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OBSAH

KEYNOTE PRÍSPEVKY

ANTON OSVALD

ÚBYTOK NA HMOTNOSTI AKO HODNOTIACE KRITÉRIUM VLASTNOSTÍ VZŤAHUJÚCICH SA K OHŇU 10

JURAJ SINAY, ZUZANA KOTIANOVÁ

NOVÉ TRENDY V BOZP V KONTEXTE STRATÉGIE PRIEMYSLE 4.0.....16

PETER ŠIMON, TIBOR DUBAJ, ZUZANA CIBULKOVÁ, ANNA VYKYDALOVÁ

TERMOANALYTICKÉ TECHNIKY A IZOKONVERZNÉ METÓDY PRI HODNOTENÍ POŽIARNEHO RIZIKA 26

VYŽIADANÉ PRÍSPEVKY

VLADIMÍR ADAMEC, BARBORA SCHÜLLEROVÁ· LIBOR KREJČÍ, KRISTÝNA HRABOVÁ

MODELOVÁNÍ ÚNIKU AMONIAKU A CHLÓRU V HUSTĚ OSÍDLENÝCH MĚSTSKÝCH OBLASTECH 36

PETR KUČERA, ADAM THOMITZEK, DANA CHUDOVÁ, BOHDAN FILIPI

PRAKTICKÉ POZNATKY ZE ZKOUŠEK URČENÝCH PRO VALIDACI MODELŮ HAŠENÍ SPRINKLEROVOU HLAVICÍ.....56

JOZEF SVETLÍK

PRENOS POŽIARU V STATICKEJ DOPRAVE Z VOZIDLA NA VOZIDLO 65

PÔVODNÉ VEDECKÉ PRÁCE

DALIBOR BALNER, KARLA BARČOVÁ

ODEBÍRÁNÍ TEPLA POMOCÍ VODNÍCH KAPEK 76

MARTIN BEDNÁR, TATIANA BUBENÍKOVÁ, FRANTIŠEK KAČÍK, IVETA ČABALOVÁ

VPLYV STARNUTIA IZOLAČNÝCH MATERIÁLOV NA BÁZE POLYSTYRÉNOV NA VZNIK TOXICKÝCH PRCHAVÝCH PRODUKTOV 88

VLADIMÍR BLAŽEK, MARIÁN SUJA

SKÚSENOSTI Z PRAKTICKEJ PRÍPRAVY ŠTUDENTOV ŠTUDIJNÉHO ZAMERANIA OCHRANA PRED POŽIARMI A ZÁCHRANNÉ SLUŽBY V SIMULAČNOM CENTRE 95

TATIANA BUBENÍKOVÁ, VERONIKA VEĽKOVÁ, MAROŠ ČEREVKA

ÚČINOK VYBRANÝCH SORPČNÝCH LÁTOK PRI ODSTRAŇOVANÍ ÚNIKU ROPNÝCH LÁTOK Z VODNEJ HLADINY 111

IVETA CONEVA

HORENIE A VLASTNOSTI HORĽAVÝCH LÁTOK.....117

JÁN DEKÁNEK

HISTORICKÉ PREDPISY O HORĽAVÝCH KVAPALINÁCH NA ÚZEMÍ SLOVENSKA 129

ROMANA ERDÉLYIOVÁ

TOXICKÉ LÁTKY AKO JEDEN Z FAKTOROV OHROZUJÚCICH ZDRAVIE HASIČOV 142

STANISLAVA GAŠPERCOVÁ, TOMÁŠ KOSTELANSKÝ

OCHRANA HISTORICKÝCH OBJEKTOV PRED POŽIARMI 150

JANA GORDANOVÁ, ANNA DANIHELOVÁ

INTEGROVANÝ ZÁCHRANNÝ SYSTÉM A ZÁCHRANÁRSKY PES.....160

MARIÁN HRUBIZNA, JÁN PODHORSKÝ, ĽUDMILA MACUROVÁ

ZNALECKÉ DOKAZOVANIE PRI VÝPOČTE NÁHRADY ŠKODY SPÔSOBENEJ POŽIAROM 170

ALICA HUDÁKOVÁ, MARTINA HUDÁKOVÁ, ŠTEFAN GALLA, JANA KRAJČOVIČOVÁ

POŽIARNOTECHNICKÉ VLASTNOSTI RÔZNYCH DRUHOV TAPIET 182

DANA CHUDOVÁ, ELIŠKA MAIXNEROVÁ, ADAM THOMICZEK, ALEŠ DUDÁČEK

PŘENOS TEPLA RADIACÍ NA SVRCHNÍ VRSTVU ZÁSAHOVÉHO ODĚVU 194

JURAJ JANCÍK, JAROSLAV FLACHBART, LINDA MAKOVICKÁ OSVALDOVÁ

ŠPECIFIKÁ BEZPEČNOSTI HORSKEJ TURISTIKY NA SLOVENSKU 204

LADISLAV JÁNOŠÍK, IVANA JÁNOŠIKOVÁ, JAKUB VACULÍK

STUDIE VYBRANÉHO FAKTORU CHARAKTERIZUJÍCÍHO BEZPEČNOU JÍZDU PRVOVÝJEZDOVÉHO VOZIDLA K ZÁSAHU 210

DANICA KAČÍKOVÁ, VERONIKA VEĽKOVÁ, TATIANA BUBENÍKOVÁ, ADRIANA EŠTOKOVÁ, BRANISLAV RAGAN

POROVNANIE PARAMETROV VYBRANÝCH PRÍRODNÝCH A SYNTETICKÝCH POLYMÉRNYCH MATERIÁLOV PO TERMICKOM ZAŤAŽENÍ V INERTNEJ ATMOSFÉRE 221

ZUZANA KAMENICKÁ, JAROSLAV SANDANUS

STANOVENIE RÝCHLOSTI A HĹBKY ZUHOĽNATENIA DREVENÝCH PRVKOV POMOCOU METÓD PODĽA EUROKÓDU 5,ČASŤ 2 231

ALEXANDRA KISS

INSPECTION OF DANGEROUS MATERIALS TRANSPORT IN HUNGARY 239

HANA KOBETIČOVÁ, MICHAELA KLAČANSKÁ, LENKA REŽNÁ

SVIEČKA AKO MOŽNÝ INICIÁTOR POŽIARU 247

LÁSZLO KOMJÁTHY

POŽIARNA OCHRANA HISTORICKÝCH BUDOVÁCH V MAĎARSKU 261

RADOVAN KOSTELNÍK, JURAJ OLBŘÍMEK

NOVÝ POHĽAD NA NÁVRH POŽIARNEHO VETRANIA BUDOVY 269

ELIŠKA KRISTLOVÁ, LENKA MALÉŘOVÁ, MAREK SMETANA, HANA ŠTVERKOVÁ, JANA WOJNAROVÁ

KOMPARACE STRATEGICKÝCH DOKUMENTŮ ZABÝVAJÍCÍ SE PROBLEMATIKOU RESILIENCE V KRIZOVÉM ŘÍZENÍ 276

STANISLAV LICHOROBIEC

EFEKTÍVNÍ NASAZENÍ KUMULATIVNÍCH NÁLOŽÍ JAKO VODNÍHO CHRLIČE PRO UHAŠENÍ OHNISKA INTENZIVNÍHO PLAMENE 286

DOROTA LIPTÁKOVÁ, EDINA JENČOVÁ, ZUZANA ŠUSTEROVÁ

PROTIPOŽIARNA OCHRANA NA LETISKU 297

ĽUDMILA MACUROVÁ, JÁN PODHORSKÝ, MARIÁN HRUBIZNA

VPLYV PODCENENIA PRAVIDIEL BEZPEČNOSTI A OCHRANY ZDRAVIA PRI PRÁCI NA VZNIK MIMORIADNEJ UDALOSTI .306

MILAN MARCINEK

VYBRANÉ ASPEKTY PREPRAVY NEBEZPEČNÝCH LÁTOK V KOTEXTE S NOVOU PRÁVNOU ÚPRAVOU O TRESTNEJ ZODPOVEDNOSTI PRÁVNICKÝCH OSÔB 317

IVETA MARKOVÁ, MAREK SUCHOŇ

HODNOTENIE VPLYVU VIBRÁCIÍ NA RUKY V DÔSLEDKU POUŽÍVANIA PNEUMATICKÉHO NÁRADIA 337

MIKULÁŠ MONOŠI, MICHAL BALLAY

TECHNOLÓGIA ZÁSAHOVEJ ČINNOSTI HASIČSKÝCH JEDNOTIEK PRI DOPRAVNÝCH NEHODÁCH NA ŽELEZNIČNOM PRIECESTÍ 350

MIKULÁŠ MONOŠI, NIKOLETA CSÁPAIOVÁ

RIEŠENIE MIMORIADNEJ UDALOSTI NA VODNEJ STAVBE GABČÍKOVO 357

POŽIARNA OCHRANA HISTORICKÝCH BUDOVÁCH V MAĎARSKU

FIREFIGHTING IN HERITAGE BUILDINGS IN HUNGARY

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Abstrakt

Podobne ako v iných bežných prípadoch by sa požiar v budovách kultúrneho dedičstva mal zamerať aj na dve hlavné úlohy: čo najskôr požiar uhasiť a čo najmenšie škody spôsobiť pri hasení požiarov. Pri ukladaní cenností je veľmi potrebná odbornosť odborníkov pracujúcich v danej budove. Navyše je potrebná aj rýchla doba odozvy hasičov, ale nie je to možné so vzdialenými požiarnymi zbraňami. Musia sa vytvoriť priaznivé podmienky pre čo najrýchlejšiu a najefektívnejšiu požiarnu intervenciu. Potenciálnym riešením by bola spolupráca medzi hasičskými zbormi cez hranice. Príspevok skúma skutočný prípad požiaru v budove kultúrneho dedičstva v Maďarsku.

Kľúčové slová: hasenie požiarov · plán požiarnej bezpečnosti · protipožiarna prevencia · zachránenie majetku

Abstract

Similarly, to other ordinary cases, firefighting in heritage buildings should also focus on two main tasks: to extinguish the fire as soon as possible and to cause as little damage as possible during firefighting. When saving the valuables, the expertise of professionals working at the given building is much needed. Moreover, rapid response time of firefighters is also required, but it is not feasible with distant fire brigades. Favourable conditions have to be created for the quickest and most effective fire intervention possible. A potential solution would be cooperation among fire brigades across the border. The paper examines an actual fire case in a heritage building in Hungary.

Keywords: fire prevention · firefighting · saving possessions · Fire Safety Plan

1. Introduction

Preventing and extinguishing fires in historic buildings needs special expertise and attention. What should be primarily included in the Hungarian legislation, which characteristics? All of these require the cooperation of professionals from the fields of fire prevention and firefighting along with other institutions involved.

The paper explores the special requirements which have to be taken into consideration in such fire incidents, extinguishments, rescue and drills. The author points out the differences between theory and practice through an actual fire case.

2. National regulations

Cultural values are unique and inimitable creations. Any damage to them necessitates a lengthy and costly restoration process, while their destruction causes an irreparable damage. Therefore, preventing and suppressing such fires require special expertise and interventions. The legislation currently in force mainly focuses on firefighting activities [1]. The Decree of the Minister of the Interior of Hungary No. 39/2011. (XI.15.) lays down the basic regulations of the fire fighting and technical rescue activities performed by fire brigades. However, it does not cover fire suppression in heritage buildings. As regards saving material values, life saving precedes it in every case and they are to be saved only if human lives are not at risk. In addition, a paragraph provides for Fire Safety plans for establishments carrying high-priority from the viewpoint of fire safety. They are to be prepared by the fire department in its area of responsibility [2]. Article 15 of the Regulations on Fire Fighting Tactics [3] related to the Decree of the MoI does not cover firefighting in heritage buildings either. Article 2 of the Regulations on Technical Rescue Operations [4] touches only lightly on this subject:

- is there any damage to the building based on the fire detection;
- reconnaissance has to address the extent of damage and the function of the building;
- saving material values is the last point to consider.

3. Intervention and rescue

Based on the above, it is clear that fire suppression is the primary purpose. However, in heritage buildings firefighting operations should pay particular attention to saving objects. When starting the intervention the main factors to consider are the location of the building, its special features, the size of its interior, its fire load, the size of the fire compartments and the risk of heat and smoke spread. [2]

Main considerations for the intervention units:

- fire water supply;

- installed fire safety equipment;
- escape routes;
- ventilation and smoke removal;
- the surroundings of the objects on fire;
- the surroundings of the building;
- available equipment and tools;
- travel time of the intervention unit.

Smoke alone is enough to cause irreparable damage to certain artworks, whereas others can withstand direct exposure to fire without being significantly damaged. Heavy heat and smoke conditions greatly affect rescue and firefighting operations as well, since it delays fire suppression, requires more personnel and equipment and may alter tactical plans. A further point to consider is whether the valuables can be moved and transported from the scene with resources available there. Moreover, what exposure to fire, smoke or heat the given valuable can tolerate. Depending on this characteristic, the objects can fall into various categories, such as sensitive to smoke and heat, limited tolerance to fire, tolerance to smoke.

In addition to fire, smoke and heat, the huge amount of water that is used for extinguishing is also a potential source of damage. As an example, water could be replaced by IFEX rear-mounted impulse fire extinguishers. Despite the fact it is a Hungarian invention, it is rarely used among fire fighters. It consists of a 12.5 litre water container, a 300 bar air cylinder and a pressure reducer. The purpose of the air cylinder is to keep the pressure of the water container below 6 bar and to supply the impulse extinguisher with air of 25 bar pressure. The air cylinder can also supply air to the breathing apparatus of a person performing the rescue. It can be used during the rescue in fire and smoke by spraying a corridor and it can even save human life. With the application of the impulse fire extinguisher the water usage could be greatly reduced which would be especially important in case of confined areas [5].

No general rule can be set up on saving valuables when preplanning the intervention, but we must not ignore their size, weight, density and location. It is a basic requirement that a low number of crew should be able to move the given object via the escape routes to a safe location within a short time.

If cultural values are endangered, an increased number of crew is needed which has to be considered when determining the level of alarm together with the different travel time of the various deployed units. The recommendations of the local specialists (curators, restorers) have to be taken into account when assessing the emergency and preplanning the response [2]. Involving the restorers at this stage is essential because as professionals they can predict and specify the impact of fire on the given valuables, thus providing information for the planning of the possibilities and methods of the intervention. The tactics can be specified, which has a decisive role in the allocation of the necessary resources. For the sake of effectiveness, alternative, unconventional methods of firefighting might have to be applied. Therefore, it is advisable to create a preliminary account of all the equipment that might

become necessary and the organisations that are ready to provide them in emergencies within a short time (e.g. civil protection, police, economic players, local governments, etc.).

4. Protection of valuables

Protection of fixed valuables: Fire suppression in the presence of cultural valuables should minimise damage to them as much as possible. Preferably, pulverized water or even impulse fire extinguishers should be used in the intervention with periodical application. To protect fixed valuables from heat, fire resistant sheets can be of service. In case of attic fires when domes or towers are on fire, drainage of water has to be ensured with the help of openings or special foils. Vaulted roofs bear the risk that water gathering at the vault poses a threat to the statics of the building and it might collapse.

Protection of portable valuables: With this type of objects, rescue seems a convenient solution. The question that arises is what should take priority: firefighting or rescue. In the case of valuables of cultural-historical importance, fires may lead to serious financial losses. Various fire models show that fire may spread incredibly fast without any effective and quick response [6][7]. As a result, rescue cannot be the first step. The priority is, thus, firefighting or at least preventing fire spread. As soon as the necessary number of crew is available, they have to start rescuing the objects without delay. Saving objects is not an ordinary activity for fire fighters, so it requires special training. The incident commander has to specify the following tasks:

- Rescue activities in areas directly exposed to fire, smoke and water;
- Rescue activities in areas indirectly exposed to fire, smoke and water;
- Rescue activities in collection and exhibition areas;
- Evacuating and sheltering valuables.

When preparing for the intervention, the necessary forces and resources have to be reckoned (e.g. packaging materials, tents, means of transport, foils). The rescue activities always pose a certain amount of risk to the artworks and they have to be protected from the main hazards. Therefore, the ways to secure the area surrounding the artwork have to be explored. Investigations show that the valuables can be successfully protected from the impacts of fire and smoke. Exploring fire prevention possibilities and identifying related potential problems can contribute to higher effectiveness. Protection against heat radiation is also possible in certain situations, but it requires special solutions (for instance fire resistant tarps, special fire protection equipment). Protection against direct heat radiation can only be achieved with architectural solutions.

5. Fire in the Basilica

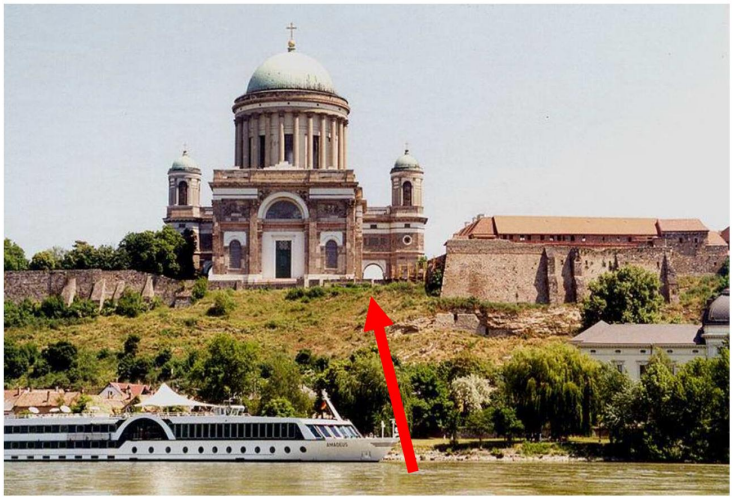
An example is a fire in Hungary, in the town of Esztergom. The Basilica is the symbol of the city (Figure 1). The fire lit up in the attic above the main entrance of the monument. It was discovered by bystanders when the roof was on fire as well. Because of the wooden roof structure which is more than a hundred years old, the fire was expected to spread rapidly. The level of alarm was ordered to be 4. This means that 8 water ladders, 5 turntable ladders and 5 special purpose ladders marched onsite with 52 fire fighters [2].



Obrázok 1. Bazilika v Esztergome, Maďarsko

Figure 1. Basilica in Esztergom, Hungary

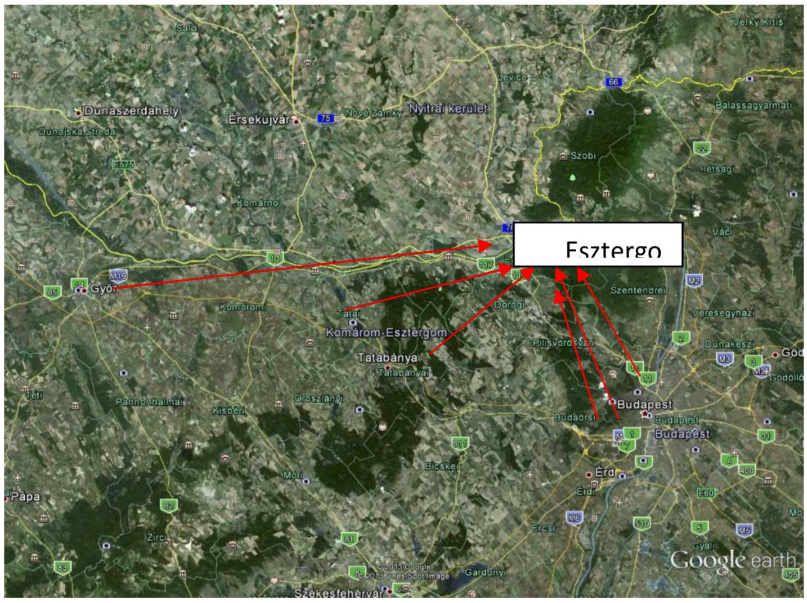
The huge amount of smoke, the closed doors, the large area on fire and the heat made the rescue even more complicated. The source of the fire was almost inaccessible. The rescue in a height of 30 metres probed the firefighters as well as the water ladders. The huge amount of water needed for the rescue could not be provided by the fire hydrants around the Basilica.



Obrázok 2. Prívod vody z Dunaja

Figure 2. Water supply from the Danube

Therefore the water was pumped from the river Danube next to the monument using a 400 metre main pipe with a height difference of 200 metres (Figure 2). This placed a heavy strain on the pumps. After two hours of intense rescue stairs leading to the attic was torn. 4 fire fighters were stuck in the attack due to that. They had to be rescued. The fire was extinguished with 6 beams. During the rescue firefighters had to strive to avoid any further damages. If the ceiling got soaked, the frescos were ruined as well. Moreover, the fire spread toward a priceless wooden framed organ. It was already mentioned that more personnel and equipment is required in case cultural artworks are endangered. However, it should be considered that the alarmed units arrive from different locations and requires different time to arrive to the location. So it happened in case of the fire at the Basilica. Fire inspection revealed that the fire was caused by short circuit of electricity [8]. Although the fire was extinguished quickly, financial damage is still significant. Due to the rapid response, inimitable values (e.g. the dome, the organ) suffered no damages.



Obrázok 3. Hasičské jednotky z rôznych lokalít

Figure 3. Fire fighter units from different localities

The 17 fire fighter units came from 6 different localities as visible on the attached figure (Figure 3). The half of them needed 50 minutes to arrive. As Esztergom is a town near the border, it would be advisable to ask forces from the other side of the border for help in similar cases [9]. They could join the rescue much earlier than interior forces. As a result of open borders it would be possible nowadays.

6. Conclusion

Because of the priceless artworks, this field poses a significant challenge for the fire fighters. Such responses call for unconventional approaches, where risks endangering cultural values have to be considered (e.g. sooting, water damage) together with the tactical solutions to avoid them. To prepare for these responses, a good cooperation with restorers, collection managers, architects and monument protection professionals is inevitable. They have to be informed about the circumstances of firefighting interventions and accordingly, the most reasonable decisions can be made. Various drills and exercises are good ways to test the feasibility of the plans. If possible, these drills should take place in life-like circumstances as this gives rise to solutions that could be useful in actual situations. The International Visegrad Fund could contribute to this purpose, as its aim is to facilitate transboundary connections between the Visegrad Group (V4) countries [9].

In cases similar to the fire that happened in the Basilica in Esztergom, it would be reasonable to alert fire brigades on the other side of the border – on a reciprocal basis – since they are much closer to the site [9]. It is not always possible or allowed to use traditional firefighting methods – that is, water. It is not always possible to apply the well-proven tactics.

Yet, the best decision has to be made in every case. Successful and preferably quick interventions need nothing else than a bit of luck, the right technique, well-trained firefighters, cooperation and plenty of exercises

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