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JÁNOS BOLYAI MILITARY TECHNICAL FACULTY  
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**RESEARCHING AND DEVELOPING THE MANAGEMENT AND  
SECURITY OF THE EQUIPMENTS AND PROCEEDINGS  
REGARDING A NUCLEAR ACCIDENT**

Titled (PhD) dissertation  
Author's guide

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## **I. SUMMARY AND AIMS OF THE RESEARCH PROJECT**

The safety of the environment plays a bigger role in today's system of global defence. It became a crucial issue after the many critical industrial accidents occurred in the past decades, which caused significant environmental impairment along with human sacrifice. Catastrophes in the past can be traced back to either outer malevolent effects, or temporary dropouts of caution and they were mostly regional in their extent. In these days it is accounted for civilizational reasons, human mistakes and faults and they became even more globalized.

The concept of environmental safety integrates those potential impairments – or both preventing and averting – which are caused by human made and applied hazardous materials getting out in the environment. To protect the right for safety – in consort with commitments laid down in international acts – can be achieved through the establishing of unified disaster management. The main element of a standardized system is the integrated function of the different sectors and their subordinate systemsegments.

To properly apply the available means, provide a down-to-earth risk taking, and ensure effective prevention and quarantine methodical reactions we require a system, based on common disaster management principles, technical norms and coordinated IT, signal- and alarm-system.

It is essential during catastrophes, that the steps regarding reaction to be born as fast as possible, in order to avert the expansion of the affected area, and to reduce the possible threats to both human and financial values. It is especially true for those accidents, disasters that are in connection with radioactive materials, because the contamination could hamstring the affected area for decades or even centuries.

In order to achieve the minimum impairment and damage an efficient acting, leading-monitoring system is required and technical casemaps working in co-operation with the system. A major accident, disasters assumes several organizations reacting parallel during the crisis, hence the leadership's responsibility increases. It is substantial that the leadership possesses both technical knowledge in the scientific research field, so as to constructively manage the continually altering crisis. In a particular case reliable information and their authentic intercession is needed to single out the ideal reactions.

Such a scouting-, rating-, analysing-, and IT-system should be established and maintained that are able to provide sufficient and accurate information for the leadership in order to choose the ideal method for handling the crisis.

Taking into consideration the nation's economics, the necessary time needed for modernizing and upgrading the available equipment, it is conceivable, that the expansion of our defence potential can be realized through the research of new methods and their practical implementation.

Applying modern proceedings, may lead to greatly improve the efficiency in the reaction and the protection of the environment, even with the use of the currently available equipments.

Proceeding from this consideration, I am dealing with the emphasis of those areas in my dissertation that cause damage from either misconstruction of competency or imperfectly developed system in my opinion.

In Hungary the standardized disaster management system is already established. Conditions of the new system are created with the help of several new laws. Disorders are caused, because the laws do not regulate definitely the competency. Developing the crucial points the majority of the contradictions can be removed, without any extra expenses.

Sufficient amount of information is needed to prevent accidents and catastrophes. During an eventuate situation the need for information increase in an extrem rate. With the apace development of the IT systems, the information is always at hand even at the leadership's level. Though the system is not whole and complete, because it does not cover every aspect of reacting. Those, who are involved in operative work get the least and deficient information. With the expansion of the IT system this deficit is manageable.

During an actual situation the absence of routine is unacceptable. Practical training for those involved in the reaction does not follow out efficiently for years. It greatly reduces the efficiency and increases the jeopardy concerning the forces involved and the population. The wide-scale availability of the IT systems are unbound today. The crisis can be managed with the help of an IT based proper technical system with negligible expenses.  
an IT system

With deliberate and modern development – considering national economics – an attainable and sufficient defence system is at hand.

## **CIRCUMSCRIPTION OF THE ISSUE**

During nuclear accidents the crisis management is composite, on one hand the reduction of damages is important, and on the other to implement the necessary applications. Proceedings and equipments – increasing efficiency and security - mentioned in the title of my dissertation are so differing that they go beyond this dissertation's limits and prospects. I had to decide during my assumptions in which way I should continue my research. This way I would only manage to work out methods not for handling the situation as a whole. Therefore I have chosen to study the fields, from which I have information from my teaching and execution experiences, and are not finished in design. I have chosen 3 part topics, without in my opinion the nuclear crisis can not be managed properly. With the help of well-developed and maintained systems, the efficiency and safety of the situation handling members can be secured.

According to the mentioned options, I would like to emphasise these topics:

- the conception and practice of handling international and national nuclear disasters;
- providing information during a nuclear accident;
- system of preparing and handling a nuclear disaster.

## **RELEVANCE AND IMPORTANCE OF THE ISSUE**

I have mentioned in the beginning of my introduction that disasters can be large in extent, and can affect many members of the population. It is especially true for nuclear accidents, catastrophes. After the disaster in Chernobyl, the nuclear threat became internationally known. Most people agree that nuclear power plants are needed in the future for many years. However they have a claim on such methods, systems that can reduce or prevent the possible threat in a short time.

According to practice we know, that several areas need developing, because of their deficiency.

So far fortunately we faced only hypothetical events and their management, though we must be ready for handling an actual crisis as well, in order to avoid serious damages.

We must take notice, when we strive for better efficiency, that our financial possibilities are limited. That is why we should endeavour to implement such new methods, that can be integrated into our present system and begin to operate efficiently in a short time.

In my opinion with the help of my researches in the chosen topics the deficits can be eradicated, which causing difficulties in the actual prevention.

#### **AIMS OF THE RESEARCH PROJECT**

- With the analyses of laws in connection with nuclear security and disaster management to reveal the contradictions, discover the overlapping competencies and provide proposals to avoid errors.
- With the analyses of disaster- and catastrophe management systems reveal the inadequacy of the system and provide proposals to avoid these deficits.
- According to international and national researches the analyses of methods used when managing nuclear accidents – especially dealing with the information – and developing new ways to provide information.
- Working out a new system preparing for managing a nuclear accident , and with it to ensure the different needs of the altering participants.

## **ASSUMPTIONS OF THE RESEARCH**

- Examining today's international and national laws I can draw a conclusion, about how laws in Hungary match with the international requirements, and are there any fields that needs to be developed.
- Studying national law background and the disaster management based upon it, I can scientifically establish a personally visualized IT model-system, within the boundary of the national one, and to work out its details.
- With the analyses of laws regarding nuclear accidents and the reactions taken we can set out a new system, which integrates the present one so, that both the efficiency and security chances increase.

## **RESEARCH METHODS**

In order to fully expand this issue, we have to study the related international and national experiences along our knowledge and practice. Processing the experiences of conferences, consulting with members of authorities playing part in a crisis handling situation, comparing practical and theoretical methods, and drawing conclusion. Analysing and comparing the international practice with the national. Studying the equipments in practice and analysing their efficiency.

## **EXPECTED ACHIEVEMENTS, AND THEIR APTITUDES**

- Working out factual ideas regarding laws in connection with nuclear accidents in order to extinguish any deficit.
- Setting up an information system preventing accidents, and to widen the information flow.
- Establishing an educational system to improve qualification, and with it to ensure a low-cost practical training.

## II. SHORT DESCRIPTIONS OF THE ANALYSES USED, AND THE DEDUCTIONS

In the **first chapter** I examined the methods and practice of international and national nuclear-catastrophe preventing systems.

Nuclear materials have significant effects on security, so the reduction of the jeopardy – laying stress upon prevention – required serious law regulation regarding both international and national authorities.

International and national laws and regulations regarding nuclear-disaster management systems give us chance to investigate the field. Both at international and national level occur break-downs and malfunctions. Life itself – falsify statistics – created nuclear catastrophes.

The National Nuclear-Accident Management System (ONER) is a well-based system in connection with authorities, equipments and law background.

Practice experience appoints, that during the system's work such arrangements may occur, which does not help managing the actual situation, rather they generate unsubstantiated activity. I assume, according to my practice and the information gathered during my research, that deficiency comes from either system hierarchy or from competency overlapping among the laws. I analysed few nations' nuclear-disaster management systems, in order to have an objective view about their structure. I also analysed those laws, which contain the proceedings, competencies about nuclear accidents managing, and worked out proposals for their necessary modification.

In the Hungarian law regulation regarding nuclear accidents two states can be marked off, one initial and one after Chernobyl. The draw line between the two is precisely the disaster in Chernobyl, though this statement can be true internationally. Before the accident in Chernobyl, the information flow stayed basically within one nation's boundaries, and internationally it did not play a substantial role, because of political reasons and intentions regarding nuclear security or even tense point of views.

In Hungary the first structure and leadership was established in 1982, under the supervision of the National Defence Ministry. Practice and preparation for training came down mainly on the powerplant of Paks and its surroundings.

The catastrophe in Chernobyl in 1986 fundamentally changed the conceptions so far. Governments and competent international authorities brought in verdicts in order to improve nuclear safety and to develop disaster management. This last activity covered both inner and other actions in the compound, and their coordination.

New regulations included many advancements, corrected reaction steps, but did not manage to wind up the authority system. Certain tasks lacked, like for example the coordination of radiation surveillance and measuring stations, because it belonged to different authorities.

The establishment of ONER acted on the structure of the Hungarian polity, so the level of ONER and the disaster management is the same, and they work in synch. Always the size of the effected area determined the level of reacting. Experience gathered from the international cooperation played important role in nuclear-disaster management. In the field of development the researches in international programs brought significant experiences. For this accordingly Hungary based its knowledge – in connection with European integration efforts - upon the international programs, NATO, and OECD NEA.

During a nuclear threat, it can only be avoided if the authorities in connection with ONER coordinated and harmonized their work.

For this, exact competency and connection among the authorities should be determined. Today's laws regulation contain overlaps and they can be ambiguous. Therefore it makes the situation impenetrable and hardens the management during a nuclear accident.

Along with the new regulations the Unified Catastrophe Management System was established, which fundamentally did not change ONER's structure, though it can be managed with the help of reconsidering the laws and altering to a sufficient measure. During disasters it is essential to determine the competencies, rights and obligations in order to efficiently implement the reactions.

Summing up the effects it can be stated, that both at local and KKB level it may set back the reaction time, if the law regulations and nuclear disaster management practice creates overlapping in decision-making. Extant problems can be solved through ways and proposals described in this chapter.



In the **second chapter** I emphasised the information flow during a nuclear accident management. After every disaster the time plays the biggest factor managing the situation. It is essential during catastrophes, that the steps regarding reaction to be born as fast as possible, in order to avert the expansion of the affected area, and to reduce the possible threats to both human and financial values. It is especially true for those accidents, disasters that are in connection with radioactive materials, because the contamination could hamstring the affected area for decades or even centuries.

In order to achieve the minimum impairment and damage an efficient acting, leading-monitoring system is required and technical casemaps working in co-operation with the system.

Major accidents, disasters assume several organizations reacting parallel during the crisis, hence the leadership's responsibility increases. It is substantial that the leadership possesses both technical knowledge in the scientific research field, so as to constructively manage the continually altering crisis. In a particular case reliable information and their authentic intercession is needed to single out the ideal reactions.

During an actual event, the information must be provided to the participants at all levels. Authorities working on the issue need accurate information as fast as possible in order to react in the most efficient way in the nick of time. It both increase efficiency when dealing with the accident and the security of those who are involved in the operations.

Taking part in accident management, planning an evacuation, or training it came to my that the most difficulties came from the lack of information or following them up, either by engaged phone lines, lack of mobile phone fields, shadowing or drawing paper-maps, etc.

In our time many developed technical equipments is at hand, which can be integrated and used in practice in order to shorten the time between the accident and reactions taken, and to continually monitor the events.

I examined from different angles the features of nuclear accidents and many nations' practice in order to establish an efficient system managing the situation. Considering these, I worked out such a standardized system on the basis on the current technical possibilities, which after its installation can provide each member of the managing authorities – according to their hierarchy in function and their part in disaster management - sufficient amount of information.

Different risks lead to establishing different authorities dealing with the eventual situation and to create alternative protection methods, which can cooperate with each other. So during an accident it is essential for the units of the standardized protection system to cooperate, this way the system ensures that the units make out each other and have a commulative effect.

In an actual situation it is necessary to have sufficient amount of accurate and authentic information to choose the most suitable method.

It is advised to establish such a scouting-, valuing- and analysing system, which can provide enough information for the leadership both in quantity and in quality, so that they may select the ideal proceedings to manage the accident.

Different types of catastrophes create different conditions, which hardens the disaster management, because it may do not alter the situation fundamentally, but it requires various methods and countermeasures when dealing with the accident.

These arrangements and needs can be locally found and used in time. Though they can not miss an aligned pre decision-making, choosing the proper reactions and the coordinated management.

Pre decision-making and the decision must be based upon multiple information and their analyses. The supervision of the reactions should be put through interactive channels of information and analyses and communication.

It is always essential to have enough information (about the event, the consequences, the available defence equipments – both outer and inner) and analyses, to work out alternative ways of reacting, to make proper decisions, to react as fast as possible in order to restore to conditions in their original state or at least to the normal conditions if living.

Analyses of NEA members give us the opportunity, to compare the participating nations and to nourish the coordination among them. It is also good for international harmonization and to gain valuable knowledge about each other, which can bring out the differences in their practice in order to help them understanding the other's way of reacting.

Though the national and local reactions may alter, they are on common terms with the proposals of IAEA. In some countries the reactions are divided to different levels, so there may exist national, regional, local authority or coordinator.

The most efficient way of reacting is the prevention and lessens of the damages. Therefore it is highly recommended to establish such a modern regional – beyond borders even – measuring, alarming system, which provide continually, and reliable information and be a vital part of the decision making during disaster management.

In this chapter I proposed the establishment and maintenance of such a system to help the information flow, that can provide accurate and sufficient amount of data to every level of decision making in the hierarchy of disaster management, in order to react as fast as possible in an actual situation, and with it to reduce the time of reacting and to increase efficiency regarding the organisations. The system gives us a chance for interactive communication among every level of the leadership, which not only would increase the effectiveness, but also the safety of the participants taking part in the management.

In the **third chapter** I analysed the training system regarding nuclear disaster management. I determined that the biggest gap in their training is the field of practice.

The increasing need for world's energy requires the peaceful use of nuclear energy. Ensuring nuclear safety, reducing possible risks and peaceful use of nuclear energy is guaranteed through many regulations and equipments. We can not leave unmarked that the best way of management is prevention. Nuclear activities should be planned and executed so, that no accidents may happen. Though we must prepare for possible accidents.

Managing a nuclear catastrophe requires almost every ministry and nation-wide authority to work and to cooperate. Reactions need organized forces and their labour both in the beginning and after it. At the beginning of the disaster management – during a nuclear threat (NVH) – those equipments and forces are of great importance that are continually available or is at hand in the nick of time.

Other sections' according to their technical hierarchy play important roles in the period after it. Executive authorities work along with (capital city, county) other regional, local authorities and also take part in the decision-making.

The detailed planning and training for disaster management is carried out by Disaster Preventing Regulation Plans (BEIT) and ONER.

The already available BEIT-s and the operational ONER basically provides the security measures regarding nuclear safety. During catastrophe management the up-to-date plans, or their developing increase safety, with the help of training ONER's at all three levels. With all these measures carried out decrease the reaction time.

The well-known ALARA principle states, that it is necessary to strive for the least doses. In the contaminated area the spent time plays the most important factor. Keeping safe distance is provided by automatic systems. Nuclear disasters accidentally or by human faults consist of line of events.

From the events in the beginning until the contamination some time passes by, and for the pollution to expand it takes also some more. For managing every execution of the accident we also require time. As we can see to increase efficiency and safety it is one way to shorten the reaction time. This goal can be achieved with the proper training of the proceedings used in the system, or to train in a created – almost real – situation, and with the establishment of new, expensive systems, proceedings.

Researching and developing should be planned in the budget of ÖM, IRM, OAH and the other institutes regarding nuclear disaster management. Besides the regular training it is essential to acquire financial and technical terms. So when designing disaster management we should take good care of those financial conditions, which are required to the prevention training, and the human or technical necessity needed at the management.

The responsibility of the authorities taking part of the nuclear disaster management is to provide sufficient amount of labour force and equipment to effectively manage the actual situation. In order to increase safety and efficiency it is recommended to purchase the technical equipment, to maintain them, continually modernising the appliances and even to provide a well-trained crew who can carry out the reactions.

In my dissertation I proposed a practical training system, called Interactive Training System (ITR), which can efficiently prepare the participant for the tasks ahead of them. In my opinion ITR should consist of an IT system and programs designed especially for it. The programs I examined, like BALDOS, SINAC, RODOS, TREX can be used when dealing with a nuclear accident. ITR can integrate along with nuclear disaster management processes, all types of other catastrophe management and the connected forecasting softwares.

We establish a virtual reality, with relatively low costs, possible faults without consequences, reproducible results, a world with operators, which may offer us the opportunity to learn the difficulties with ease.

The establishing and development of ITR system could be a new, vital proceeding during a nuclear threat in the hands of ONER users and others. ITR is a cost effective response for the challenges of the 21st century. In my opinion the ITR is a brand new solution, and it is essential for improving the training. With ITR a lot of money and time can be spared both during training and prevention. Indirectly participating in the increase of safety within the local population and to raise the training's quality.

Though it is desired not to have the opportunity to test this knowledge in reality. However I see there is great need for the establishment of such a system like ITR.

### **III. SUMMARY OF THE SCIENTIFIC RESULTS, REFERENCES**

In the first chapter, titled practical and theoretical management of nuclear disasters internationally and nationally, I examined the systems used for this purpose and the law regulation background. I analysed the two practical field in the same chapter, because in my opinion they are fundamentally in interaction. At the beginning of the chapter I examined other nations' management systems regarding nuclear accidents, in order to compare the results with our own observations. I noticed that the various nations established a standardized defence system, so that they could work in unison with each other. The disaster management system built in Hungary is based on similar principles as the international structures, and here also prevails that during a nuclear accident other authorities can take part in the reactions and to be able cooperate with the leadership.

In the second part of the chapter I analysed the laws and regulations focusing on the ones regarding disaster management. I observed that the varying events (reactor establishment, reactor accident) may determine the procedures. Though the regulation always matched the international expectations. The current regulations are full-scale, but the competencies are not stated exactly, therefore the anomalies can set back the decision-making. Reconsidering laws and to definitely appoint tasks is essential to increase efficiency in the disaster management.

In the second chapter, titled information flow during a nuclear disaster, I processed two major topics again. In the beginning of the chapter I analysed the opportunities of accessible information in various countries' systems. With the examination of the system I declared those requirements, which can be of great use to Hungary's defence system.

In the chapter's other half, I analysed the Hungarian developments. I observed that there are many developments we can integrate and use.

If we established a system, into we can integrate the current ones, we would acquire such an unified database, which would provide the substantial information to the various members at any level. In my opinion the decision-making and assuring the needed information make out one whole. Today it is basically known that reactions taken at an early stage is the best

way of disaster management. The system I have worked out is not only able to handle the information flow, but can also execute alarming the public and interactive cooperation. Information (fast, accurate, continuous) is not only vital in decision-making, but also in reacting. For years there is a need for the establishment of a modern measuring, analysing, and alarming system. In this chapter I tried to collect and emphasise the answers to this opportunity.

In the third chapter, titled training system for nuclear disaster management, I analysed the different tasks and proceedings regarding nuclear accident defence systems. Nuclear accidents cause varying plans and tasks. It is elementary that every plan worth so much, as much we can make out of them. Procedures need sufficient time of practice in order to be carried out perfectly, which require huge amount of financial support. Theoretical prevention does not provide enough security at nuclear disaster management, and without practice it often does not reach the optimal efficiency. Practicing requires more time and financial costs along with needs of space, equipment, and other materials. With the help of today's technical standards it is available to artificially simulate the situations, and to practice the sufficient procedures. For these results I worked out the structure and the system.

## **SCIENTIFIC ACHIEVEMENTS**

1. During my research regarding standardized disaster management system, I managed to point out the flaws of the law regulation, which may set back nuclear disaster management and proposed detailed modifications.
2. With the analyses of international systems regarding nuclear disaster management, I foremost appointed the conditions and terms of the sufficient information flow. According to the comparing analyses, our national system's lack is information gathered and processed on the local spot.
3. I was the first to work out such an integrated informing and monitoring system and its connected information model, which can provide the local authorities with sufficient amount of data needed for the disaster management.
4. I set up such a training system for the preparation of nuclear accident managing, that models actual information and bounds the members to react in their own level. To successfully solve the tasks is also required for passing the exam.

## **REFERENCES**

- OKF members dealing with law regulation modification should consider my proposals.
- OKF and its local authorities and the defence committees should take note the scientific results regarding the information flow.
- OKF and its local authorities and the defence committees should apply in their practical training the results of my scientific researches.



#### IV. MY ARTICLES FROM THE SUBJECT

1. Zoltán Janik: Study about the national nuclear disaster management authorities, their competence and thier all ranks, BM PVOP 1998. Bp.
2. Zoltán Janik: Basics of Environment Protection note, KOK 1998. Bp.
3. Ferenc Molnárk, Zoltán Janik: Basics of radiology and antigas, note, KOK 1998. Bp., chapter: II-III., pp. 40-120.
4. Attila Szilvási, Zoltán Janik: Instruments note, KOK 1999. Bp., chapter: I-III., pp. 1-120.
5. Zoltán Janik: Civel Defence Training, Hungarian Civil Defencem, year:1999 XLI. number: 1, pp. 24-26.
6. Zoltán Janik: Actinometer intruments, Florian press 2003. number 12, p. 744.
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11. Árpád Vincze, Zoltán Janik: Study about the information needs in disaster management, ZMNE 2005. Bp.
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14. Zoltán Janik: Civil Defence Knowledge note, Pro-sec Bp. 2006
15. Zoltán Janik: Interactive training system, as an efficient way for prevention, Disaster Management. year: 2008 no. 12. p. 21.
16. Janik Zoltán, Árpád Vincze: Supporting the Information need for protection, AARMS, 4/7/2008. under publication (January 2009)

## V. PROFESSIONAL, ACADEMIC CURRICULUM VITAE

### Scope of activities and professional assignments:

**1985-1986.** no.3101. Independent Technical Regiment; Hatvan

#### **Chemical-ray scout platoon leader**

**1987.** no.3101. Independent Technical Regiment; Hatvan

#### **Chemical-ray scout platoon leader**

- Preparing training and readiness plans
- Training enlisted man
- Supporting and handling technical equipments

**1987-1990.** Máté Zalka Military Technical College; Budapest

#### **Company commander, teacher**

- Preparing projects
- Student work coordination
- Antigas teaching work

**1990-1991.** National Civil Defence Executive Training Institute; Pécel

#### **Head teacher**

- Preparing educational documents
- Disaster management, teaching civil defence, interrogation

**1991-1992.** National Civil Defence Executive Training Institute; Pécel

#### **Specialist-group leader**

- Planning, organising and coordinating the teachers' work
- Disaster management, teaching civil defence, interrogation

**1993-1997.** National Civil Defence Executive Training Institute; Pécel

#### **Head of Department**

- Planning, organising and coordinating the department's issues
- Disaster management, teaching civil defence, interrogation
- Education monitoring, and preparing training and readiness plans

**1997-2000.** National Civil Defence Executive Training Institute; Pécel

**Head of the Educational Department**

- Planning the budget of the center and other economical tasks
- Running the professional education
- Managing the teachers' work, monitoring, planning and supervising
- Working-out the documents of procedures
- Personal and logistical designing and their implementation
- Preparation of laws
- Leading the educational work, disaster management teaching

**2000-2002.** Police College, Educational and Methodology Department; Budapest

**Deputy Head of the Department**

- Planning and organizing the education of protective service officers
- Preparing educational materials
- Disaster management training, interrogating

**2002-** Hungarian Post Co. Ltd Chief Executive Office

**Catastrophe recovery associate**

- Strategic coordination of the tasks of local authorities
- Regulation tasks
- Disaster management planning, organizing and monitoring
- Disaster management training

**Qualification:**

1981–1985 Máté Zalka Military Technical University; Budapest

Radio-chemical plant engineer

1991-1993 College of Public Administration; Budapest

Environmental security manager

1994-1996 Budapest University of Technology and Economics; Budapest

Radio-chemical engineering teacher

1998-2001 Miklós Zrínyi National Defence University; Budapest

Chartered defence executive manager

Chemical and environmental security engineer

**Professional courses:**

1985 Máté Zalka Military Technical College; Budapest

Elementary fire service qualification

1992. Ministry of the Interior, Disaster Management Training Centre; Budapest

Hazardous material management course

1993 National Civil Defence Executive Training Institute; Pécel

Civil Defence professional course

2007. National Directorate for Disaster Management; Budapest

Built-in fire-alarm equipments planning

**Language certificates:**

English basic language exam

Russian intermediate language exam

**Memberships:**

Hungarian National Committee of the European Organization for Quality (HNC for EOQ)

National Civil Fund - Application Committee Member

**Budapest, 29. january 2009.**

**Zoltan Janik**