

EXPERIENCE IN IMPLEMENTING CIVIL PROTECTION MEASURES IN ADVERSE WEATHER CONDITIONS

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Abstract: *The organized operation of the civil protection system occupies an increasingly important place in the sustainable development of society, and it is reflected in the timely response of the local community and strengthening of resistance to the risks that surround us. Acknowledging the fact of increasingly frequent weather extremes caused by climate change, it is necessary to analyze the possibilities of the local community's response to extraordinary events caused by adverse weather conditions. This professional paper is based on a real event, using information about the activities carried out, which were collected during and after the event from the heads of civil protection staff of two observed local self-government units. The observed local self-government units are the City of Obrovac and the Municipality of Gračac, which are territorially located in the northeastern part of Zadar County. The above-mentioned local governments share similar hydrometeorological phenomena as well as traffic characteristics of connections with other road routes that are important for the mutual connection of the northern and southern parts of the Republic of Croatia. The analysis of the event will show the reaction of the organized action of the civil protection system in two neighboring local communities during a simultaneous identical emergency event. In order to use the experiences from the lessons learned in the emergency events that are the subject of this paper, the final result will be a proposal for improving the preparatory preventive activities of legal entities responsible for cleaning and maintaining roads at the local level. Furthermore, in order to reduce the risk of disasters, the analysis of the mentioned event indicates the necessity of strengthening the human and material capacities of the local operational forces of the civil protection system, as well as the targeted definition of cooperation of all participants involved in ensuring the safety of citizens, travelers and tourists in adverse weather conditions.*

Keywords: civil protection measures, weather conditions, shelter, traffic.

1. INTRODUCTION

Territorially competent Civil Protection Services of the Civil Protection Directorate direct local and regional self-government units to prepare for adverse weather conditions through instructions on procedures,. These instructions provide guidelines for a coordinated response by the civil protection system in the case of emergency events caused by adverse weather conditions. In this context, adverse weather conditions should be viewed as a possible negative hydrometeorological phenomenon that includes:

- heavy snowfall

- ice on roads
- stormy weather with the consequences of road traffic disruptions
- suspension of ferry traffic
- rising river water levels
- torrential rains, etc.

In the case of a local community reaction by activating the civil protection system, the instruction emphasizes the necessity of respecting the principles of operational acting of the civil protection system (principle of subsidiarity, solidarity and continuity of action), which is prescribed by Law on the Civil Protection System ("Official Gazette" no. 82/15, 118/ 18, 31/20, 20/21, 114/22). Acting in emergency situations in accordance with the principle of subsidiarity primarily implies the engagement of all locally available resources, and in the case of insufficiency of their operational forces, it is possible to request assistance from a higher hierarchical level in accordance with the principle of solidarity. Based on the aforementioned Law, municipalities, cities and counties adopt planning documentation in the field of civil protection. The basic "input" document of each local self-government unit in the field of civil protection is the Major Disaster Risk Assessment, on the basis of which the Civil Protection Action Plan is adopted. The purpose of these planning documents is to respond to the identified risk based on an action plan for a specific emergency event. In order to better respond to challenges in adverse weather conditions, based on the Law on Mitigation and Elimination of the Consequences of Natural Disasters ("Official Gazette" No. 16/19), the civil protection headquarters of the municipality / city adopts an Operational Plan for Civil Protection Measures in Adverse Weather Conditions for a specific period, in cooperation with the competent services and its operational forces. In addition to the aforementioned planning documentation, local self-government units adopt specific acts that additionally direct the reactions of the operational forces of the civil protection system to a specific event. Examples of such implementing acts are: Road cleaning plan in the winter period, Implementation program of winter service on unclassified roads in the winter period

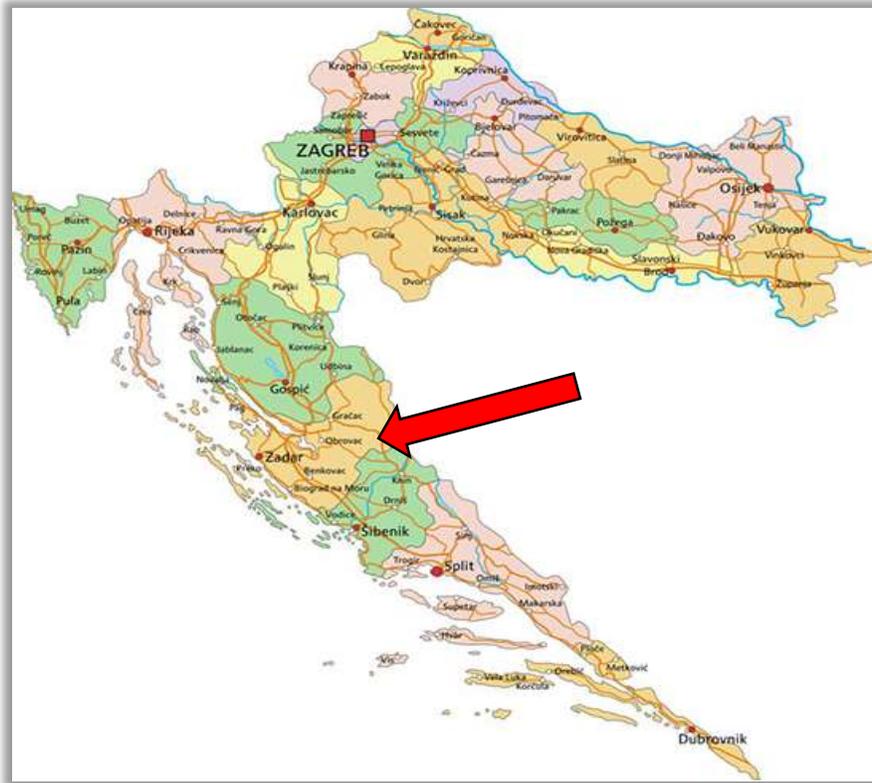
The aforementioned implementing acts define more precisely the necessary activities and the responsible parties for the implementation of individual activities. Due to the climatic - geographical specificity, human and material potential of each local government unit, special attention is required from the representative body of the local government unit when adopting planning documentation. The adoption of the aforementioned implementing acts requires providing financial resources, which are defined and reserved at the level of the local government unit and self-government through the annual plan for the development of the civil protection system with financial effects for a three-year period.

2. OBSERVED LOCAL GOVERNMENT UNITS

The town of Obrovac developed at the crossroads of traffic routes to Zadar, Šibenik and Knin, at the foot of the Velebit crossings of Mali Alan and Prezid, which lead from Lika to Dalmatia. Once an extremely important traffic route, it lost its significance with the construction of the Zagreb – Split motorway. However, in times of adverse weather conditions when traffic on a

section of the mentioned motorway is closed (Sv. Rok tunnel, Maslenica, Maslenica bridge), the traffic route through the town of Obrovac often remains the only alternative and link between the north and south of Croatia. For the reasons previously mentioned, in such situations the town of Obrovac becomes either a traffic route through which traffic flows or a temporary refuge for passengers who cannot continue their journey. The implementing acts mentioned in the introduction have the task of preparing the local community as best as possible for the necessary activities of human and infrastructure potentials. The Civil Protection Headquarters of the City of Obrovac, in cooperation with the competent services and its operational forces, adopted the Operational Plan for Civil Protection Measures in Adverse Weather Conditions for 2022/2023 on September 28, 2022. CLASS: 240-01/22-01/2; REGISTER NUMBER 2198-23-29-22-3. This plan lists the names of persons who are representatives of individual services and legal entities with contact information. Potentially endangered road routes and the person or legal entity responsible for the passability of traffic routes are listed. The same plan determines the locations for individual settlements, as well as accommodation capacities and persons responsible for taking care of vulnerable people in adverse weather conditions. On December 29, 2022, the City Council of the City of Obrovac adopted the Annual Plan for the Development of the Civil Protection System of the City of Obrovac for 2023 with financial effects for the period 2023-2025, CLASS: 240-01/22-01/25; REGISTER NUMBER: 2198-23-02-22-1. This plan lists the financial resources available for the implementation of individual activities of the civil protection system.

The Municipality of Gračac is the largest municipality in Croatia in terms of area. It developed at the intersection of traffic routes from Gospić to Knin and Krbava to Dalmatia. Gračac is separated from Dalmatia by the Velebit mountain, over which the Gračac-Obrovac road passes through the Prezid pass. As in the previous case, it lost its traffic importance with the construction of the Zagreb - Split motorway. However, in the already mentioned situations of adverse weather conditions and the closure of the Sv. Rok, Maslenica, Maslenica Bridge motorway section, traffic through Gračac becomes the only possible route to the south of the country via Knin. In accordance with the previously mentioned Planning and Implementation Documents, the Municipality of Gračac adopted on 7 October 2022 an Operational Action Plan in the case of extraordinary events caused by adverse weather conditions in the winter period 2022/2023, CLASS: 240-01/22-01/6; REGISTER NUMBER: 2198/31-01/22-1. This plan defines an area of 1100 km² with 38 settlements, operational forces and legal entities of interest for the civil protection system. Potentially endangered traffic routes are defined, as well as accommodation capacities for temporary care of people who cannot continue their journey due to adverse weather conditions. In Picture 1- a map of the Republic of Croatia, one can see the spatial and traffic interconnection of these two observed local government units. The city of Obrovac, with its 12 settlements and a small number of inhabitants who are predominantly elderly, requires a specific approach in planning and implementing the Operational Plan for Civil Protection Measures, while the Municipality of Gračac must adapt to its large spatial distribution with large distances between settlements.



Picture 1. Obrovac and Gračac on the map of the Republic of Croatia

3. ADVERSE WEATHER CONDITIONS - SNOW AND STORMY WINDS

On Sunday, February 26, 2023 heavy snow and strong storm winds caused the interruption of traffic for all road vehicles on the A1 motorway section Zagreb - Split - Ploče between the Sv. Rok - Posedarje junctions. Alternative routes for continuing travel were via the road routes passing through Gračac and Obrovac. After a very short period of time, snow and strong winds made road traffic impossible even through the aforementioned alternative routes. Pictures 2 and 3 show the condition on the roads and the amount of snow. Traffic routes DC1 Vaganac – Korenica-Udbina-Gračac-Knin, state road DC 27 Gračac – Obrovac, state road DC50 Gračac – Sv.Rok-Gospić, state road DC54 Maslenica – Zaton Obrovacki, state road DC522 Udbina junction – Gornja Ploča junction, as well as Pag Bridge were also interrupted. Many passengers trapped in vehicles requested assistance in the form of short-term evacuation and information on further action via the Emergency number 112.



Picture 2. Stopped traffic due to snow drifts
Source: Headquarters of Civil Protection Gračac

In a very short period of time, the wind, which in moments reached a speed of over 150 km/h, caused a complete interruption of traffic on all the mentioned road sections



Picture 3. Clearing snow drifts from traffic routes
Source: Headquarters of Civil Protection Gračac

4. LOCAL COMMUNITY REACTION – RECEPTION CENTERS

Zadar County Center 112 informed the head of the civil protection headquarters in Gračac and the head of the civil protection headquarters in Obrovac, about the numerous calls from passengers who found themselves on those traffic routes due to a possible temporary evacuation from the road. The necessity of activating the local civil protection headquarters and implementing all activities adopted by the Civil Protection Measures Plan in adverse weather conditions was determined. The process of collecting information from the sites, informing local headquarters and the local community's reaction is shown in Diagram 1.

The reaction of the local community



Diagram 1: The reaction of the local community

Through coordinated activities, the civil protection headquarters managed to prepare three shelters in three heated locations in Gračac and one location in Obrovac in a very short period of time as a reception center for travelers who could not continue their journey. Reception centers have been opened in Gračac in the school hall of Nikola Tesla Elementary School Gračac, High School Gračac and the premises of the cultural information center "KIC Napredak". All facilities have a heated space, food, water, hot drinks, blankets, sleeping bags and sanitary facilities for personal hygiene. Over 300 people were cared for in the Gračac area and about 100 people in the Obrovac area. Pictures 4 shows the situation in one reception center "KIC Napredak" where the most users are housed.



Picture 4. "KIC Napredak" reception center Gračac
 Source: Headquarters of Civil Protection Gračac

Heated space, food, water, hot drinks, blankets, sleeping bags and sanitary facilities for personal hygiene were provided. Over 300 people were cared for in Gračac area and around 100 people in Obrovac area. During the temporary shelter of travelers, local civil protection headquarters provided and distributed certain groceries and products, especially hot beverages, water, food and milk. Due to the uncertainty of the weather conditions duration, everything was done in parallel to provide additional logistical equipment such as sleeping mattresses, blankets and sleeping bags. In Diagram 2, we see the products and proportions of the logistical assistance provided.

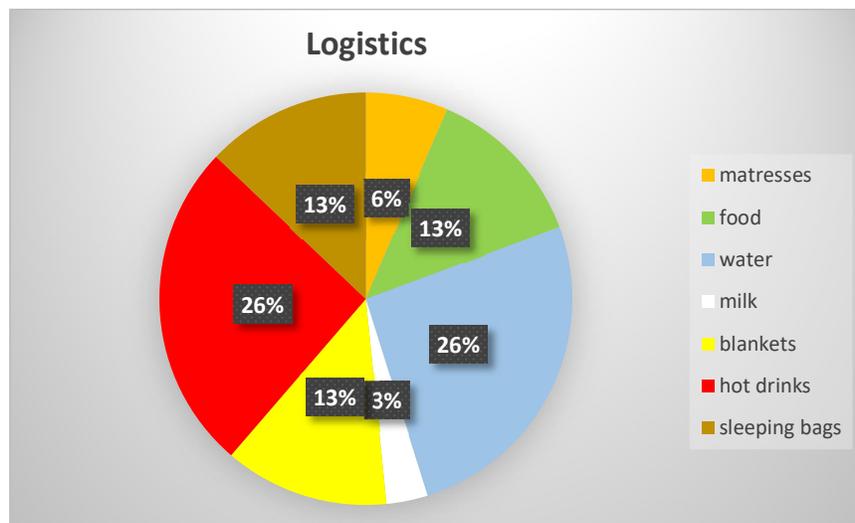


Diagram 2. Logistics products

On this occasion, the civil protection systems of the City of Obrovac and the Municipality of Gračac implemented several important basic civil protection measures. All activities that were implemented are the part of the introductory planning documents. Diagram 3. graphically shows the implemented civil protection measures: information and warning, rescue, evacuation, care, providing first aid.

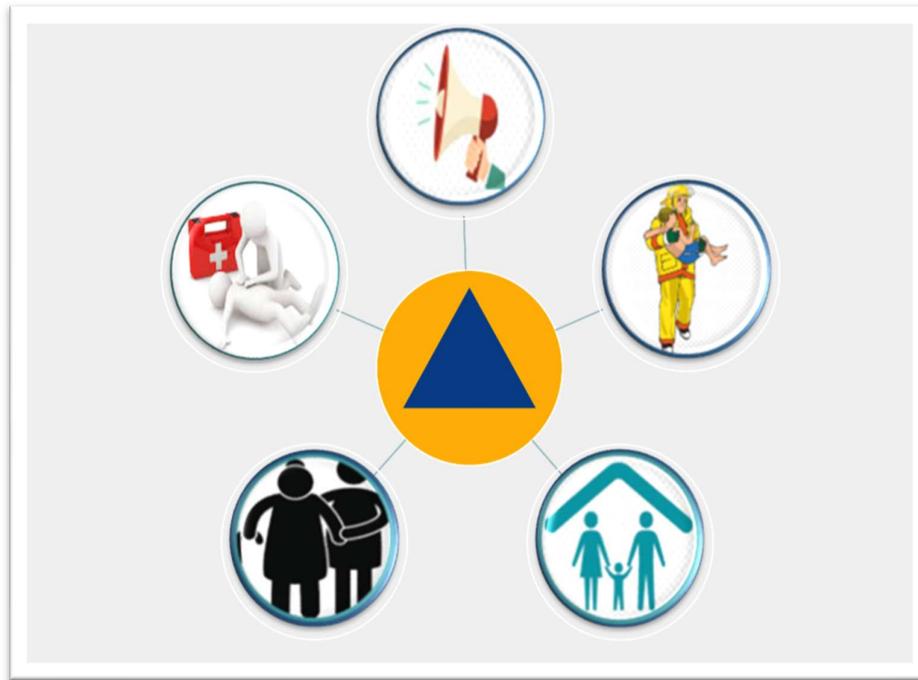


Diagram 3.: Civil protection measures implemented

The following were engaged in the implementation of civil protection measures, as well as in other activities that were necessary for this event:

1. Headquarters of civil protection Gračac
2. Red Cross Gračac
3. HGSS / Croatian Mountain Rescue Service
4. MUP Police Station Gračac
5. MUP Civil Protection Directorate
6. DVD Gračac / Volunteer Fire Department
7. Legal entities important for the civil protection system
8. Commissioners of civil protection
9. Volunteers, local people ...

5. CONCLUSION

In these situations, we can see a large organizational burden on local communities. The Municipality of Gračac and the City of Obrovac are not sufficiently capacitated with manpower or technology, because in such situations the amount of vehicle and passenger traffic increases several times compared to the local population. Help from neighboring municipalities/cities is not realistic and should not be expected because the roads are closed so they can only count on their own human and infrastructural capabilities. Planning documents that are adopted at the level of local communities and which result from the legal obligations mentioned in the introduction, try to ensure a sufficient number of operational forces for tasks that are within the scope of the size and quantity of the local community. Such challenges represent an unrealistic relationship between needs and opportunities for local self-government units that have a small number of elderly residents on a large area of the local community, It is not realistic to expect the fulfillment of all needs with the growing needs in a short period of time,. A great help in such situations is the volunteer strength of the locals and the human empathy to help in times of need. In order to avoid such situations and reduce the burden on local communities that have become the only safe zone due to the weather, it is necessary to strengthen preventive activities and disperse the ways of solving traffic collapse.

These are some suggestions for improving the response to the challenges caused by weather:

- Educational and promotional campaigns for drivers on the use of winter equipment
- Increased control and timely exclusion from traffic of vehicles without winter equipment
- Timely communication between representatives of Croatian Motorways, Croatian Roads, State Roads, County and local roads due to the closure of individual sections.
- Dispersing traffic load in adverse weather conditions on multiple exit routes from the A1 Zagreb – Split motorway
- Financial assistance to local communities in ensuring the infrastructure and logistical needs for temporary shelter due to adverse weather conditions

6. LITERATURE

Annual plan for the development of the civil protection system of the City of Obrovac for 2023 with financial effects for the period 2023-2025., CLASS:240-01/22-01/25; REGISTER NUMBER: 2198-23-02-22-1.

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01/22- 1. - Gračac Municipality