

## PARTICIPATION OF CYNODOLOGY TEAMS IN DISASTER SEARCHES IN THE CZECH REPUBLIC IN 2006–2017

Kateřina JANČAŘÍKOVÁ, Antonín JANČAŘÍK  
katerina.jancarikova@pedf.cuni.cz, antonin.jancarik@pedf.cuni.cz

### Abstract

*This article provides a comprehensive overview of the use of rescue dogs in disaster searches the Czech Republic. In Introduction, Czech rescue cynology as well as an overview of Czech literature on the topic are briefly introduced. The research part assesses all (104) disaster searches with participation of cynological teams in debris in the Czech Republic in the period 2006-2017. The data are processed using a mixed research design. The most important results: no living person was found, dogs reliably mark the victims' bodies, even if only live people are searching in the trainings. No handler was injured. Two dogs were slightly injured. Conclusions formulat in which areas for further research are outlined and recommendations on methodological measures given that would lead to an increase of efficiency.*

### Key words

*Czech Republic, cynology, rescue dogs, USAR, disaster search, population protection.*

### Introduction

Rescue dogs have been used in disasters of larger or smaller scale for more than one hundred years and are of irreplaceable help in disaster searches in debris, especially in cases when the buried people cannot be localized optically or acoustically. This is because of dogs' olfactory and motoric skills. In searches in difficult, often unstable terrain full of obstacles and various smells of different origin, dog rescue teams are the best primary detection of presence of people (e.g. [2], [9], [10], [11] p. 208–209, [28]) and are deployed in searches by a number of countries (e.g. [3], [4], [7], [8], [21]).

The Czech Republic is one of the countries with a long cynological tradition. Czech dog handlers are among the best in the world in many areas of cynology, including rescue cynology. The book Speciální výcviky psů (*Special Training of Dogs*) was published in the Czech Republic already in the 1950's. Its major part focuses on training of dog rescuers ([26]). The importance of deployment of rescue cynology teams in disaster searches has been confirmed in a number of articles and surveys. The most recent in the Czech Republic was conducted among members of the Czech USAR detachment ([29]).

Czech dog handlers-rescuers took part in six foreign missions in 1988-2003. L. Zápotocká (tab. 1) gives an overview of findings of Czech cynological teams on these missions.

Until 1999, Czech professional bodies did not have their own dog handlers; dog handlers from voluntary organizations were invited to cooperate in searches ([29]). Naturally, such situation was not satisfactory, as the state should guarantee presence of all needed specialists at the site of a disaster. That is why professional cynological rescue teams were gradually built ([10]).

There is a significant number of popular and methodological literature on rescue cynology in the Czech Republic. However, very little published research exists.

In 2010, a research overview of Czech publications on the topic of rescue cynology was produced. It mentions 4 books in the category of methodological guides, 10 university

qualification works at different levels focusing on various topics and sometimes also on research methods (e.g. [12], [15], [16], [23]), and 18 popularizing articles in newspapers ([30]).

*Table 1*  
*Findings with the help of Czech cynological teams on USAR detachment missions abroad*

Participation of Czech dog rescuers abroad – search for earthquake casualties				
Location	Year	Time of intervention in the place	Living people found	Remains found (dead bodies)
Armenia	1988	9 days	1	37
Turkey	1999	Several teams, the longest stay was 15 days	8	45
Taiwan	1999	7 days	6	not given
Turkey	1999	6 days	not given	not given
Iran	2003	4 days	1	51
Algeria	2003	6 days	0	5
In the years 2003–2018, Czech cynological teams were not involved in any foreign missions (with the exception of training missions).				

*Adapted from [29], p. 55.*

In 2005 *Metodika sutinového vyhledávání s využitím záchrannářských psů – Methodology of disaster search using rescue dogs* ([22]) was published by MI – DG FRS CR (Ministry of the Interior of the Czech Republic – Directorate General of Fire Rescue Service of the Czech Republic).

After 2010, about ten more qualification works were published (e.g. [1], [18], [27], [29]).

The most extensive methodological book on training dogs for deployment in disaster search in debris was published in the Czech Republic in 2013 ([26]). An important overview was published by R. Hejzlar ([10]). The first comprehensive monograph *Rescue cynology* is planned to be published in 2019 ([14]).

None of these publications has been translated to any foreign language, which makes it impossible for foreign dog handlers to get any useful information about good practice in the Czech Republic.

The aim of this paper is to present an analysis of data from disaster searches in the Czech Republic in 2006–2017. The main research questions focus on the characteristics of the teams involved in the rescue work, ways of deployment and success/reliability of their work.

## Research methodology

The research primarily works with data of MI – DG FRS CR published on the website of<sup>1</sup> USAR CZ. These data were collected from forms “Record of deployment of cynological

teams”, which cynological teams have to fill in and submit to MI – DG FRS CR after their search.<sup>2</sup> The gained data were put into a spreadsheet. Since a lot of records did not include all the requested data, the author of this paper asked the following groups to check their records and fill in the missing information: a) eight selected dog handlers-rescuers actively involved in the reported searches, b) three persons employed at the MI - DG FRS CR in the given period. These experts added 4 searches that were missing on the website and a lot of missing partial information. Despite this effort, it turned out to be impossible to get all the data; with respect to the nature of the data, incomplete records were not excluded from the study.

The data were analysed using usual statistical methods. In consequence to a low frequency of some phenomena, these phenomena were studied using methods of qualitative research such as a case study. This means the research design is a mixed one.

## Results

The total number of joint deployments of dog rescue teams and fire rescue service (FRS) in disasters in the Czech Republic in the studied period (2006–2017) was 104. In the studied years, there were 2–18 disaster searches per year (see Fig. 1). The records include only those searches where the cynological teams actually arrived and were active in searching. Searches, where cynological teams were asked for cooperation but called off before their arrival at the site, are excluded from the overview.

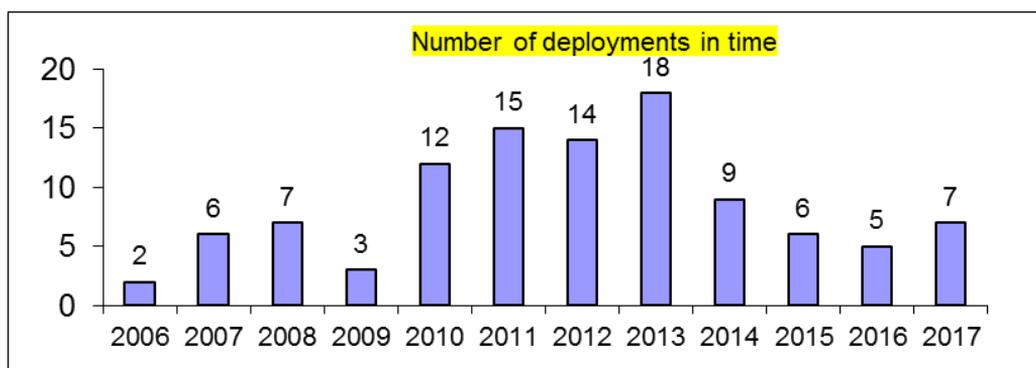


Figure 1

*Number of disaster searches in debris with participation of cynological teams in the Czech Republic in the studied period from 2006 to 2017*

Data show that most often two cynological teams are deployed in a rescue disaster search.<sup>3</sup> The average number of cynological teams per one search is 2.6 (the median 2.0). In two searches, it was impossible to find and state the number of deployed teams. The results thus refer to 102 searches.

Just one cynological team was called up in case of 11 searches in the studied period. Two cynological teams were involved in 47 searches. That means that in case of 58 searches (55.8 %) the minimum number of at least three cynological teams as recommended in *Methodology of disaster search using rescue dogs* ([22]) was not attained. In 2 out of 3 searches where cynological teams did not assess the inspected area correctly, there were only two cynological teams (in the last one three teams were present). The highest number of deployed

cynological teams was 9. That was the case when four workers were buried in debris when reconstructing a house in the city centre of Prague on the 2<sup>nd</sup> October 2009 (see Tab. 2).

*Table 2*  
*Overview of the number of cynological teams in disaster searches in the Czech Republic in 2006–2017*

Number of teams	1	2	3	4	5	6	7	8	9
Frequency	11	49	23	12	4	2	-	-	1

In case of 71 searches, it was possible to get information on the time when the teams were working at the disaster site. On average, cynological teams spent 157 minutes in debris (the median 78 minutes). The shortest reported period was 20 minutes, the longest 27 hours 25 minutes. It must be stated here that the search where cynological teams assessed incorrectly that there was no one buried in debris had the teams working on the site only for about 20 minutes.

The total number of findings with the help of cynological teams was 16 (on 12 searches). In all cases, remains of people who had died when the building had collapsed were found. No living person was detected in debris with the help of cynological teams in the studied period. These results do not include the findings made before arrival of cynological teams, either by fellow citizens or by firemen in the primary check of debris (this is the case of two searches). The highest number of searches with findings was in 2013 (three). In 2008, 2011, 2015 and 2017 no search finished with finding a person (see Tab. 3).

*Table 3*  
*Overview of disaster searches with findings with the presence of cynological teams in the Czech Republic in the years 2006–2017*

Number of rescues with living persons found												
2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
0	0	0	0	0	0	0	0	0	0	0	0	0
Number of searches where dead bodies were found												
2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
1	2	0	2	1	0	1	3	1	0	1	0	12

The overall reliability of cynological teams was higher than 97 %. In 101 cases (out of the 104 recorded), the cynological teams evaluated the situation correctly, i.e. they determined correctly whether there was or was not a human buried in debris.

In 7 cases, the dog handlers corrected the wrong initial assumptions. In all these cases, they were given information that there was a buried human or people at the site. The cynological teams detected the opposite. In one of the cases, the “presence of a buried person was confirmed by a bioradar”. Despite that, the dog handlers gave the correct negative report (i.e. they did not report a false presence of a buried person).

In 5 cases, one or more dogs marked presence of people (the records imply that the dogs marked worn-out clothes, frozen meat or other unspecified smells) although there was no buried person at the site. In 3 of these cases, the dog handlers came to the conclusion that these were false markings and did not report presence of a buried person. In 2 cases, the dog handlers reported to the commander of the intervention that there was a dead person at the site on the basis of their dog marking. In one case, they were not absolutely sure and asked for confirmation by a dog-specialist in search for cadaver (which was, however, not available).

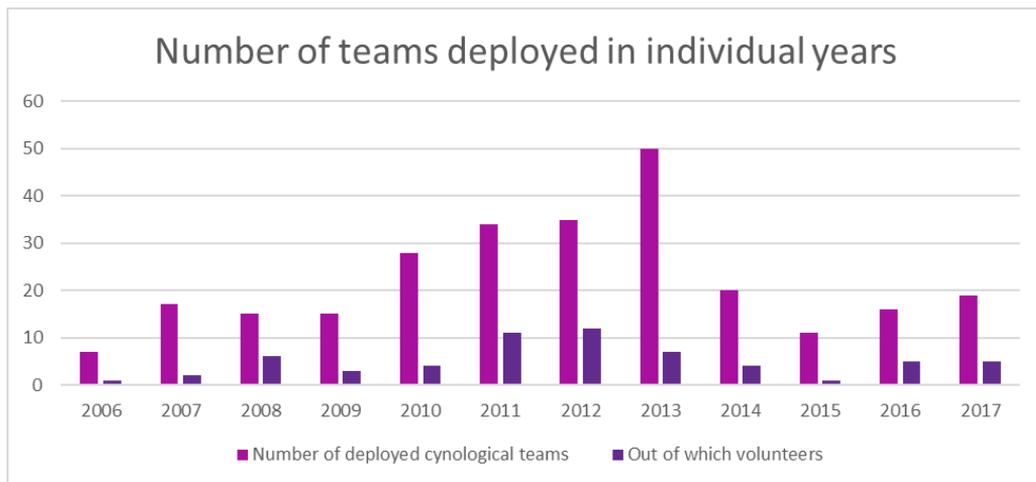
In 1 case, the cynological team gave wrong information about presence of no person buried in the debris. However, a few months later while the debris was being cleared away two dead bodies torn by explosion were found. This case was paid due attention and is described in detail in the case study section (tab 4).

*Table 4*  
*Case study "Gas explosion in the village Šenov"*

Case study "Gas explosion in the village Šenov"
Two cynological teams were called up on the 10 <sup>th</sup> January 2015 to help at the site of gas explosion and collapse of a house in Šenov by Nový Jičín. The dog handlers were informed by the officer in command of the intervention that "there were definitely no people at the site of the explosion". The commander got this information from the owner of the house, the Croatian citizen Goran Boban. Goran Boban was later accused of insurance fraud and in June 2018 he was convicted. <sup>4</sup> Two men of Croatian nationality had helped him prepare this insurance fraud. They were killed by the explosion and their bodies were torn and blown into pieces ([19], [20]). There were two cynological teams deployed in the search in Šenov (the recommended number of teams is three) and they did not spend much time searching the site of explosion (about 20 minutes). The debris environment is said to have been full of dust and the dogs found it difficult to breathe (oral testimony of one participant). Presence of buried bodies was ruled out not only by dog handlers but also by a slit camera. <sup>5</sup> Let us remark here that this is the only one of all the here reported cases when the officer in command informed dog handlers that no people were expected to be buried in debris although there were some.

The searches were undertaken both by professional rescue dog handlers (mostly) and by volunteers. Figure 2 shows the proportion of volunteers in the total number of deployed dog handlers-rescuers in the studied period. Volunteer dog handlers participated in disaster searches in each of the studied years. The majority of dog handlers, however, were professionals. In 50 searches, only professionals were deployed. On the other hand, in 14 searches there were only volunteers, out of which in 7 cases only one team was deployed (in one case with a finding) and in 7 searches two voluntary cynological teams. In 38 searches, there were both professionals and volunteers. In total, volunteers participated in 52 searches (i.e. 51%). The above discussed search where the remains of two buried bodies were left was conducted by two professionals. In the two searches were dogs marked erroneously that there were human bodies buried in debris, 5 dog handlers were deployed out of which 3 were volunteers (one of them was involved in both of these searches).

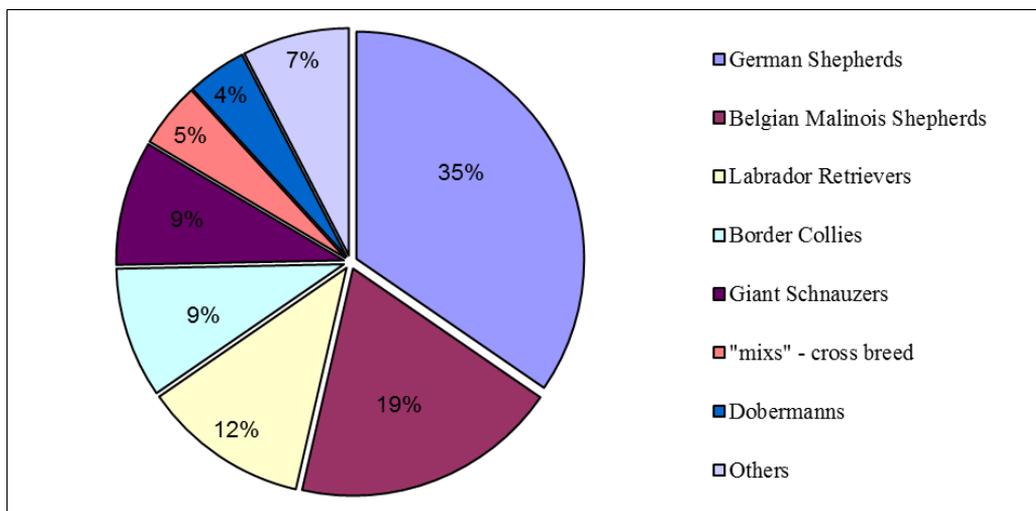
An important difference between voluntary and professional teams is the number of deployments. 5 professional dog handlers were involved in more than ten searches. The most frequently deployed professional dog handler was involved in 25 disaster searches. None of the voluntary teams was involved in ten or more searches in the given period. The most often deployed voluntary dog handler took part in nine searches.



*Figure 2*  
*The proportion of volunteers on the number of dog handlers in disaster searches in the Czech Republic in 2006–2017*

In the studied period, the proportion of male and female dog handlers was 7 : 3 (namely 177 : 74 cases).

In the studied period, dogs of 15 breeds and also dogs of indeterminate breed (crossbreeds) were used in disaster searches. The most common dog breeds used were the following five: German Shepherds, Belgian Malinois Shepherd, Labrador Retrievers, Border Collies and Giant Schnauzers. These five breeds together make  $\frac{3}{4}$  of breeds of dogs used in disaster searches in the Czech Republic in the years 2006–2011 (see Figure 3). It is much more usual to use male dogs (170 dogs) than female dogs (73 cases) in searches.



*Figure 3*  
*Representation of dog breeds in disaster searches in the Czech Republic in 2006–2017*

No dog handler was injured in disaster search in the studied period. Two reports state that a dog “saved life of its dog handler” by running away from debris, thus warning the dog handler of the forthcoming danger. Specifically, it was fall of the rest of the roofing and slide of kaolin.

Injury of a rescue dog was reported three times. In two cases they were lacerations (1.5 and 6 cm) on paws. In the third case, a partial burying of a dog by kaolin was reported; however, it turned out nothing had happened to the dog (that is why this case will not be treated as an injury). This means there were two light injuries of dogs reported in the studied period of eleven years.

## Discussion

**Number of disaster searches in debris** depends on the number of disasters in the Czech Republic in the given period and also on their type (in case of some disasters cynological teams are not useful). In the years 2006-2017, there were 104 reports on disaster searches in the Czech Republic where cynological teams were deployed. As stated above, the authors of this study tried to check and supplement data published on the website of MI – DG FRS CR. It must be admitted that there might have been a few more searches excluded from the website. We know for sure that there were not fewer searches with presence of cynological teams in the studied period.

The here presented study focuses only on the **findings** made with the help of cynological teams. Of course, more people were found in joint interventions of FRS CR and cynological teams, e.g. by witnesses of the event or during the primary inspection of the disaster site carried out by fire rescuers.

We are convinced that all the findings made are included in the records. There could not have been fewer and also without any doubt no living person was found (that would be in the media). The only known case in the Czech Republic when a living person was found in debris with the help of cynological team is more than 20 years old. It was in Brno on the 22<sup>nd</sup> October 1997 ([5], [14], [17]).

Due attention must be paid to the fact that **in all 16 recorded cases of findings they were findings of human remains**, in other words of bodies without any signs of life or of torn parts of bodies (which was the case when dog handlers evaluated the situation incorrectly and marked the debris as “empty” in the village Šenov, see tab. 4). In this context it is also important to say that the last search with finding of a living person by a Czech cynological team was in 2003 on an international mission (see Tab. 1); most findings on foreign missions are also remains of bodies ([29], p. 55).

In the context of these data, it is alarming that Czech rescue cynological teams are not trained to search for human cadaver. Current legislative frame in the Czech Republic allows training of search for human cadaver only in case of professional bodies of the Police of the Czech Republic, since handling of human remains is strictly defined by the law with no exception for training of rescue dogs.<sup>6</sup> In contrast, it is possible to train dog handlers from voluntary bodies for search for human cadaver in other countries (e.g. [24]).

There is a lack of dogs trained to search for human cadaver in the Czech Republic. Tereza Pálová in her bachelor thesis states that in 2003 only one dog from professional bodies was trained to search for human cadaver and in years 2004, 2005 and 2006 there were two such dogs ([23]); none of the two became a member of USAR deployment.

This opens space for further research and subsequent methodological and legislative measures.

**Reliability of cynological teams** is significant. Out of the 104 recorded cases, only one was an error when remains were left at the site of disaster (error rate below 1%). If we bear in mind that cynological teams found only human remains in debris, these are outstanding results. The success rate in search for living humans can be expected to be one hundred percent.

The overall reliability of cynological teams was at least 97.1 %. It must be said again that in 1 of the 2 cases when dog handlers erroneously marked presence of human remains in debris they asked for a dog-specialist in search for cadaver. It is thus questionable whether to classify this case as a case in which dog handlers made a mistake. Moreover, an error when dog handlers report suspicion on presence of human remains that are not at the site are less serious than if it were vice versa. Other detection tools are also not error free, e.g. the above mentioned bioradar or slit camera.

Still, it is important to pay attention to how reliability of cynological teams could be improved. The first measure to be taken is to follow the methodological recommendations of *Methodology of disaster search using rescue dogs* (2005). There should be at least three cynological teams at the site, as only then it is possible to maintain the recommended methodological procedures (overlapping and verification). Reliability can also be increased by having the cynological teams inspect the debris repeatedly, in other words to spend more time at the site. It takes long before smells and scents get through the mass of debris or soil, sometimes several hours. Thus there might be no smell of the buried people on the surface for hours.

Reliability seems to be threatened if the same teams are deployed in searches, i.e. teams that often train and work together. Such teams usually adopt the same undesirable habits, e.g. dogs mark a place already marked by another dog from the group regardless of whether there is some finding or not. If a place is marked by a majority of present dogs or by all of them, the situation is then evaluated incorrectly, which was the case e.g. in Mikulandská ulice in Prague on the 17<sup>th</sup> July 2018 ([13]).

It is very interesting that no dog handler was injured in the studied years 2006–2017. And this despite the fact they were working in unstable debris where secondary collapse was possible or actually happened, most often collapse of a wall or roofing. This can be accounted for by a thorough training of dog handlers and their preparation in the area of safety and elimination of risks. The training was organized by MI – DG FRS CR on instructional methodological employments in the studied years. It is also thanks to the dog handlers' ability to read their dog. In two cases, the dog handlers claim it was their dog that saved them from injury or death when it warned them of the possible danger. It gave them enough time to retreat to safety.

## **New knowledge**

The research study conducted by the authors of this paper contributes to broadening and precision of data about use of cynological teams in disaster search. The existing data were supplemented by information on the composition of cynological teams. Also information on 4 searches was added that had been missing in the published overviews.

The research study confirms a high level of reliability of detection using cynological teams. It also verifies a high level of preparedness of teams thanks to which dogs get injured in very few searches (less than 1%). There was no injury of a dog handler in the studied period.

The study shows that in most cases when cynological teams were deployed in searches, only one or two teams were called up, which is less than the minimum recommended in *Methodology of disaster search using rescue dogs* ([22]).

It is also important to realize that in all cases when a body was found, it was human remains. At the same time, current legislative does not allow to train dogs with this specialization. Looking for cadaver is not part of compulsory attestation of dog handlers.

The study also draws attention to the fact that currently there is no dog in the Czech Republic that would have experience from disaster searches (in the Czech Republic or abroad) where a living person would be found. The number of dog handlers with this experience is also minimal.

## Conclusion

The research confirms high reliability of work of cynological teams in disaster searching. There was only one error in the 104 studied cases when human remains were left on the site of the disaster (error rate below 1%). Moreover, that was in a highly specific case discussed in the paper in detail.

The analysis of the findings shows that despite the fact that the primary goal of searches is rescue of living people no living persons have been found by cynological teams in the past 20 years. That is why the author of this paper recommends changes in the training of attested cynological teams. Their training should include search for cadaver. Dog handlers should also be trained to work under pressure of being given misleading information. It is also very important to bear in mind that in majority of deployments there is no person in the terrain. Thus dogs should be trained to mark “empty terrain”, which is the practice in other countries ([6]).

The data confirm good preparedness both of professional and voluntary cynological teams. It can be presumed that this is partly thanks to the training of dog handlers given by MI – DG FRS CR in the studied years within the frame of instructional methodological employments. The result is both high reliability of results and also a minimum number of injured dogs (the ability gained by dog handlers and the attested dogs to move safely in debris).

The research study also documents changes that happened after creation of professional cynological teams in 1999. The current state when dog handlers from professional bodies are helped by dog handlers from voluntary organizations seems to be optimal. Volunteers bring enthusiasm and a variety of training methods, certain level of competitiveness and the possibility to compare the quality of training with dog handlers from professional bodies. Moreover, presence of volunteers is much cheaper ([27]).

The data gained in this research study should be further elaborated. The data should be continually supplemented. The aim should be to record and archive complete information about disaster searches. Dog handlers participating in these searches should be lead to submit well-written reports. It would also be of interest to discuss model cases of disaster searches in detail, as was done by Michaela Stejskalová in her diploma thesis, where she presents two case studies: “The collapse of the road bridge in Vilémov” and “Railway accident in Studénka” ([27], p. 64–72).

## Résumé

*In the studied period of 11 years, the total of 104 disaster searches were recorded. Cynological teams helped to detect 16 bodies (on 12 searches). No living person was detected.*

*Cynological teams included*

- a) *Dog handlers from professional bodies (majority) and from voluntary organizations (notable minority), men (about  $\frac{3}{4}$ ) and women,*

- b) *Dogs, majority of which were male (about ¾), various breeds, most common German Shepherd, Belgian Malinois Shepherd, Labrador Retriever, Border Collie and Giant Schnauzer.*

*Reliability of results of detection of humans in debris by cynological teams was very high (almost 100%). Since cynological teams in the studied period of time found only remains of human bodies and no living persons that they are trained to detect, the discovered reliability is really surprising. In 101, the cynological teams determined correctly having searched debris negative or positive presence of humans in the debris. It happened only once in the studied period that the cynological teams erroneously stated there were no people buried in debris; this case is discussed in detail. In 2 cases, cynological teams were not able to rule out presence of human remains. Despite this reliability, measures are recommended that would result in even higher reliability of cynological teams. Specifically:*

- a) *To deploy at least three cynological teams in each search (as recommended in Methodology of disaster search using rescue dogs),*
- b) *To deploy cynological teams from various bodies and organizations in searchers, i.e. such teams that do not often train together,*
- c) *To recommend to dog handlers to stay longer at the site and to search in debris repeatedly,*
- d) *To include training of search for human cadaver in preparation of attested rescue teams, at least using special training pills with putrescin and cadaverin (maintaining work safety regulations),*
- e) *To use training of marking "terrain as empty",*
- f) *To train to work under pressure of misleading information.*

*It turned out that training in work safety of attested cynological teams was exemplary as no dog handler was injured in the studied period and only two dogs were injured lightly (lacerations on paws).*

*Without any doubt use of cynological teams in disaster searches is meaningful.*

*The data are useful not only for dog handlers and instructors involved in their training and preparation but are important also for the whole Integrated Rescue System, safety of population and for insurance companies.*

## NOTES:

<sup>1</sup> See <http://www.usar.cz/webmagazine/kategorie.asp?idk=325>

<sup>2</sup> Available from <https://www.hzscr.cz/clanek/kynologie-v-integrovanem-zachranem-systemu-65558.aspx?q=Y2hudW09Mg%3d%3d>

<sup>3</sup> A cynological team is made up of a dog handler and a dog. In several searches, a dog handler participated with two attested dogs. In that case it was taken as two teams. A dog handler without a rescue dog is not included in the data as a team.

<sup>4</sup> <http://tn.nova.cz/clanek/pojistny-podvod-za-miliony-a-dva-mrtvi-strujce-si-odsedi-ctyri-roky.html>

<sup>5</sup> <https://www.pozary.cz/clanek/102912-v-senove-na-novojicinsku-zasahovali-hasici-u-vybuchu-v-suterenu-rozlehle-dvoupatrove-vily-do-trosek-domu-byli-nasazeni-psi/?fbclid=IwAR22Jh5rc3Ja5oqKcJonWRglDcrOxhOkULuUEg-lnrnKQBMeO2jhI7YK3UM>

<sup>6</sup> Specifically, by the Act on Funeral Services (No. 256/2001), the Act on Health Services (No. 372/2011) and the Act No. 89/2012 Coll. The handling of a removed part of a human body and its surrender to another party is regulated in Sections 111 and 112 of the Code of Civil Procedure. These provisions are based on the principles of protection of human integrity and the prohibition of trafficking in human beings and their parts.

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