Fire brigades

Description of the collaboration

Although the 2011 reform of the system of Disaster Management in Hungary was primarily concerned with professional firefighters, it also addressed the role that volunteer brigades (local associations) would play in the new system. Up until then, volunteer fire brigades had a cooperating and ancillary function, meaning that each incident required a professional unit in attendance, even if local voluntary capacities were sufficient to deal with the incident. The new policy offered a stronger relationship, with the introduction of written cooperation agreements and different support schemes. One of the main consequences was a substantial increase in the number of volunteer fire brigades in Hungary, something that was consolidated in 2014 with the introduction of a new administrative and operational status: the “responding volunteer brigades”.

According to informants of this case study, the previous requirement of professional presence at incidents was inefficient as many volunteer groups had the ability and resources to extinguish smaller fires and carry out rescue activities without additional assistance. (WP9-04). The introduction of “responding volunteer brigades” acknowledged the autonomous potential of this group. If there is a sufficient headcount, if volunteers are trained, there is a fire engine vehicle with certified equipment, and other administrative requirements are satisfied, then volunteer brigades can elevate their status from additional cooperating assets to first responders. In practical terms, this means that they can be alerted via instructions from the central operation room and dispatched to attend incidents.

The pattern of settlements in Hungary means that ensuring adequate spatial coverage is challenging, with many remote areas and scattered individual homesteads. There have also been severe budgetary limitations in the public sector. With any fire and emergency incidents, the response time is critical and harm to human life and tangible assets rises exponentially. The
The map below shows the large gap in the professional firefighting response times throughout the territory of Hungary and the ancillary role played by “responding volunteer brigades” to increase cover areas with ready-to-respond on duty capacities. For example, after alerting the nearest 24/7 on duty firefighter units (red, green and blue squares shows the location of the different professional fire houses, while black markings pinpoint the location of the responding volunteer brigades) it can take more than 25 minutes to reach areas marked in white. The existence of responding volunteer brigades are especially crucial in these white, brown and light green areas, where they fill a large gap in response times.

1. Figure: responding time of fire fighting units in case of full capacity and average road conditions (1 minute/1km road). Dark green: within 10 mins, mid-green: within 15 mins, light green: within 20 mins, brown: within 25 mins, white: more than 25 minutes. Source: Varga F. 2018

The new firefighting status brings more than just additional responsibilities. If the brigades satisfy the minimum requirement of 3000 hours on-duty time per annum, they receive monthly support for their operations (~500 EUR/month) covering utility and other costs. They are also given priority in calls for central proposals for training and in-kind support (equipment).
According to the information we received from our public data request, out of the 657 old volunteer brigade associations across the country, by November 2020, 58 groups had taken up the RFVB responsibility and opportunity. The remaining 599 volunteer fire brigades continued to provide additional response assets as cooperating volunteer fire brigades, as well as participating in other social and civic activities such as fire safety awareness raising, youth, sport, and heritage-preservation.

**Impact of ICT on collaboration**

ICT solutions play a vital role in the communication, data provision and response coordination of both volunteer and professional assets. During the interviews, we identified different layers of ICT tools in use, and respondents mentioned further development needs. Considering that these ICT solutions support the Standard Operating Procedures, they also have an apparent effect on Red Tape as well. The ICT examples below show how technology helps ensure prompt response to incidents, but also highlight the need for better solutions to interact with volunteers (mobile applications). These solutions are originally developed for the professional fire units, but made available for the management of the volunteer units within this newly established collaboration for a more efficient first response.

“PAJZS” is the central operation coordination system used by the National Directorate General for Disaster Management. It receives all calls in need of firefighting capacities. Calls can be received through the central emergency line (112 or 105), through other emergency agency (police, ambulance services), but it has a direct connection with automatized fire alarm systems as well. Whenever a call is received, the system sends out automatized SMS notifications and an email detailing the alert to the Volunteer Fire Brigade leaders in the corresponding area (both for responding and cooperating fire brigades).

### Table 1: Number of Responding Volunteer Fire Brigades (RVFB) and their on-duty service hours.

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>RVFB</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of RVFB</td>
<td>12</td>
<td>22</td>
<td>37</td>
<td>44</td>
<td>49</td>
<td>55</td>
<td>58</td>
</tr>
<tr>
<td>On duty (hrs)</td>
<td>28 500</td>
<td>69 125</td>
<td>135 125</td>
<td>167 000</td>
<td>179 750</td>
<td>202 000</td>
<td>211 375</td>
</tr>
</tbody>
</table>

*Source: NDGDM – public data request*
“EDR” is the nation-wide governmental TETRA radio system. It uses a specialized mobile network to provide secure and encrypted radio communication for law-enforcement and other agencies. It replaced the pre-existing URH radio network after 2010. Each responding volunteer brigade is equipped with EDR radios, provided by County Disaster Management Directorates. They report their readiness through radio calls at the beginning of each shift. They are alerted and directed to respond to incidents through EDR radio communication, and they use it for on-site activities as well. “EDR” provides a quick and secure way to communicate between the operations room and the units alerted and on-site. The downside of the system is the coverage – there are scattered areas across the country where EDR network coverage is low. An informant, WP9-05 stated that areas with hills have many black spots for radio coverage. Procedures of radio communication in Disaster Management are also very structured.

“Katasztrófavédelmi Adatszolgáltatási Program – KAP” – the ‘Disaster Management Data Provision Program’ is an online application supporting Disaster Management. It provides a centralized surface to report in Unit Readiness (unit is ready to respond/occupied with exercise / at a scene / not available, etc.) which is used at the operation room to decide which units to be dispatched to a certain incident. “KAP” is also the surface where incident commanders upload their after-action reports - in cases when their capacities are sufficient, unit leaders of volunteer brigades. Reports have a standardized structure, with obligatory information to be submitted after each alert.

Mobile applications: there are different self-developed mobile apps used by volunteer brigades, for example, SMS messages and emails received from “PAJZS” can be transformed into push notifications of registered volunteers. They can respond if they are available as an additional asset to deploy or not (this is for non-responding, only cooperating volunteer brigades). The need for the development of a central alert application was mentioned across the interviews. Mobile applications could assist volunteer brigades in shift-planning, in training and in day-to-day operations as well.

Many volunteer fire brigades use different free or open access solutions, some of them even have their own IT system developed by local professional in-kind supporters. For example, one informant (WP9-05) presented a state-of-art command and control system developed by a supporting IT company. The HR and alert functions are based on the business communication platform ‘Slack’. The brigade mapped the exact GPS coordinates of all hydrants and other water sources in their area and then the map is mainstreamed into their IT system. However, WP9-05 highlighted that their brigade is in a very fortunate situation, and local communities have very different capacities and opportunities across the country.

ICT Solutions play a crucial role in the collaboration with responding volunteer fire brigades and are at the heart of their work as first responders. They receive alerts through “Pajzs” and communicate with the central dispatch through “EDR”/TETRA radios. All after action reports are submitted through the data provision platform “KAP”. These tools integrate the responding volunteer fire brigades fully into the centralised operational system of the professional Disaster Management. With the provision of prompt and accurate flow of information, the ICT solutions
presented in this case study enabled responding volunteer fire brigades and professional units to establish a constant situational awareness on scene and a common operational picture in the dispatch room.

**Efficiency of the collaboration**

According to one informant (WP9-04), 10% of all alerts in the country are now attended by volunteer brigades, either individually or as cooperating asset; this means 8,000 responses by volunteer brigades each year. Since 2010, the number of volunteer brigades increased from 283 to 657 brigades as the result of the additional support and competences given to voluntary actors. Most of them are classified as “cooperating” fire brigades without individual response competences. Historically, Hungary had a developed volunteer fire brigade movement, but after the second World War, firefighting became a task for the national authorities. Communities across the country kept the memories and traditions, which was the base of the renewal of the movement. Expanding the volunteer fire brigade movement is an essential part of the development of the national fire safety.

According to those interviewed, the most important factor in assessing efficiency is the speed of response, as the following quotes demonstrate:

“When it comes to a fire or an accident, the time factor is crucial. If the start of the firefighting or rescue activities is delayed more than 15 minutes, the risk of further harm and damage increases exponentially with each minute passed.” (WP9-02).

“We can take the example of a village 20 km far from the nearest professional firehouse. Maximum two minutes is needed to the fire engine to leave the firehouse, 20 additional minutes for the average travel time. At this point, we’re at 22 minutes. If there is a volunteer brigade in the village, either cooperating or responding, they could be there sooner. Even for a cooperating brigade, which would mobilize in 15 minutes, they could be on the scene earlier than the professional unit, starting the necessary life-saving work.” (WP9-04)

Arguably, the most crucial contribution of the “responding volunteer brigades” is to free up professional brigades from having to respond to minor incidents. Prior to 2014, volunteer brigades were only “cooperating” actors, meaning that even if they were first to arrive and put
out the fire, a professional unit still had to attend, supervise and clear the alert. In many cases, where the volunteer brigade is well equipped and trained, and the incident is minor, this requirement created unnecessary costs and more importantly, diverted the unit from more pressing incidents. According to the data of NDGDM, the average response cost of a professional fire engine is 92 970 HUF ($255 EUR), which is comparable to the entire monthly costs of a responding volunteer brigade.

*Table 2: number of incident responses with VFB involvement. Source: NDGDM – public data request*

<table>
<thead>
<tr>
<th>Year</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>2019</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of incident response involving VFB assets</td>
<td>3 903</td>
<td>3 923</td>
<td>4 746</td>
<td>7 711</td>
<td>5 582</td>
<td>7 496</td>
</tr>
<tr>
<td>Number of individual responses without professional presence</td>
<td>631</td>
<td>1 141</td>
<td>1 518</td>
<td>2 575</td>
<td>1 835</td>
<td>2 815</td>
</tr>
<tr>
<td>Number of cooperating responses</td>
<td>3 272</td>
<td>2 782</td>
<td>3 228</td>
<td>5 136</td>
<td>3 747</td>
<td>4 681</td>
</tr>
</tbody>
</table>

In the new system, “responding volunteer brigades” are alerted individually to incidents with no immediate life-threatening danger. “If there is no indication in the 112 calls to immediate life-threatening conditions, and a responding brigade is on-duty in the area, we alert them to attend the site. From this point, we rely on them to mobilize, attend, assess and eliminate the situation. If they are on-site and report back with their assessment indicating a life-threatening danger, we alert additional units.” (WP9-04) Responding volunteer brigades are able to deal with minor incidents like smaller wildfires on the outskirts of settlements or small accidents with no or minor injuries, but they can also provide rapid reconnaissance over larger incidents and start the necessary life-saving tasks before the professional units arrive.

“Volunteering means giving up our time and knowledge to the community for free, but it does not mean that the volunteer needs to put money into his or her service.” (WP9-04) Based on this principle, Disaster Management provides in-kind and financial support for volunteer fire brigades described below. According to WP9-01, the support of volunteer brigades rose in the past years, but the contribution of local communities and local donors are still important.

Central financial support for volunteer fire brigades began in 2010 in the form of regular “call for proposals”. Every volunteer fire brigade associations can submit their needs for equipment and specialized training in the annual call. The funding is covered by the central national

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1 see L. Bérczy (2013): Realignment of the rescue services of fire prevention, in Bólyai Szemle XXII:3 p17-28
budget, which in 2010, allocated 150 million HUF (approx. 555,000 EUR on 2010 exchange rates) for the volunteer fire brigades. As the number and competences of the fire brigades extended, the allocation from the central budget rose. This year (2020) 700 million HUF (approx. 2,050,000 EUR) was dedicated in the central budget. This means that the average support rose from 530,000 HUF in 2010 to 1,044 M HUF in 2020.

Responding volunteer brigades receive monthly financial allocations, based on their on-call obligations. In category one, the brigade is obliged to serve 4500 hours on-duty readiness shifts through the year, while category two brigades are on-duty for 3000 hours annually. During their on-duty shifts, they must respond immediately (with a short mobilization time) after they receive an alert through radio. They also receive notifications of incidents when they are not on duty and can mobilize to incidents during this period as well. To mitigate the costs related to their on-duty service, responding brigades receive monthly financial support from NDGDM:

- category 1 (with 4500 hours) receives 170,000 HUF (~470 EUR)/month
- category 2 (with 3000 hours) receives 100,000 HUF (~275 EUR)/month.

The eligible costs for this support include utilities, fuel, maintenance of equipment, purchase of equipment and other direct costs, with the exception of personal expenses. As this is a governmental funding, financial costs must be reported in a structured and standardized report form. According to WP9-03, this monthly allowance is still low, only covers the minimum costs, but isn’t enough to pay for unforeseen costs like mechanical failures of the equipment.

There were 10,515 individual incident response done solely by responding volunteer fire brigades since the introduction of this new level of collaboration. Mobilizing volunteer units to these alerts, the new collaboration shortened response times and cut the costs of the possible alert of professional units. Using the average response cost of a professional fire engine cited earlier, without the new responding volunteer structure, 977,579,550 HUF (around 3 million EUR) would born as cost. As presented earlier in Table 1, the on-duty hours of responding volunteer brigades is constantly rising since 2014. During these hours, each RVFB have at least 5 trained volunteer fire fighters ready to respond. Volunteer units offered readiness for 992,875 hours since 2014. Multiplied with minimum 4 members in a unit, this equates of 3,971,500 person hours. In comparison, professional firefighters work in 24 hours shifts with 2 days of break; with an average of 10 shifts/months. The average gross salary for a professional
firefighter is 270,000 HUF (800 EUR). Following this calculation, responding volunteer firefighters substituted salaries of 16,548 person months, equating 4,467,937,500 HUF (around 13.2 million EUR). However, this calculation is indicative and approximately only, it shows the financial importance of the volunteer contribution of RVFBs.

Considering that some of the responding volunteer brigades are located in “white areas”, where professional response time is more than 25 minutes, the introduction of this collaboration certainly provided faster deployment of fire assets, however no detailed data available on this issue.

Red tape

The introduction of the category “responding volunteer brigades” certainly brought some development in Red Tape with opening systems and formalizing collaborations. The County Disaster Management Directorates (territorial bodies of the National Directorate General for Disaster Management) began written cooperation agreements with the local volunteer fire brigade associations in 2011-2012. These agreements are the basis of cooperation between the professional fire and rescue agency (Disaster Management’s local Professional Fire Command) and the volunteer associations. The agreement defines two-way responsibilities: the volunteer association takes part in fire and rescue activities led by the DM, while the DM provides training and other opportunities to maintain and develop the fire and rescue activities of the volunteer brigade. A signed cooperation agreement is a requirement to apply for the annual call for proposals for training and equipment support, published by NDGDM.

Rules of this collaboration is mostly set by NDGDM Written Command nr 2/2014 (I.17). It defines the requirements of “responding volunteer brigades” and standard procedures applied through their operations. To become a “responding volunteer brigade”, the volunteer fire brigade associations must fulfil certain criteria set by the written command:

- written cooperation agreement (as category „I“ volunteer brigade), meaning the association has a fire engine truck with blue lights and standardized equipment, a sufficient number of trained volunteers, etc.;

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2 https://alfahir.hu/2019/04/06/tuzoltok_katasztrofavedelem_fizetesek_egysegeses_tuzolto_szakszervezet_hivatasos_tuzoltok
• fulfil an annual evaluation system readiness exercise to assess the readiness and capabilities of the volunteer brigade,
• take up 3000 hours or 4500 hours on-duty service.

The document also contains the minimum list of the standardized equipment that the “responding volunteer brigade” needed to have and keep maintained.

NDGDM Written Command 2/2014 details different procedures and obligatory administrative actions, for example, “responding volunteer brigades” must organize internal training every quarter of a year, with mandatory attendance for the volunteers involved. A training log must be kept and updated regularly detailing the date, location, topic and timeframe of the training held, including the attendance sheets. According to informants WP9-04 and WP9-05, these obligations could be seen as administrative and bureaucratic burden with many details to bear in mind, but the Professional Fire Commands provide guidance and support for each volunteer brigades to mitigate these. In the scope of this support, a mentoring scheme has been introduced, involving a professional firefighter who knows the respective responsibility areas of the mentored brigade and support them in their different professional, administrative and training tasks.

The most crucial difference between the administrative burden of a regular “cooperating volunteer brigade” and a “responding volunteer brigade” is related to the procedures of alerting and after-action reports. Regular “cooperating” brigades receive notifications through SMS, and they can decide upon the available personnel and resources if they mobilize to the incident. “Responding” brigades got alerts through radio (EDR) if they are on-duty with a minimum of 4 volunteers, and they are obliged to respond.

While regular “cooperating” brigades maintain their logs of their actions, the “responding” brigades must request an account to the “Disaster Management Data Provision Programme” (Katasztrófavédelmi Adatszolgáltatási Program - KAP), a real-time data management software used by NDGDM operation control. The volunteer brigade must register their on-duty readiness at the beginning of their shift in KAP and document any changes in their readiness. “Responding” brigades must upload after-action reports for each of their alerts attended. If a professional unit was also on scene, the volunteer brigade needs to use the “unit report form”, while other forms required to be filled in cases when the volunteer brigade responded alone (other report forms Fire and Rescue; Forest and Vegetation fires). According to WP9-05, leader
of a RVFB, using KAP for after-action reports is a natural part of their work and is not a burden. The reporting system provides an easy to use survey-like surface to input all necessary details of a deployment, making reports more accurate and prompter than the old paper based reporting systems.

Reporting of the direct financial support is also needed. Quarterly expense reports should include a spreadsheet with all costs reported, copy of their proof of payments, invoices, written quotations. According to WP9-05 the burden of this reporting is minimal, and reporting is needed to provide “the general transparency into the use of taxpayers money”.

<table>
<thead>
<tr>
<th>Written cooperation agreement</th>
<th>“Cooperating” volunteer brigades</th>
<th>“Responding” volunteer brigades</th>
</tr>
</thead>
<tbody>
<tr>
<td>Response to an incident call</td>
<td>Voluntary, upon available assets</td>
<td>Obligatory during on-call duty period (min. 3000 hrs/year)</td>
</tr>
<tr>
<td>Way of notification/alert</td>
<td>Notification through SMS</td>
<td>Alert through radio (EDR)</td>
</tr>
<tr>
<td>Training</td>
<td>n/a</td>
<td>Obligatory training four times a year; training log maintained</td>
</tr>
<tr>
<td>Reporting</td>
<td>Keeps own action logs</td>
<td>Uploads after-action reports in the central ICT system</td>
</tr>
<tr>
<td>Mentoring</td>
<td>-</td>
<td>Professional firefighter as dedicated mentor.</td>
</tr>
</tbody>
</table>