree	3 – 8 years
	2.9. Monuments and historical places, piles, architectural or cultural	5 years, university degree	8 years

This paper is addressing construction inspectors' job continuous vocational training needs and their European qualification recognition, being the result of a survey realized by members of Dunarea de Jos University of Galati in the Leonardo da Vinci program - *Analysis and Comparative Study on construction inspection job performance regulations. European comparative study "KNOWLEDGE"* in 2005.

2. Methodology description

a) General data

The survey was conducted in April-June 2005 (interviews were carried out between 15th April and 15th June) in Romania, using computer-aided (e-mail) and face to face interviews. The survey was executed by Dunarea de Jos University of Galati, Romania in co-operation with

ASM, Poland, which is responsible for processing the statistical data-base. The population for the study was persons working as construction inspectors in Romania construction sector, aged 25 and over, speaking the respective national language. 80 interviews were successfully completed by S.I.C. and site inspectors. The average interview length per respondent varied between 30 and 60 minutes. Another part of the survey was addressed to teachers-trainers working in vocational learning and construction managers. 10 in-depth interviewees, 5 teachers and 5 construction managers expressed their opinion regarding the authorization process and the training needs in this field.

Sampling: The sample was set up according to given industry and size of Romania. Target construction inspectors were selected at random in all Romanian counties.

Both the qualitative and quantitative surveys highlights the continuous need of training, due to the new technologies involved in the construction process and the regulations changes according to the EU main standards and rules. As an example, the Romania future accession in the European Union supposes new regulations connected with the environment protection by pollution reducing. Also, in the field of human resources, in the view of accessing a European common labour market, construction inspectors' job recognition becomes a potential need.

b) information about respondents

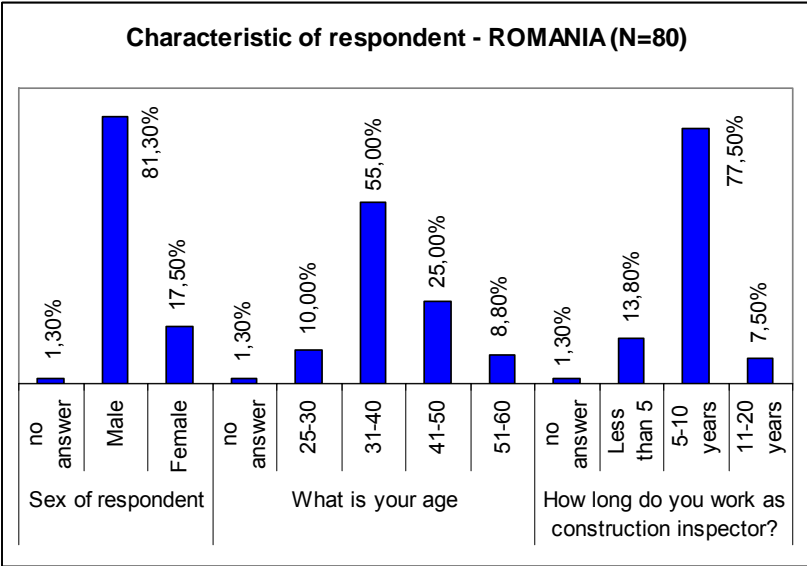


Figure 1. Characteristic of the Romanian respondents
*Bases: Romania, construction inspectors - all respondents (N=80),
 Questions: F 1, 2, 3 (a)*

Different information about the interviewed construction inspectors' main characteristics are presented in Figure 1:

- The male persons (81.3%) are predominant workers in this area, which can be very tough when the presence on the construction scene is required. The women respondents are of 17.50%.
- The 55% of the respondents are age of 31-40 years, only 8.80% are preparing for retirement, which means that the interest in future training must be increased. Low rates are registered when talking about young construction inspectors, only 10.00% of the respondents are of 25-30 years old. This is explained by the Romanian requirements of previous experience (of minimum 3 years in different specializations) at the authorization exam of construction inspector.
- The last part of the Figure 1, regarding the duration of been working as construction inspector accords with the precedent questions. 77.5% of the respondents are doing this job for more than 5 years. Only 13.80% of the respondents are relatively new in this area, having perhaps less field experience.

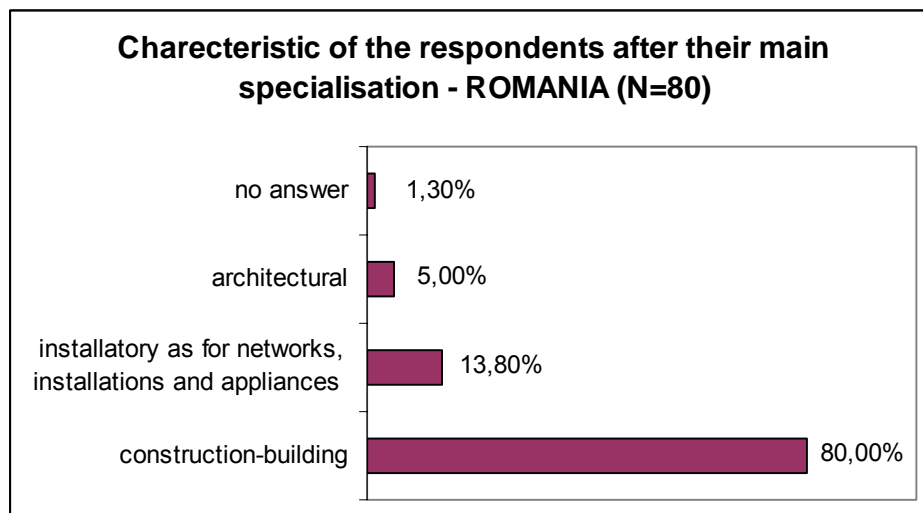


Figure 2. Characteristic of the Romanian respondents after their main specialization
*Bases: Romania, construction inspectors - all respondents (N=80),
 Question: F 4 (a)*

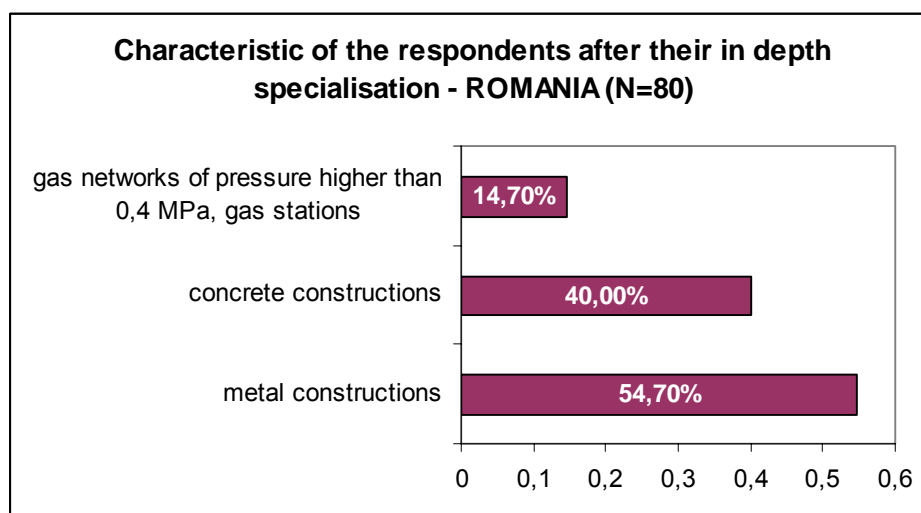


Figure 3. Characteristic of the Romanian respondents after their in depth specialization
*Bases: Romania, construction inspectors - all respondents (N=80),
 Question: F 4b (a)*

Figures 2 and 3 are presenting the respondents main and in depth specializations. Their main specialization (Figure 2) was named after their university degree. They are covering in fact all types of authorizations awarded by the Romanian State Inspectorate in Construction, (presented in Table 1). The in-depth specializations depend also on the courses attended in the university as in depth specialization and on the field working experience. It can be noticed that 80% of them, specialized in construction-building are having in depth specializations in concrete or metal constructions. The biggest number of the persons working in installations (13.8%) is authorized as gas pipelines construction inspectors.

3. Vocational self-improving

A special section of the questionnaire was dedicated to identify the respondent's attitude regarding their vocational skills improving by common techniques (courses, fairs, conferences etc.) or by using the Internet capabilities. Questions A1-A5 and the figures presented below are reflecting the general evaluation on vocational self-improving of the people working as construction inspectors in Romania.

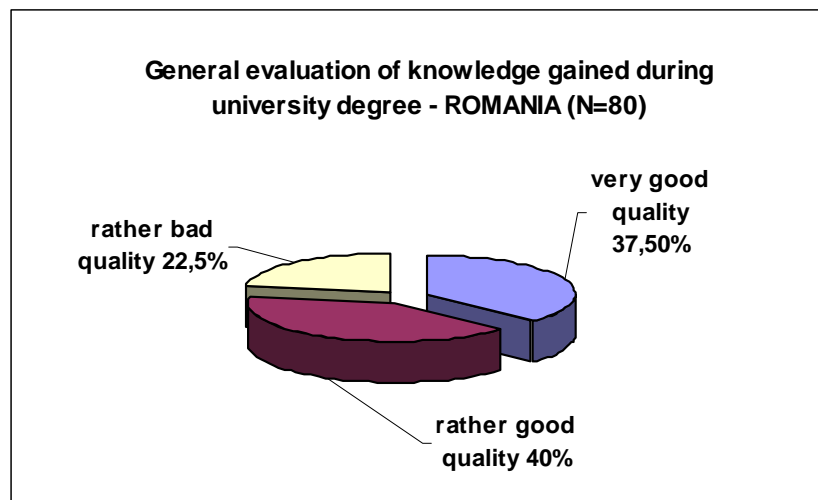


Figure 4. General evaluation of knowledge
*Bases: Romania, construction inspectors - all respondents (N=80),
 Question: A 1 (a)*

As Figure 4 presents, the Romanian respondents' general opinion on the knowledge gained during their university graduation in terms of quality is quite good, 77.5% of the people marking "very good" or "rather good", 22.5% of them being un-satisfied. Our opinion is that some changes regarding the training base knowledge must be done; new teaching methods including multimedia techniques must be introduced as training methods.

An interesting opinion of the respondents is presented in Figure 5; 48% of them are considering that the constant life-learning is necessary to perform their work properly, but 32% are saying that the up-dates are necessary mainly for improving their value on the labour market. This can be the reality if we are thinking that if you are a job seeker, the chances for a better paid job theoretically depends on the personal background and skills.

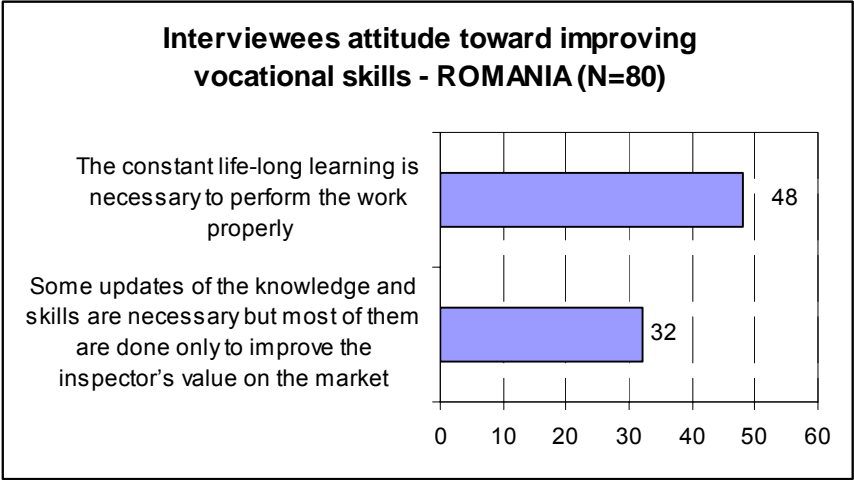


Figure 5. Interviewers' attitude on improving skills
*Bases: Romania, construction inspectors - all respondents (N=80),
 Questions: A 2 (a)*

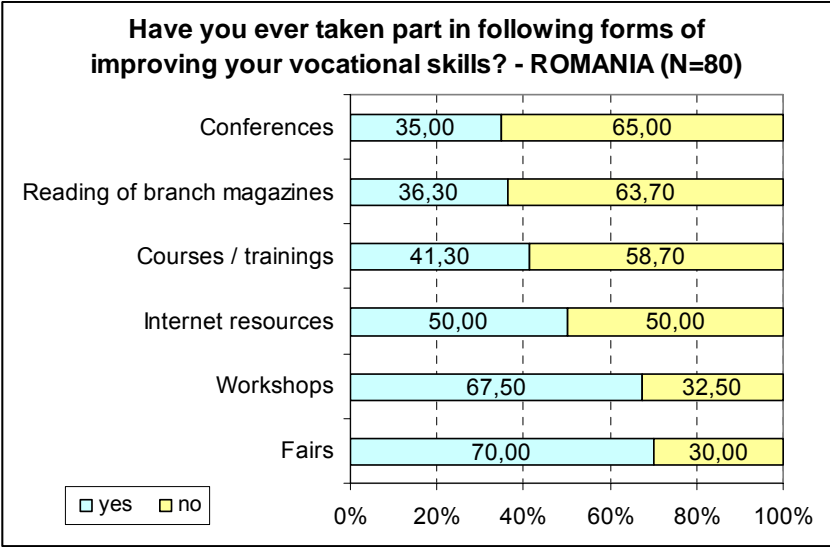


Figure 6. Romanian respondents' skills improvement bases
*Bases: Romania, construction inspectors - all respondents (N=80),
 Question: A 3 (a)*

Figure 6 is presenting diverse methods of improving vocational skills in Romania; an interesting fact which must be underlined is the respondents 50% of the Internet usage on up-dating their skills. It seems that the Internet is now in a great competition with the traditional training methods as face to face courses/training are, marked by 41.3% of the respondents. The first place pointed as answers to this question is about fairs (70%) and

workshops (67.5%). The opinion that the participation to fairs and workshops are the best ways of up-dating knowledge is due to their specificity on bringing together the goods and equipment producers with the direct users, as constructors are.

The respondents' opinion, presented in Figure 7, is that reading of branches magazines (25%) and courses/trainings (27.5%) are the most efficient forms of improving vocational skills. These are followed by workshops participation (17.5%) and Internet usage (17.5%).

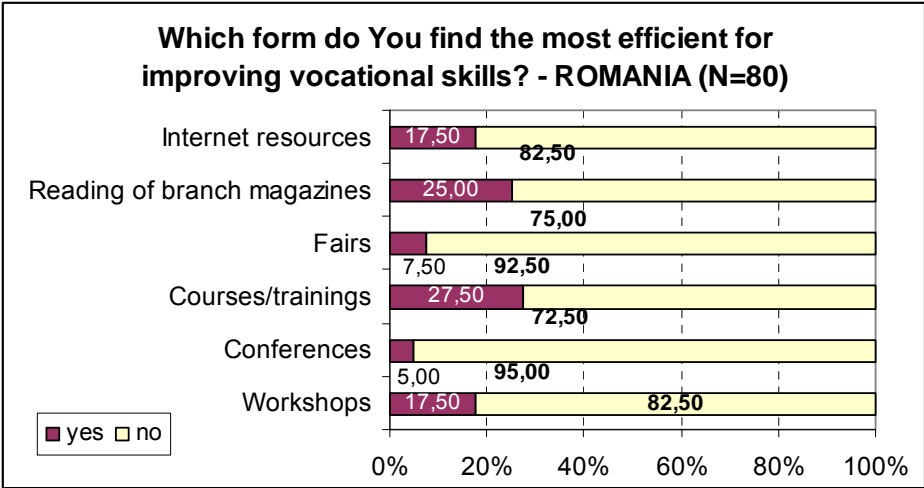


Figure 7. Most efficient forms of improving skills
*Bases: Romania, construction inspectors - all respondents (N=80),
 Question: A 4 (a)*

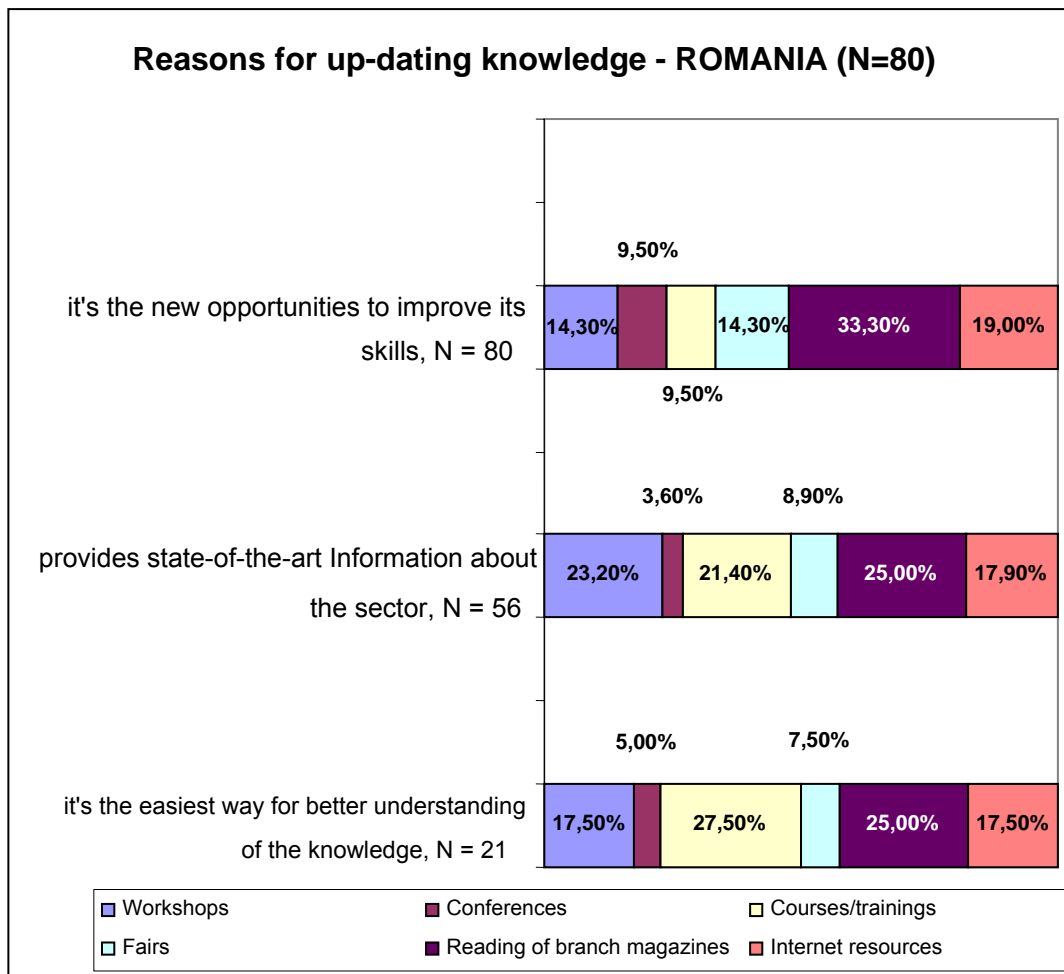


Figure 8. Reasons for up-dating knowledge and most efficient forms of improving skills
*Bases: Romania, construction inspectors - all respondents (N=80),
 Question: A 4 d(a)*

As Figure 8 presents the Romanian respondents' answers regarding the methods of up-dating skills are connected with the following headlines:

- *new opportunities* was point out by 80 respondents, split on reading of branches magazines was the main answer of 33.3% of the respondents, followed by the Internet resources (19%), fairs and workshops(14.3%) etc;
- *state-of-the-art information*, the 2nd answer variant of this question, was pointed only by 56 persons; it is split on reading branches magazines (25%), face-to-face courses (21.4%), workshops or internet resources etc.;
- *the easiest way of understanding the knowledge*, the 3rd variant was considered only by 21 respondents; defined by the classical way of courses/trainings participation (27.5%), reading of branches magazines (25%) or Internet usage and workshop participation (17.5%).

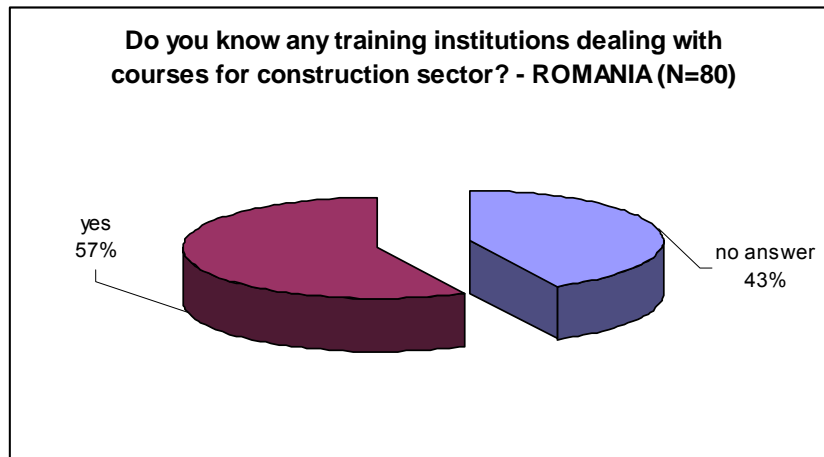


Figure 9. Knowledge of training institutions
Bases: Romania, construction inspectors - all respondents (N=80),
Questions: A 5 (a)

As Figure 9 presents the respondent's knowledge of training institutions dealing with post-graduate courses for construction sector represents a weak point identified by this survey. Only 46 interviewed persons could name institutions involved in vocational training in the construction sector, representing 57% of the total number of the respondents. In fact, the participation to training courses is not compulsory for obtaining the construction inspector's authorization. In the future, due to new regulations approved by Romanian authorities, at least 1 up-dating course at every two years will be obligatory for people working in construction sector.

Figure 10 presents the training institutions named by the respondents as organizing post-graduate courses in the construction sector are the Technical University of Civil Engineering, Bucharest, Technical University Gh. Asachi Iasi (Faculty of Construction), Dunarea de Jos University of Galati (Faculty of Mechanical Engineering and Faculty of Naval Architecture) and Transilvania University of Brasov (Faculty of Construction). This classification was made after the respondents' nomination, with the following remark: different authorizations for construction sector exist in Romania (see WP 2 details): for concrete building, installations, gas pipelines etc. The chart contains the respondents' 1st, 2nd and 3rd optional variant answers.

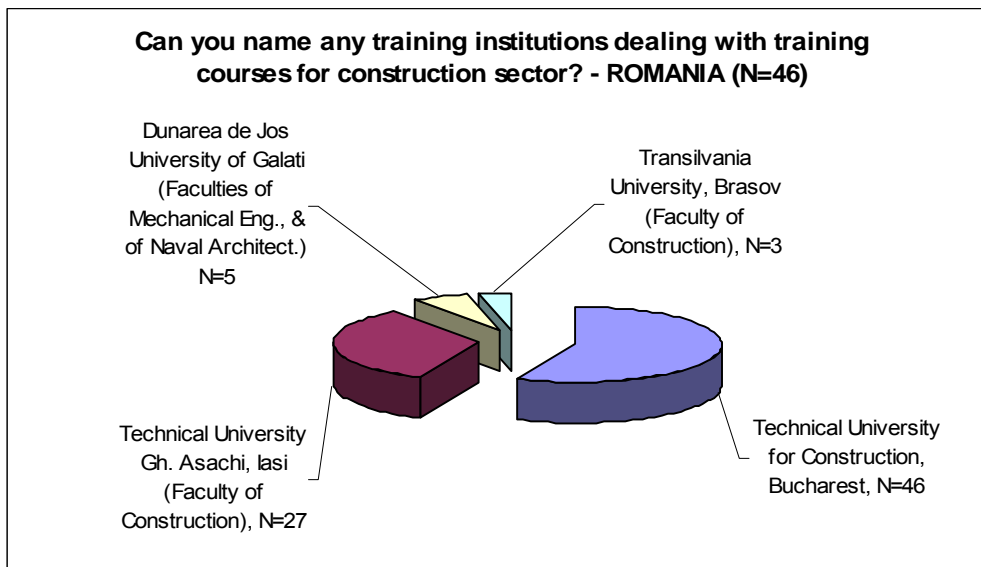


Figure 10. Characteristic of the Romanian respondents
Bases: Romania, construction inspectors - all respondents (N=46),
Questions: A 5 (b)
Source: KNOWLEDGE 2005

4. Evaluation of courses/ training

Another part of the survey was about the evaluation of the training courses in construction sector from two different points of views: of the course participant, of the construction investor and of the teacher/trainer.

4.1. Courses preparing for getting construction authorization/certification

As we already mentioned in WP2, there are not any compulsory preparatory courses in view of the exam of authorizations as construction inspector in Romania. University knowledge, prior experience, and individual study are sufficient in order to pass the exam.

The preparatory courses can be organized by various institutions, but not from The State Inspectorate in Construction (SIC) who's the authority which awards the recognition diploma in the field of construction. The courses are specialized on a certain domain, according to the different domains of authorization, and are covering topics such as legislation in force, quality system in constructions and technical issues and rules regarding that specific domain. The trainers are professors or prior authorized inspectors.

Examples of training courses organized in the already named Romanian universities and followed by the respondents are having different titles, but normally they are covering the 4th domains presented below:

- Laws, Regulations and Standards in Construction;
- Total Quality Management; Quality Assurance in Construction;
- New Materials and Technologies;

– Information Technologies/Computer Science usage.

4.1.1. Construction inspectors' evaluation of the training courses

Figure 11 reflects the non compulsory participation of the respondents to training courses; 49% of the people didn't attend a preliminary course in the fields connected with their authorization, 11% of them considering that the course participation was an irrelevant task for becoming construction inspector. Only 40% of the respondents have participated in organized training activities.

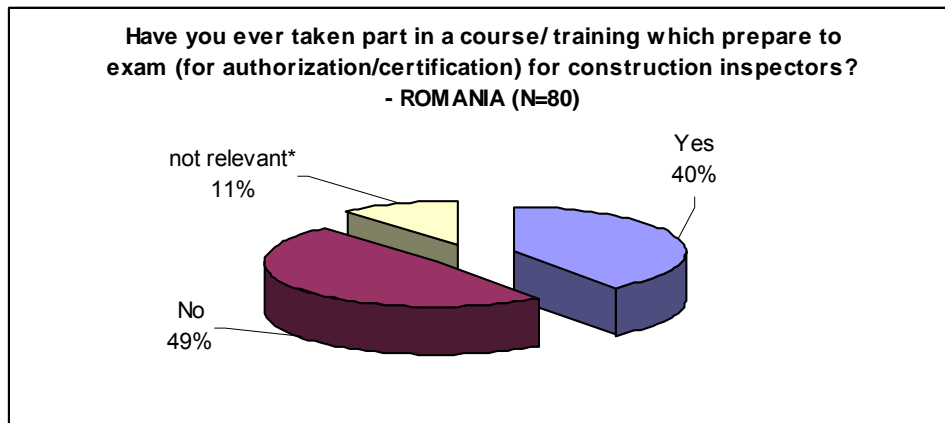


Figure 11. Romanian respondents and training courses participation
Bases: Romania, construction inspectors - all respondents (N=80),
Questions: B 1 (a)

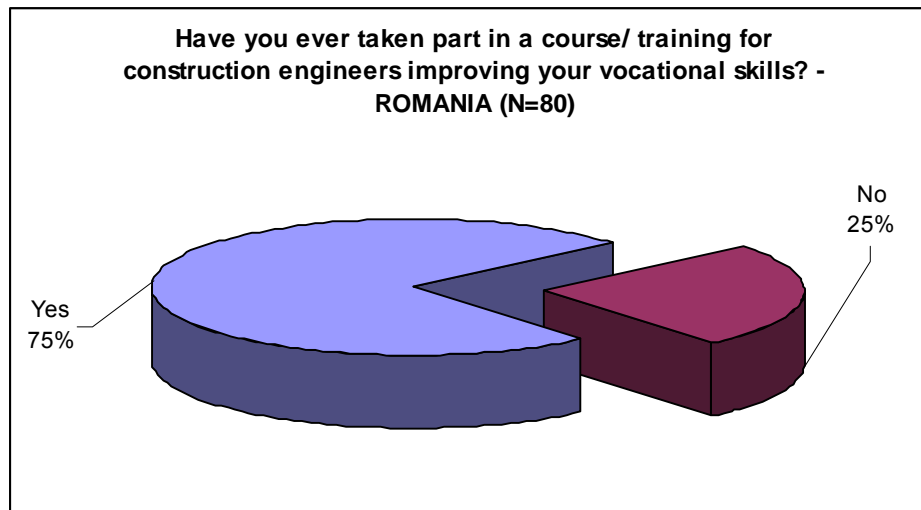


Figure 12. Romanian respondents and training courses participation
Bases: Romania, construction inspectors - all respondents (N=80),
Questions: B 2 (a)

As Figure 12 presents, from the total of number of the Romanian respondents 75% have participated at 1 training course during the last two years, 17% at 3 courses and 8% at 2 courses.

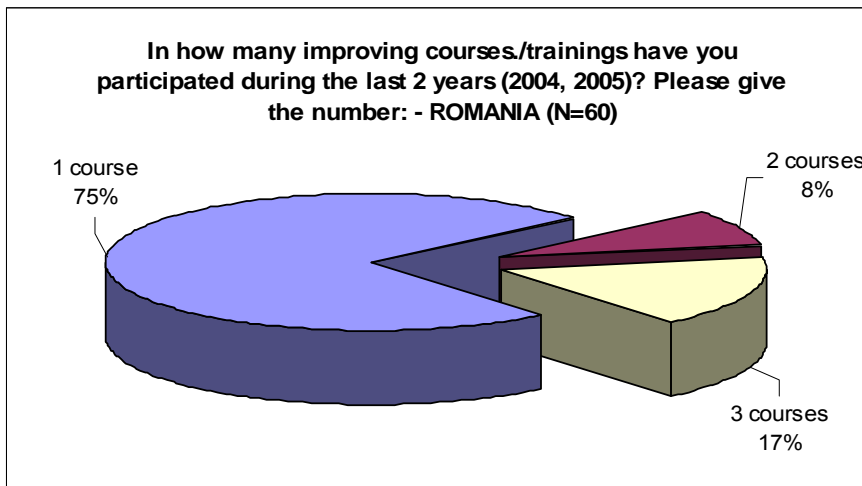


Figure 13. The respondents' participation in training activities during the last 2 years
Bases: Romania, construction inspectors - all respondents (N=60),
Questions: B 3 (a)

The respondents that attended courses in the last two years are split in 3 categories: persons who participated in 1 training course (75%), in 2 courses (8%) and in 3 courses (17%).

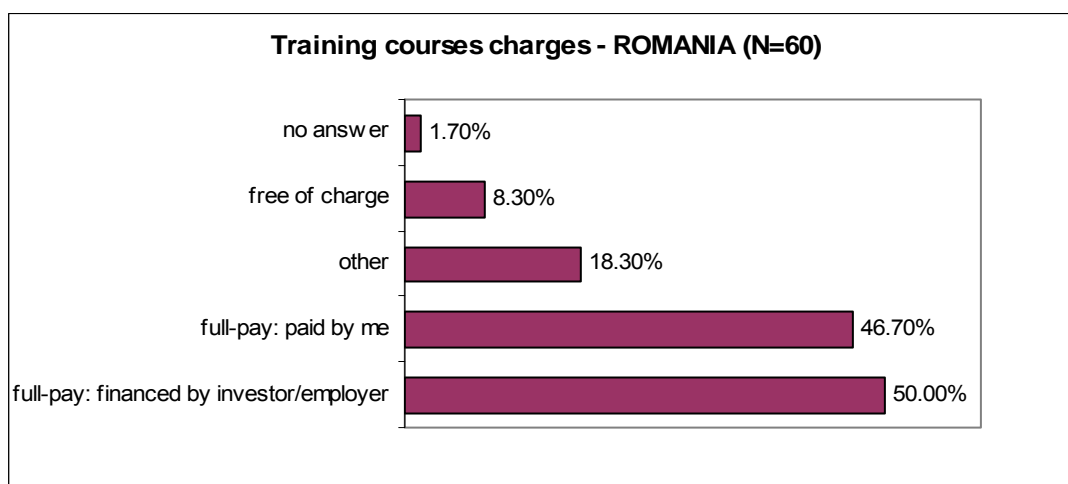


Figure 14. The respondents' participation in training activities during the last 2 years
Bases: Romania, construction inspectors - all respondents (N=60),
Questions: B 4 c (a)

The training courses charges are presented in Figure 14. 50% of the courses attended by the participants were full-paid by the investor. That means that at least 1 course per participant/per year was financed by the employer, the 2nd and the 3rd course fees were supported by the respondent, were free of charge or supported from other funds (ex. PHARE programs for human resources development).

Figure 15 presents the respondents' motives for courses participation: 38.3% of the courses were attended at investor request, 25% for getting promotion, 13.3% for knowledge up-dating etc. Thus, it can be noticed that maintaining the job position or promotion are the main reasons for attending up-dating courses.

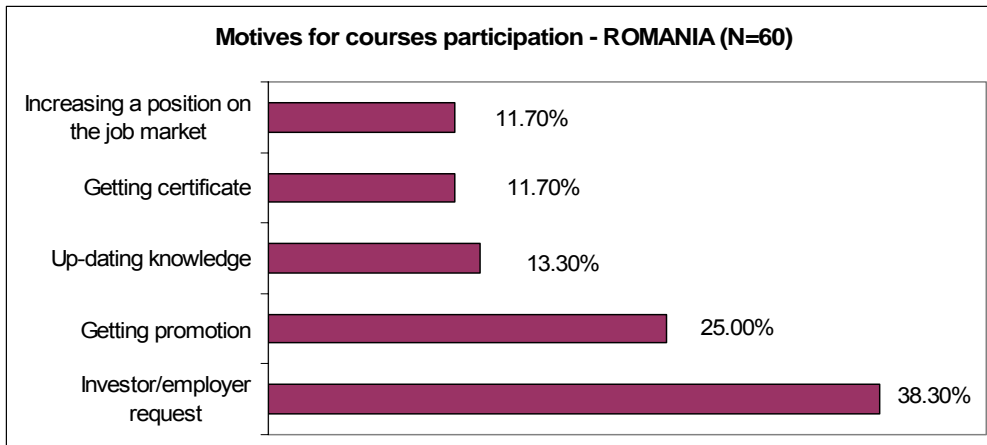


Figure 15. The respondents' participation in training activities during the last 2 years
 Bases: Romania, construction inspectors - all respondents (N=60),
 Questions: B 5 (a)

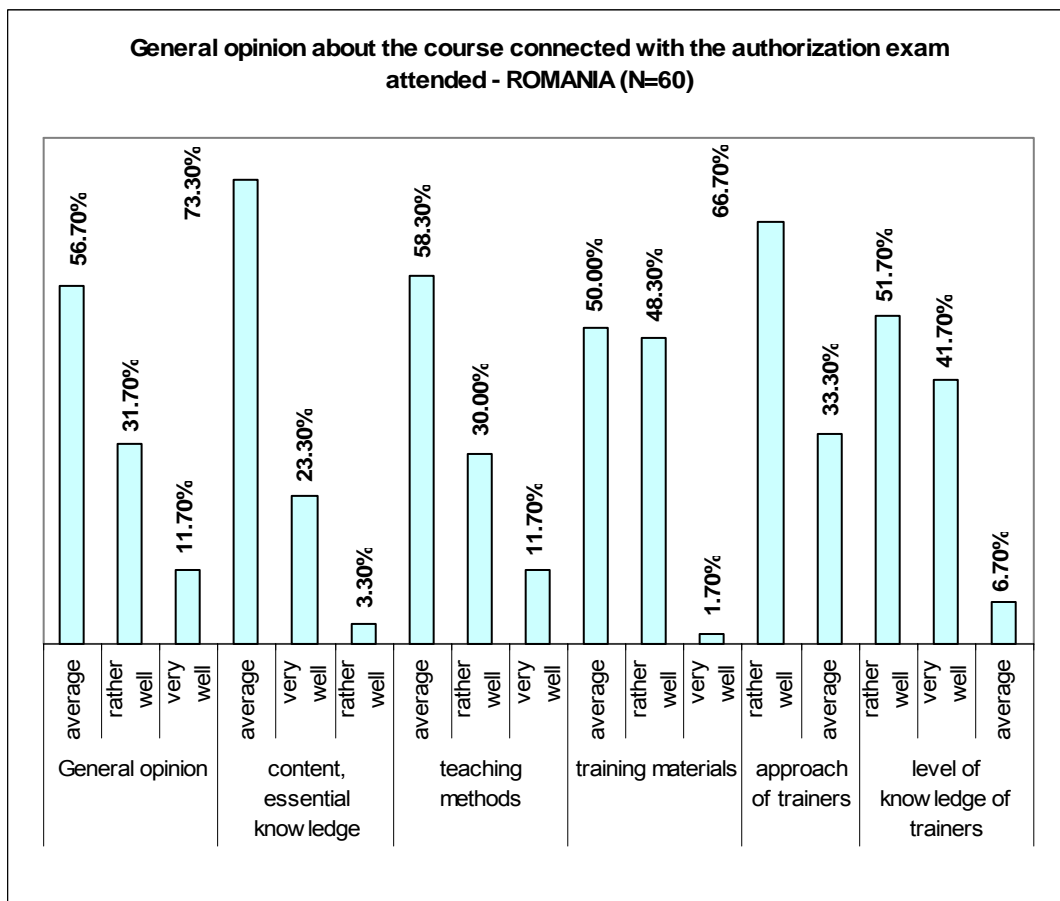


Figure 16. The respondents' opinion about courses attended in fields connected with the authorization exam

Bases: Romania, construction inspectors - all respondents (N=60),
 Questions: B 6 a (a)

As it was already mentioned before, specific courses for inspectors' authorization does not exist in Romania. Courses connected with the authorization exam, in terms of laws, regulations or techniques exist, but none of the Romanian respondents considered that they are entirely connected with the authorization. The courses are targeting for example a specific construction technique, a law or a standard modification and the exam refers to the

candidate global knowledge from technical and regulations in force point of view. Figure 16 reflects the respondents satisfaction about the courses attended, in fields connected with the authorization exam, but not specially organized to prepare it. As an example, the general opinion about the attended course was pointed by 56.7% of the respondents as being of average; only 11.7% of the participants had a very good opinion about the course attended. Improvements are requested on teaching method and training materials. Thus, can be explained by the results presented below, in Figure 19, were 42% of the respondents considered that lacking points still exist in the training.

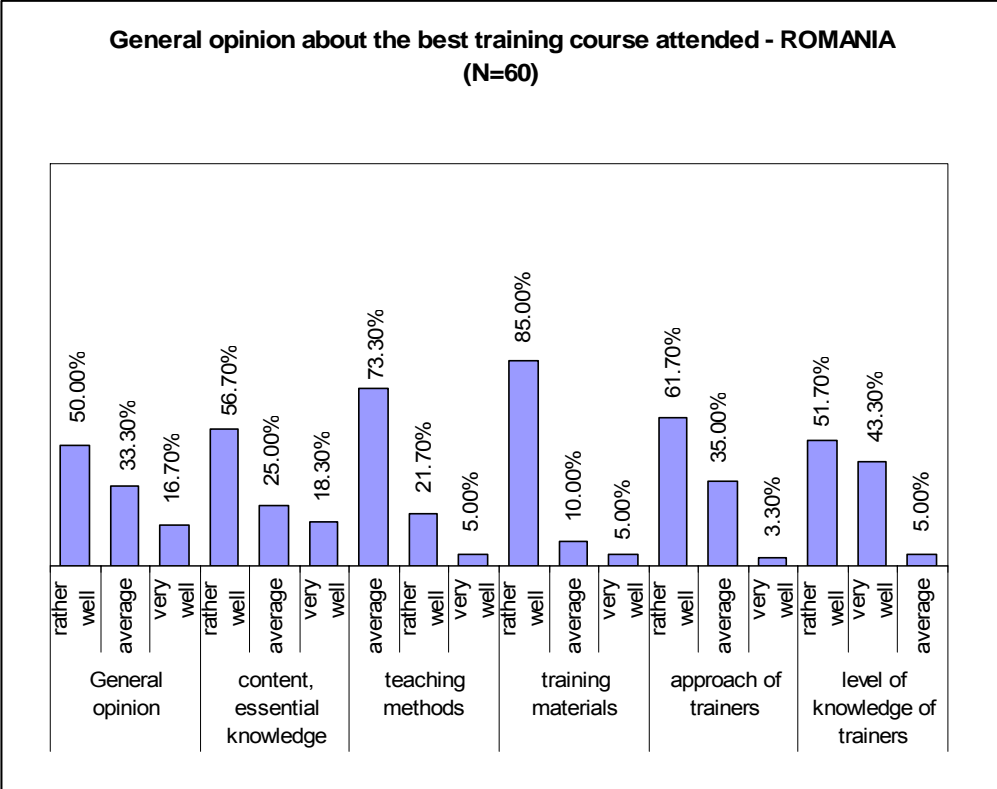


Figure 17. The opinion about the best training course attended in the last 2 years
*Bases: Romania, construction inspectors - all respondents (N=60),
 Questions: B 6b(a)*

Figure 17 presents the respondents' opinion about the best training course attended. It can be observed that the rather well opinion surpasses 50% on each depth question. Good marks are pointed on teaching methods and training materials, but improvements are still needed. The trainers' knowledge is well balanced between very well and rather well.

As Figure 18 presents, the non-respondents are predominant, due to the fact that only 15 persons from 60's attended more than one training course in the last 2 years. The courses participation wasn't a professional requirement and other forms of training were preferred. Anyway in the case of answering, the respondents rather well marks are predominant, but some lacks were identified by 42% of the respondents (Figure 19).

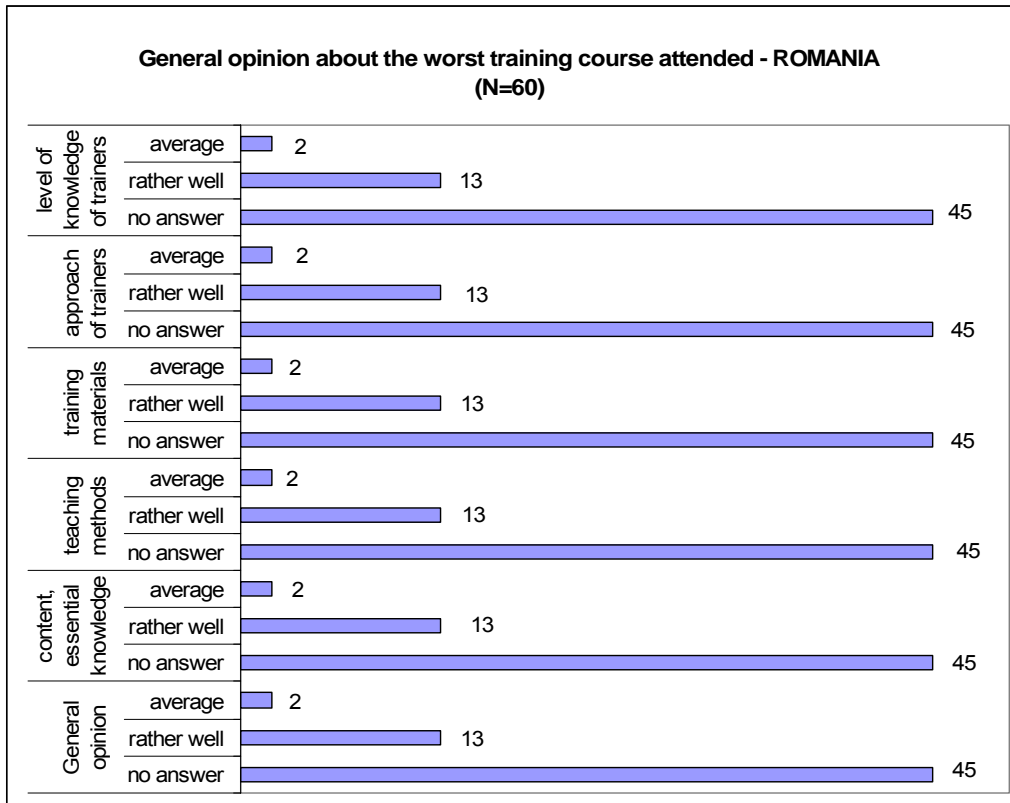


Figure 18. The opinion about the worst training course attended in the last 2 years
*Bases: Romania, construction inspectors - all respondents (N=60),
 Questions: B 6c(a)*

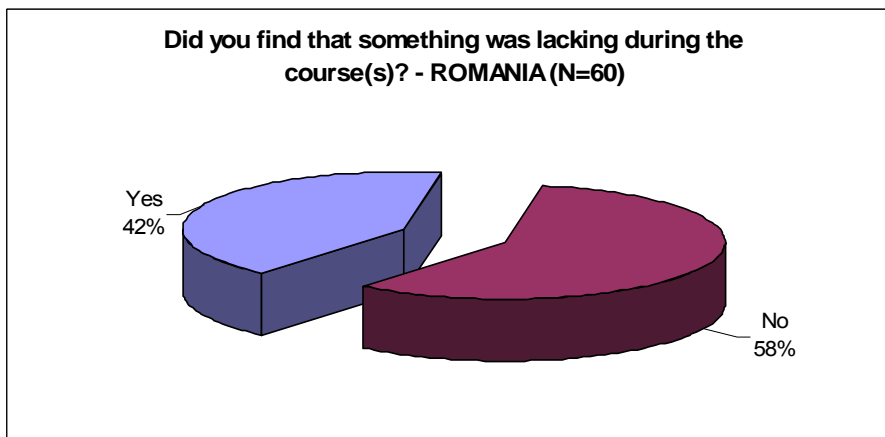


Figure 19. The respondents' opinion about training activities during the last 2 years
*Bases: Romania, construction inspectors - all respondents (N=60),
 Questions: B 7 (a)*

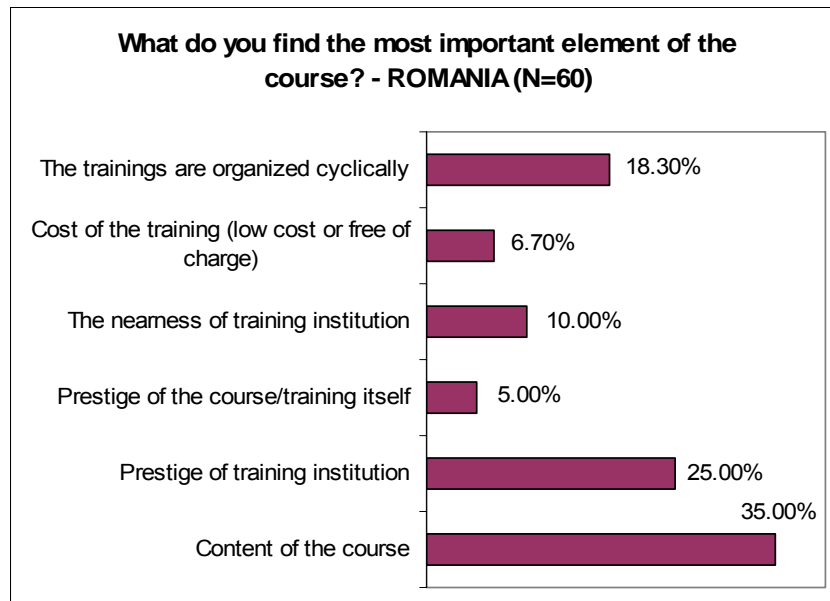


Figure 20. Romanian respondents answers about the importance of the courses

Bases: Romania, construction inspectors - all respondents (N=60),

Questions: B 8 (a)

From Figure 20 it can be noticed that 35% of the Romanian respondents consider that the content of the courses attended was the most important element in the view of ensuring their knowledge up-date. Of course, if the participation to training can be chosen, the prestige of the training institution counts for 25% of the respondents. The training institutions that are cyclically organizing courses are the option of 18.3% of the respondents. Only 10% of the participants are looking for courses organized in the job/home vicinity. 6.7% of the respondents are looking for low cost courses. Having no specialized courses at national level for construction inspector job, the prestige (the name) of the course is not a significant issue, only 5% of the respondents are aware of it.

4.1.2. View of training organizers: evaluation if the training offer is attractive for trainees, evaluation of effectiveness of trainings

The training organizers response comes from the surveys' in-depth interviews. They said that they are continuing adapting the courses content to the market needs, especially in the fields of *quality assurance*, the *implementation of new technologies*, or PC usage. They agreed that some weak points exist in using new methods of training. But if we are looking to Figure 16, at trainers approach we can notice that 66.7% of the respondents marked very well the courses attended. The trainings effectiveness can't be discussed, because there are no statistical data available, the number of the construction inspector authorizations being independent of the courses provided. Anyway, the training, at post-graduate level, in the construction sector will remain a constant preoccupation of the providers.

4.1.3 Investors' view

The investors' point of view regarding their employees' participation to different training courses is quite good. Most of them are fully-supporting at least 1 course per year/per participant. In fact they are interested in up-dating their own staff. Their future contracts are depending on the quality of the constructions already achieved. The new technologies implementation is quite a necessity for the investors. This is the main reason of investing in training the staff.

4.2. Qualification of trainers

The training is mainly organized by the universities, but some training exists at company levels. The trainers are university professors or authorized persons with lot of professional, practical experience.

4.3. Training programs

A specialized training program for construction inspectors doesn't exist in Romania. The training organized at post-university level is targeting the following directions:

- Laws, Regulations and Standards in Construction;
- Total Quality Management; Quality Assurance in Construction;
- New Materials and Technologies;
- Information Technologies/Computer Science usage.

The courses were organized by different training institutions named by the respondents as follows, marked below with their acronym:

- Technical University of Civil Engineering - TUCE, Bucharest,
- Technical University Gh. Asachi Iasi – TUGA (Faculty of Construction),
- Dunarea de Jos University of Galati – DJUG (Faculty of Mechanical Engineering, Faculty of Naval Architecture, Centre for Continuing Education and Technological Transfer)
- Transilvania University of Brasov – TU (Faculty of Construction).

Examples of post-university courses connected with construction inspectors' job attended by the respondents in the last two years (the acronym of the training institutions is marked at the end of the course name):

– *Laws, Regulations and Standards in Construction:*

- Materials and construction elements – new standards – TU;
- Constructions safety - TUCE;
- Standards' system and audit in total quality management – TUGA;

– *New Materials and Technologies:*

- Modern technologies in cadastre - TUGA;
- Cadastre – DJUG;
- Special technologies in construction - TUCE;
- Historical sites and monuments rehabilitations – TUGA;
- Bridges rehabilitation – TUCE;
- *Total Quality Management; Quality Assurance in Construction:*
 - City planning - TUCE;
 - Pollution prevention and control – TUCE;
 - Urban development strategies - TUCE;
 - European dimensions in total quality management – TU;
 - Management rules in construction – TUGA;
 - Total Quality Management – DJUG;
 - Quality Assurance – DJUG;
- *Information Technologies/Computer Science usage:*
 - Informatics - TUGA;
 - Informatics - computer usage - TUGA;
 - Computer-aided design in construction – TUCE;
 - AUTOCAD – DJUG;
 - MS Office, Excel, PowerPoint, Access – DJUG;

5. Requirements

5.1 Requirements in construction inspectors' eyes

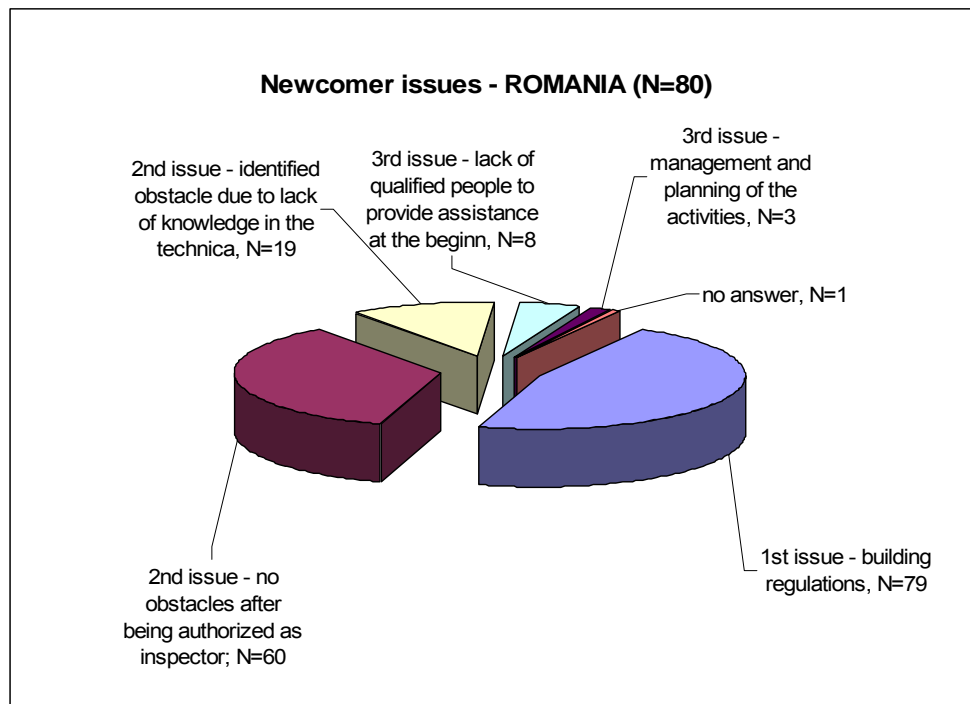


Figure 21. Newcomer issues

Bases: Romania, construction inspectors - all respondents (N=80),

Questions: C1 (a)

As it can be noticed from Figure 21, the newcomers' issues were about:

- 1st answer - facing building regulations (79 respondents), no answer (1 person);
- 2nd answer – no other obstacles (60 persons), obstacle due to lack of technical knowledge (19 persons), no answer (1 person);
- 3rd answer – lack of qualified persons to provide technical assistance at the beginning (8 persons), management and planning activities issues (3 persons), no answer (69).

As a general conclusion, the Romanian respondents identified issues are about facing continuous changing of building regulations, due to the new technologies implementation and standards adapting to the European ones'.

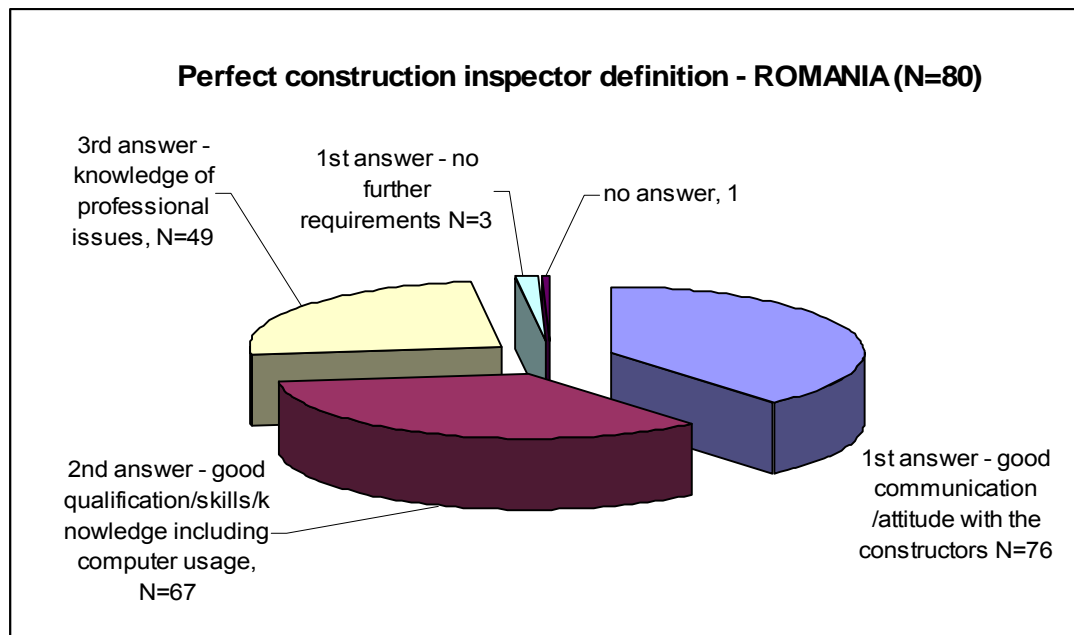


Figure 22. Perfect construction inspector definition
*Bases: Romania, construction inspectors - all respondents (N=80),
 Questions: C3 (a)*

The Romanian respondents' opinion on defining the perfect construction inspector, presented in Figure 22, was marked as follows:

- 1st answer – good communication/attitude with the constructors (76 persons), no special requirements (3 persons), no answer (1 person);
- 2nd answer – good qualification/skills/knowledge including computer usage (67 respondents), no answer (13 persons);
- 3rd answer – knowledge of professional issues (49 respondents), no answer (31 persons).

Figure 23 reflects the Romanian respondents' opinion about the currently available authorized inspectors, considering that their number satisfy the construction market. The same answers were pointed out for inspectors' duties and qualifications. In fact the respondents' answers (98.9%) are due to their job self-satisfaction, in terms of salaries,

knowledge recognition and social position. They don't want to compete with others, outsiders, risking their hardly gained position.

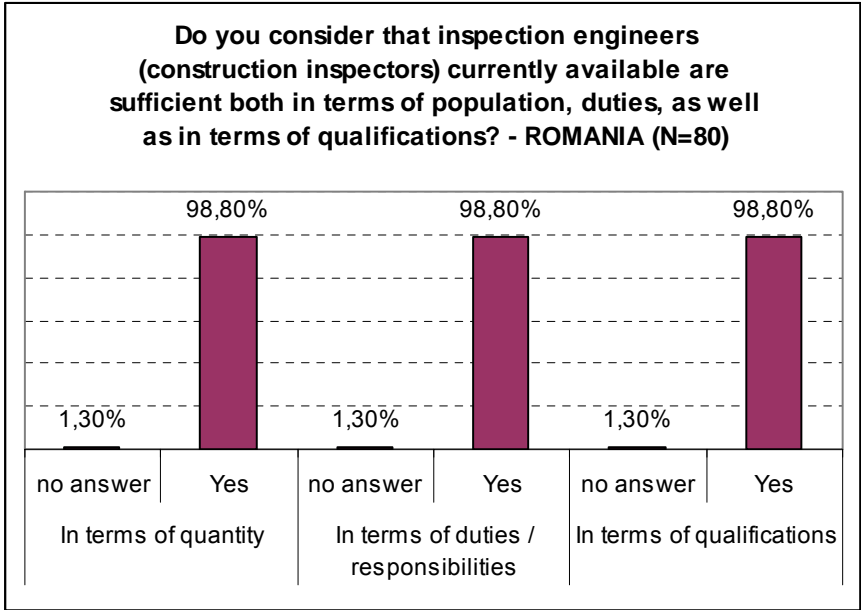


Figure 23. Opinions about the construction inspectors available in Romania
*Bases: Romania, construction inspectors - all respondents (N=80),
 Questions: C5 (a)*

5.2 Requirements of investors

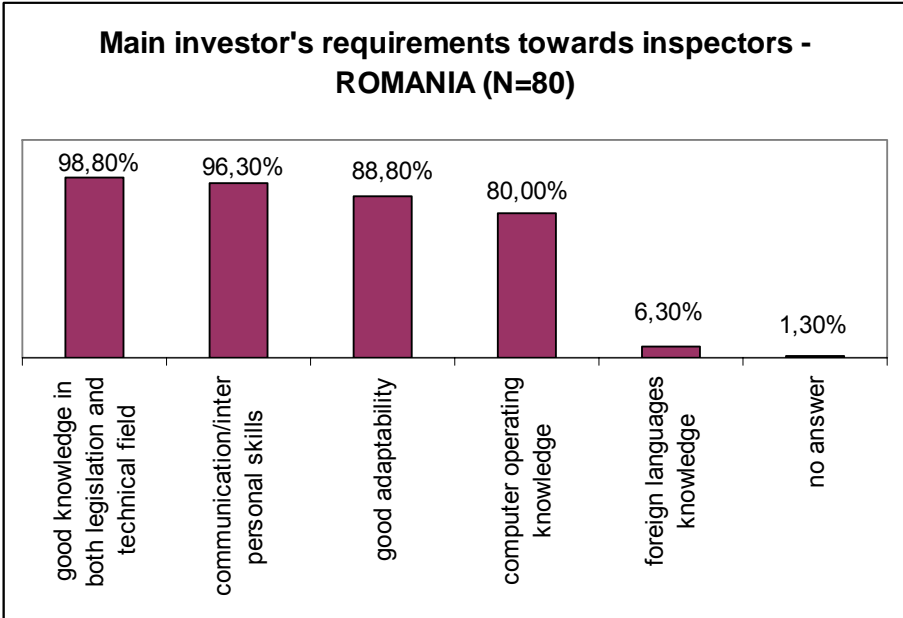


Figure 24. Investor requirements
*Bases: Romania, construction inspectors - all respondents (N=80),
 Questions: C2 (a)*

Figure 24 presents the main investors' requirements towards construction inspectors in Romania: good knowledge in legislation and technical field (98.8%), communication/inter-

personal skills (96.3%), good adaptability (88.8%, computer knowledge (80%) and foreign languages knowledge (6.3%).

As Figure 25 presents, the main part of the courses (83%) are satisfying the investor requirements in terms of legislation or technical approaches of courses provided by different training institutions. 17% of the responses were irrelevant.

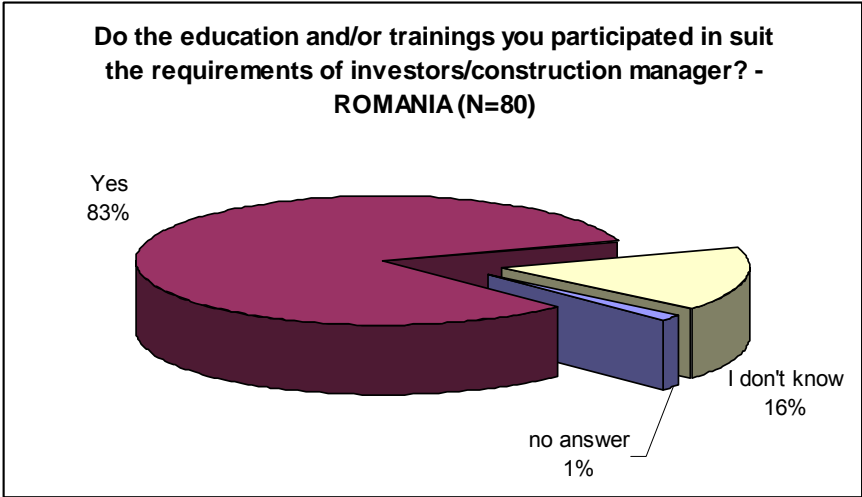


Figure 25. Training versus investor requirements
*Bases: Romania, construction inspectors - all respondents (N=80),
 Questions: C4 (a)*

6. Training needs of construction inspectors

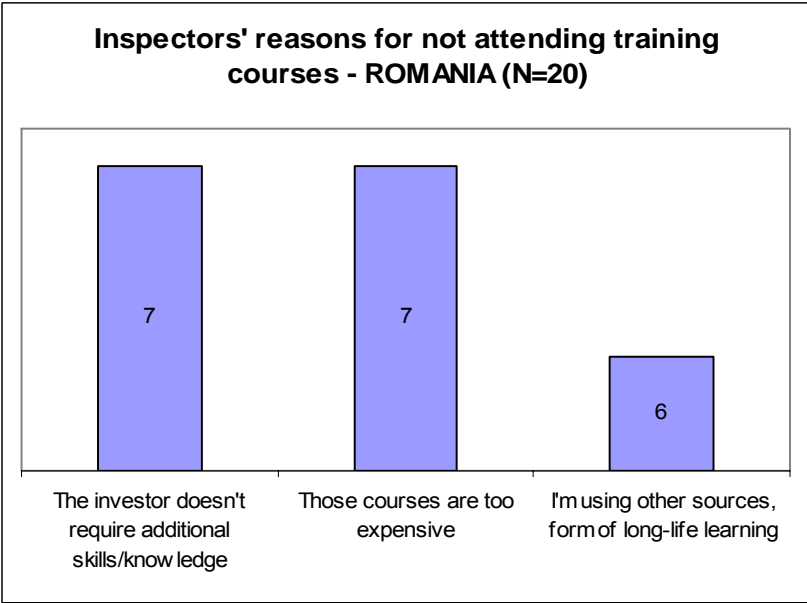


Figure 26. Construction inspectors' reasons for not attending any course
*Bases: Romania, construction inspectors - all respondents (N=20),
 Questions: D1 (a)*

As presented in Figure 26, the answer of the respondents who didn't attend training was due to: no need of additional knowledge (7 persons), the courses' fees (7 respondents) or the usage of other forms of long-life learning (6 persons).

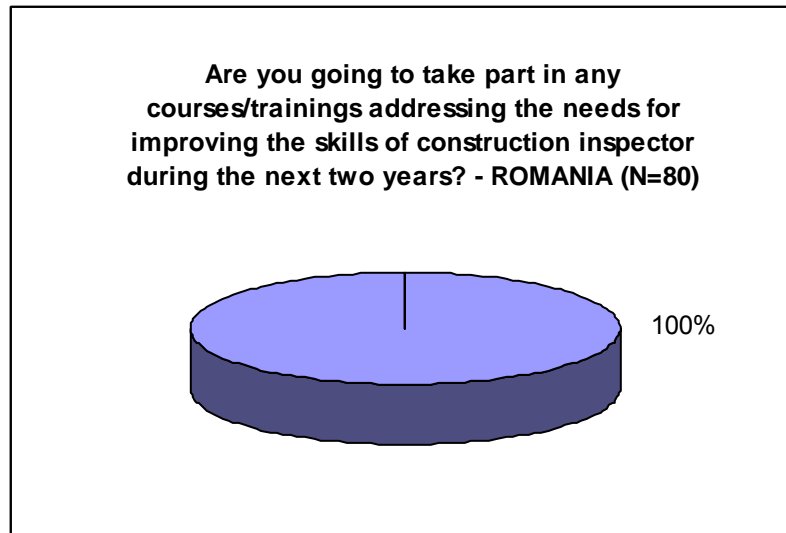


Figure 27. Construction inspectors' future training
*Bases: Romania, construction inspectors - all respondents (N=80),
 Questions: D2 (a)*

The respondents' answer, presented in Figure 27, regarding the future improvement of their skills by training (100%) is due to the fact that from now it will be compulsory for the authorized construction inspectors to attend at least 1 specialization course at every 2 years.

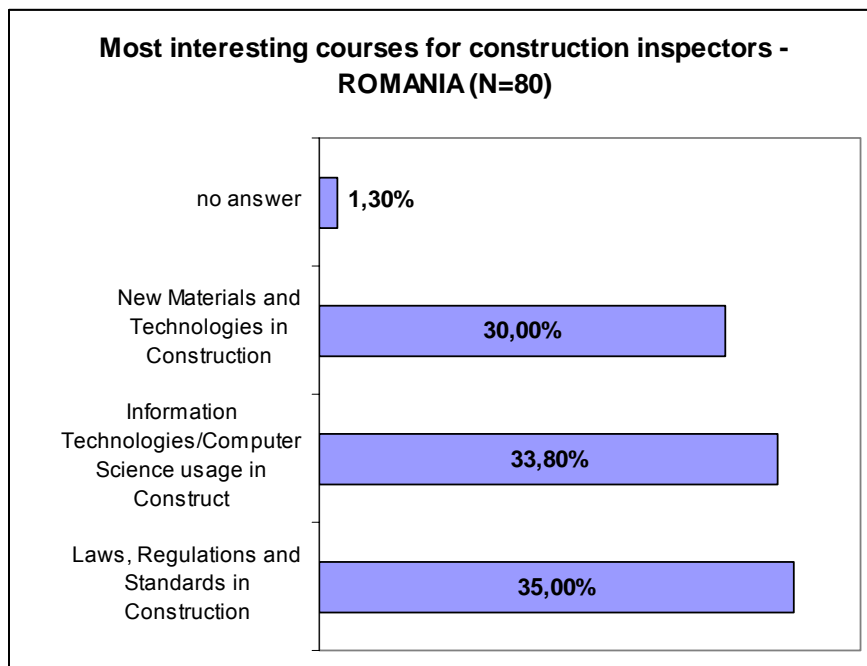


Figure 28. Construction inspectors training courses by content
*Bases: Romania, construction inspectors - all respondents (N=80),
 Questions: D3 (a)*

Figure 28 reflects the well balanced response on the question about the most interesting courses attended by the Romanian respondents: Law, Regulations and Standards in Construction (35%), Information Technologies/Computer Science usage (33.8%) and New

Materials and Technologies in Construction (30%). This is due to the variety of training courses offer, pointing new technology implementation, computer science or management.

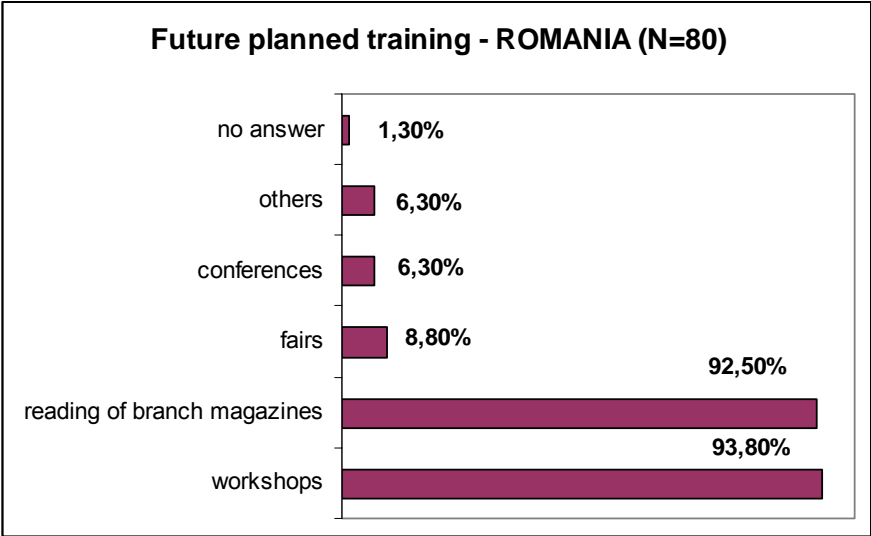


Figure 29. Construction inspectors training plans
*Bases: Romania, construction inspectors - all respondents (N=80),
 Questions: D4 (a)*

As Figure 29 presents, future planned training activities of the Romanian respondents are connected with: attending workshops (93.8%), reading of branch magazines (92.5%), fairs, conferences participation etc.

7. International certification

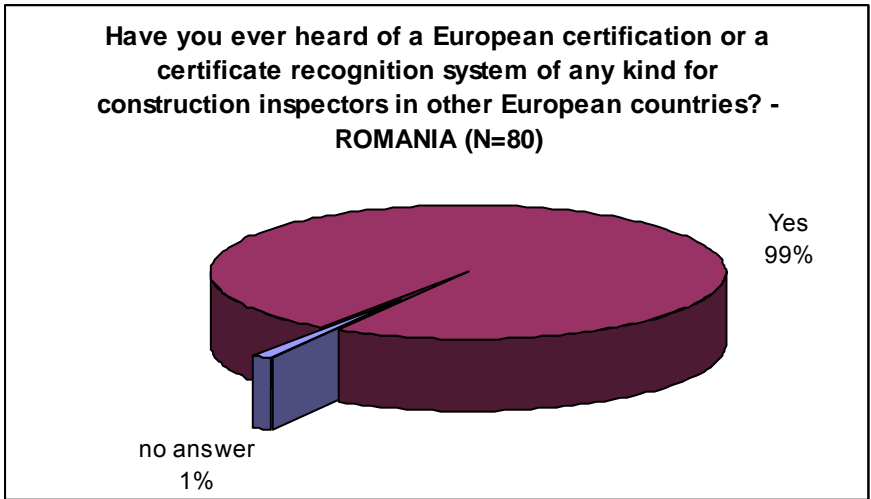


Figure 30. Knowledge about the European certification system existence
*Bases: Romania, construction inspectors - all respondents (N=80),
 Questions: E1 (a)*

As Figure 30 presents, 99% of the Romanian respondents heard about the existence of different forms of European certificate recognition, but no one of them are having such authorization (Figure 31).

The Romanian respondents are thinking that the European certification should be a voluntary one (Figure 32), due to the fact that this authorization can't have a significant influence at national level. *Furthermore, this profession must be first recognized at European level and after that it can be discussed about its certification.*

The only known European certification is provided by the European Welding Federation, which is a professional association. EWF is having its own training, certification system, implemented in the states member. Its model can be followed up, but the countries specificities are important issues to overcome.

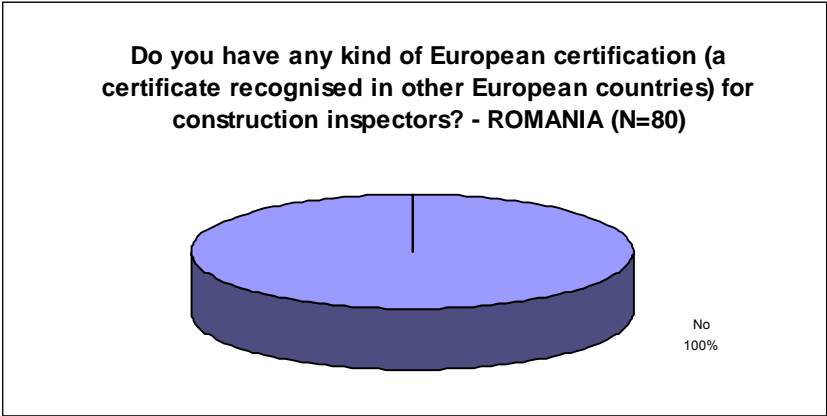


Figure 31. European authorization in construction
*Bases: Romania, construction inspectors - all respondents (N=80),
 Questions: E2 5 (a)*

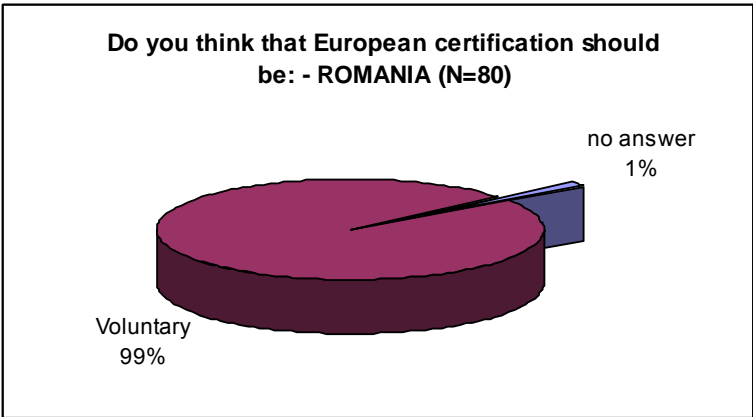


Figure 32. European authorization in construction
*Bases: Romania, construction inspectors - all respondents (N=80),
 Questions: E4 (a)*

The Romanian respondents' opinion (Figure 33), about the development of a European system of construction inspectors' authorizations it:

- seems to be crucial for future development of the European construction sector (4.5%) in terms of constructions quality assurance and safety; Of course some specific rules must co-exist, due to the countries natural factors of high-level risk as: floods, hail storms, drought, landslides, soil erosion etc;

- will ensure the main bases of a good development of the European construction sector (47.5%);
- will not influence the countries construction sectors specificity in terms of high-risk regulations.

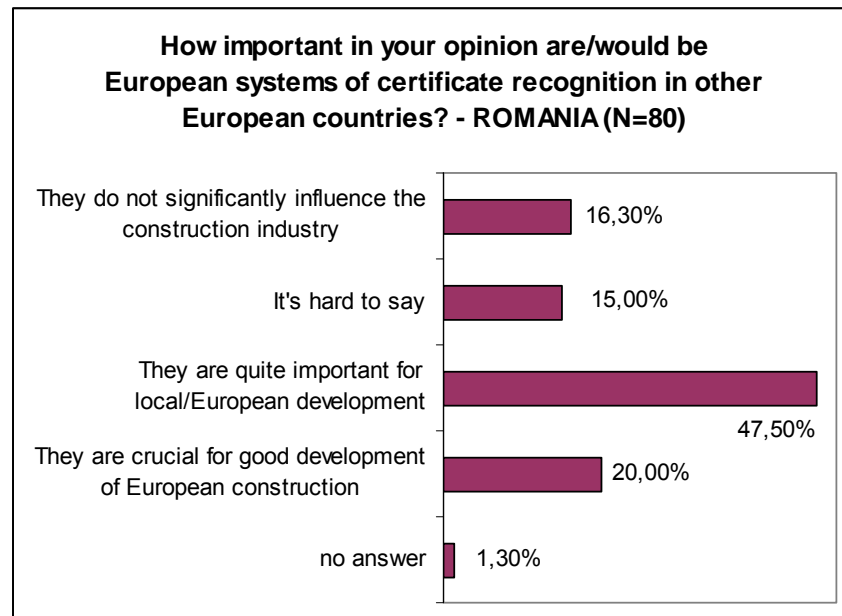


Figure 33. European authorization in construction and its influences
 Bases: Romania, construction inspectors - all respondents (N=80)
 Questions: E5 (a)

8. Concluding remarks

This paper address construction inspector job continuous vocational training needs and European qualification recognition, being the result of a survey realized in Romania by members of Dunarea de Jos University of Galati in the Leonardo da Vinci program - *Analysis and Comparative Study on construction inspection job performance regulations. European comparative study "KNOWLEDGE"* in 2005.

The Romanian survey concluding remarks are about:

- The respondents' general opinion on the *knowledge gained during the university graduation* in terms of quality is quite good, 77.5% of the people marking "very good" or "rather good". 22.5% being un-satisfied; some changes regarding the base training are necessary. *New teaching methods including multimedia techniques must be introduced as training methods.*
- *The easiest way of understanding the knowledge*, in terms of up-dating is the classical way of courses/trainings participation (27.5%), followed by the reading

of branches magazines (25%) or Internet usage and workshop participation (17.5%).

- Although specialized training programs for construction inspectors doesn't exist in Romania, organized training at post-university level in construction sector exist, targeting the following directions: Laws, Regulations and Standards in Construction, Total Quality Management; Quality Assurance in Construction, New Materials and Technologies and Information Technologies/Computer Science usage.
- The perfect *construction inspector definition* is connected with good communication/attitude with the constructors, good qualification/skills/knowledge, including computer usage and the knowledge of the professional issues.
- The European certification in construction should be a voluntary one, due to the fact that this authorization can't have a significant influence at national level. But, the development of a European system of construction inspectors' authorizations seems to be crucial for future development of the European construction sector in terms of constructions quality assurance and safety; Of course some specific rules must co-exist, due to the countries natural factors of high-level risk as: floods, hail storms, drought, landslides, soil erosion etc.

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Sustainable development and future of construction in Romania, Jana Suler, Urban project;

Informative Reports, issued by State Inspection in Construction

Annex 1

DIRECT INTERVIEW

Questionnaire for the people who have construction authorization and work as construction inspectors

Number of questionnaire |...|

Hello, my name is and I'm representing Dunarea de Jos University of Galati. Currently our University is conducting research in the framework of a Leonardo da Vinci project titled: "Analysis and comparative study on construction inspection job performance regulations. European comparative study. KNOWLEDGE." You have been identified as a person knowledgeable about construction inspection job performance.

[The interview will take approximately 30 minutes. Please be aware that your answers will be kept absolutely confidential and they will be used only for statistical purposes.]

Screening questions:

1. Do you have construction authorisation to manage the construction works?

1. YES
2. NO [Interviewer: please interrupt the interview]

2. Have you ever worked as a construction inspector?

1. YES
2. NO [Interviewer: please interrupt the interview]

Section A: Vocational self improvement

A_1. How do you evaluate the knowledge gained during university degree studies?

Please choose one option:

1. Very good quality
2. Rather good quality
3. Rather bad quality (not sufficient for work)
4. Very bad quality (I had serious problems because of that)
5. not applicable

A_2. What is your attitude towards improving vocational skills?

Please choose one option:

1. The type of work I do does not require any form of improving vocational skills.

2. Some rare updates of modern construction technologies are required in my work
3. Some updates of the knowledge and skills are necessary but most of them are done only to improve the inspector's value on the market
4. Constant life-long learning is necessary to perform the work properly

A_3. Have you ever taken part in the following forms of improving your vocational skills?

[Interviewer: please read all forms  tick those mentioned by respondent]

1. Workshops
2. Conferences
3. Courses / trainings
4. Trade fairs
5. Reading of branch magazines
6. Internet resources
7. Others: meeting with colleagues

A_4. Which form do you find the most efficient for improving vocational skills?

[Interviewer: respondent should chose 1 form only]

1. Workshops	<input type="checkbox"/>
2. Conferences	<input type="checkbox"/>
3. Courses/trainings	<input type="checkbox"/>
4. Trade fairs	<input type="checkbox"/>
5. Reading of branch magazines	<input type="checkbox"/>
6. Internet resources	<input type="checkbox"/>
7. Others:	<input type="checkbox"/>

Why? [Interviewer: please ask respondent for justification of his/her choice]

A_5. Do you know any training institutions dealing with courses for construction sector?

1. Yes, please give their names (maximum 3 institutions can be nominated here)
2. No
3. Not relevant

Section B: Evaluation of courses/ trainings done

B_1. Have you ever taken part in a course/ training which prepares for an exam (for authorisation/certification) for construction inspectors?

1. yes
2. no
3. not relevant (no certification is/was required)

B_2. Have you ever taken part in a course/ training for construction engineers aimed at improving your vocational skills?

1. yes
2. no → go to the section C if in B_1 respondent also said "NO" or "not relevant"

B_3. In how many improvement courses/trainings have you participated during the last 2 years (2004, 2005)?

Please give the number:

[Note: if the respondent indicated “NO” or “not relevant” in question B_1 and “0” in question B_3, please skip to section C.]

B_4. What was the main subject of the courses ?

[Interviewer: please ask the respondent for the precise topic of the training, number of trainings he/she took and the form of payment, i.e.

- (1) free of charge,*
- (2) partially paid,*
- (3) fully paid: financed by investor/employer,*
- (4) fully paid: by myself*
- (5) other?*

Topic of the course / training (a)	Number of courses (b)	Who paid for the course? (c)
– Laws, Regulations and Standards in Construction;		
– Total Quality Management; Quality Assurance in Construction;		
– New Materials and Technologies;		
– Information Technologies/Computer Science usage.		

B_5. Could you please indicate the most important motive for taking part in the improvement training/ trainings? *[Interviewer: please tick only one motive]*

- 1. Getting a certificate
- 2. Passing an exam
- 3. Investor’s/employer’s request
- 4. Improving my position on the job market
- 5. Getting a promotion
- 6. Up-dating my knowledge
- 7. It was required by law/ code
- 8. Other:

B_6. Then I would like you to evaluate the level of satisfaction with the particular attributes of trainings you participated in. Please give your honest opinion using a five-point scale, where:

- 1= very poor
- 2= rather poor
- 3= average
- 4= rather well
- 5= very well

and justify your grade in detail.

If you participated various trainings /courses please evaluate only the best and the worst one.

[Interviewer: if the respondent took part in one course only, he/she describes only that one]

Element	Exam course (a)	Improvement course(s)	
		The best one	The worst one
1. general opinion	Grade: Why?	Grade: Why?	Grade: Why?
2. content, essential knowledge	Grade: Why?	Grade: Why?	Grade: Why?
3. teaching methods	Grade: Why?	Grade: Why?	Grade: Why?
4. training materials	Grade: Why?	Grade: Why?	Grade: Why?
5. trainers' approach	Grade: Why?	Grade: Why?	Grade: Why?
6. level of trainers' knowledge	Grade: Why?	Grade: Why?	Grade: Why?
7. other elements:	Grade: Why?	Grade: Why?	Grade: Why?

B_7. Did you find that something was lacking during the course(s)?

1. yes, please indicate missing issues
2. no

B_8. What do you find was the most important element of the course?

1. Content of the course
2. Prestige of the training institution
3. Prestige of the course/training itself
4. The nearness of the training institution
5. Cost of the training (low cost or free of charge)
6. The trainings are organised cyclically
7. Others...

Section C: Requirements

C_1. Please try to recall any problems you had to face after being given authorisation due to lack of knowledge. In your opinion, what are the main problems/obstacles that newcomer to construction inspection can come across?

- 1st issue
2nd issue
3rd issue
others;

C_2 In your opinion, what are a main investor's requirements towards construction inspectors? What are the most important skills (apart from legal requirements)?

- 1st skill;
2nd skill;
3rd skill;

C_3 In your opinion, what are the features/skills of a perfect construction inspector in your country? (We mean both qualifications/skills/knowledge and personality/attitude)

- 1st feature/skill
2nd feature/skill
3rd feature/skill

C_4. Do the education and/or trainings you participated in meet the requirements of investors/construction manager?

1. Yes, why?
2. No, why?
3. I don't know

C_5. Do you consider that inspection engineers (construction inspectors) currently available are sufficient both in terms of population, duties, as well as in terms of qualifications?

		Please justify your answer
In terms of quantity	1 - yes 2 - no	Reason 1, 2, 3, ...
In terms of duties / responsibilities	1 - yes 2 - no	Reason 1, 2, 3, ...
In terms of qualifications	1 - yes 2 - no	Reason 1, 2, 3, ...

Section D: Training needs

D_1. Why didn't you take part in any courses improving your vocational skills? More than one response can be indicated. *[Interviewer: the question is addressed only to respondent who answered "no" to the question B_2]*

1. Those courses do not provide practical skills
2. Those courses do not provide any useful knowledge
3. There are no courses that would be interesting to me
4. I'm using other sources, a form of life-long learning
5. The investor doesn't require additional skills/knowledge/certificates
6. Those courses are too expensive
7. There are no such courses available in my country
8. Other:

D_2. Are you going to take part in any courses/trainings addressing the needs for improving the skills of construction inspector during the next two years?

1. yes
2. yes, I would like to, but there is no such a possibility in my country - go to question D_4
3. no – go to question D_4

D_3. What courses are the most interesting for you? Which course are you going to choose?

Topic of the course / training (a)	Why?
– Laws, Regulations and Standards in Construction;	Reason 1, 2, 3, ...
– Total Quality Management; Quality Assurance in Construction;	Reason 1, 2, 3, ...
– New Materials and Technologies;	Reason 1, 2, 3, ...
– Information Technologies/Computer Science usage.	Reason 1, 2, 3, ...

D_4. What other forms of vocational education (as a construction inspector) do you plan to use during the next two years?

	Yes	Please describe, give details
1. Workshops	<input type="checkbox"/>	What kind?
2. Conferences	<input type="checkbox"/>	What kind?
3. Trade fairs	<input type="checkbox"/>	What kind?
4. Reading of branch magazines	<input type="checkbox"/>	Title(s), topics
5. Others:	<input type="checkbox"/>	
6. Others:	<input type="checkbox"/>	
7. I do not plan any kind of vocational education	<input type="checkbox"/>	Why?

Section E: International certification

E_1. Have you ever heard of a European certification or a certificate recognition system of any kind for construction inspectors in other European countries?

1. Yes – if yes go to the next question
2. No – go to question E_4
3. I don't know – go to question E_4

E_2. Do you have any kind of European certification (a certificate recognised in other European countries) for construction inspectors?

1. Yes, for which countries?
2. No

E_3. Do you think that the present European systems of certificate recognition in other European countries are good and sufficient?

1. Yes, why?
2. No, why?
3. I don't know

E_4 Do you think that European certification should be:

1. Voluntary
2. Obligatory

Why?

E_5. How important in your opinion are/would be European systems of certificate recognition in other European countries?

1. They are crucial for good development of European construction sector
2. They are quite important for local/European development
3. It's hard to say
4. They do not significantly influence the construction industry
5. They are of no importance

Section F: Characteristic of respondent

F_1. Sex of respondent:

- a) Male
- b) Female

F_2. What is your age?

- a) up to 25
- b) 25-30
- c) 31-40
- d) 41-50
- e) 51-60
- f) over 60

F_3. How long do you work as construction inspector?

- a) Less than 5 years
- b) 5-10 years
- c) 11-20 years
- d) Over 20 years

F_4. What is your specialisation? Please mark the relevant one:

Specialisation	Technical-construction specialisation
Architectural	
Construction - buildings	- cadastre, geodesy
	- concrete constructions
	- metal constructions
	- wooden constructions
	- water management construction objects
	- hydro-technical objects
Roads and Bridges	
Installations and appliances of heating, ventilation, gas, water pipes and sewage system	- gas networks of pressure higher than 0.4 MPa, gas stations, gas extractor press
	- sewage treatment plant
	- appliances of atmospheric air protection
Installations, electrical and electrical power appliances	

Is there anything else you would like to add into this interview? Do you have any other relevant comments which should be forwarded to the policy makers? Please feel free to share it.

Thanks for your contribution!

Annex 2

IN DEPTH INTERVIEW

Addressed to trainers or construction managers

Background information of the respondent:

Country:	<i>Romania</i>
Name of the interviewee:	
Position:	
Organisation:	
The way the interview was done:	
Date of the interview:	
Name of the interviewer:	
Duration of the interview:	
Some possible additional comments:	

Questions and topics on the construction inspectors job analysis report:

1. Please evaluate the existent training in construction sector with regard construction authorizations:
2. What are the training need in your opinion?
3. What aspects, according to your opinion, lack from training?
4. What is your opinion about the perfect construction inspector?
5. What is your opinion about the European certification of this job?
6. Other comments?