



FIRE BRIGADE SERVICES AND REPORTS IN THE REPUBLIC OF CROATIA THROUGH THE CASE STUDY OF FIRE OCCURED AT THE BASEMENT OF THE WAREHOUSE

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PRESENTATION OBJECTIVE



- Organisation of the fire fighting brigades in Croatia
- Statistical data of the fires occurred in the recent years in Croatia
- Case study of fire occurred at the basement of the warehouse, Zagreb
- Conclusions

The fire fighting brigades in Croatia - history

- The first volunteer fire brigade was established in Varaždin in 1864 and is the pillar of the Croatian Fire Fighting Association which was founded in 1874.
- Zagreb got its first fire department as far back as the second half of the 19th century.
- There were about 100 voluntary firefighters then, and the Department, founded in 1869, had been fulfilling the responsible service of fire protection in Zagreb for 40 years.

Transportable steam fire-hose placed on a drawn waggon, manufactured in 1889 in Vienna.



Organisation of fire fighting brigades in Croatia - nowadays

- Fire Brigade in the Republic of Croatia are established in accordance to Law on Fire fighting (NN 106/1999, 117/2001) and Law on Protection and Rescue (NN 174/2004, 79/2007, 38/2009, 127/2010).
- In accordance to Law on Fire fighting , brigades are divided to:
 - **Public fire fighting brigade** for area of municipalities or towns, professional,
 - **Public fire fighting brigade** for area of municipalities or towns – volunteers,
 - Volunteer fire brigade society,
 - Professional fire brigades in industry,
 - Volunteer fire brigade in industry,
 - Special intervention unit.

Fire fighting brigades in Croatia



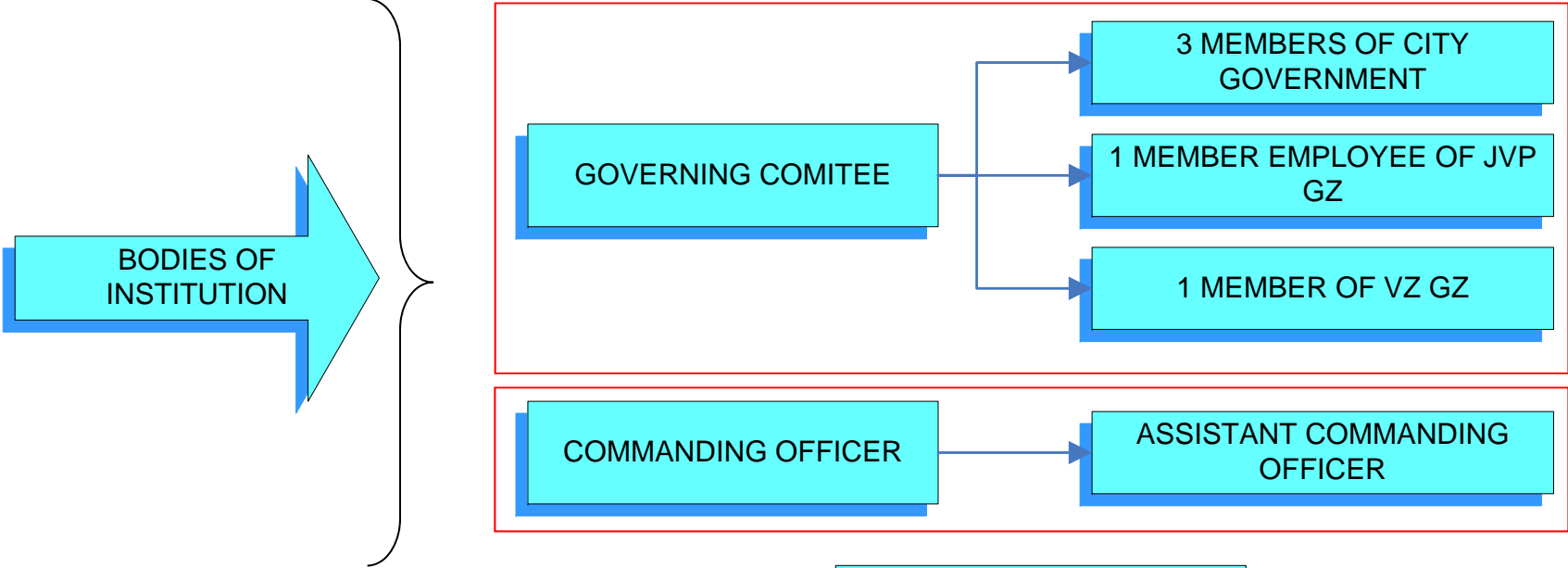
- Republic of Croatia:
 - 65 professional public (state) fire fighting brigades
 - 2426 fire fighters employed (in accordance to data from 2011).

Fire fighting brigades in Croatia



- More than 60,000 fire fighters operate in those units:
 - 58,800 volunteer fire fighters
 - 2426 career fire fire fighters in the public (state) fire brigades
 - 1050 fire fighters in industrial fire brigades
- The local government is in charge of fire protection and fire extinguishing in Croatia, and gets support from regional and national government offices as regards the supply of equipment and large-scope

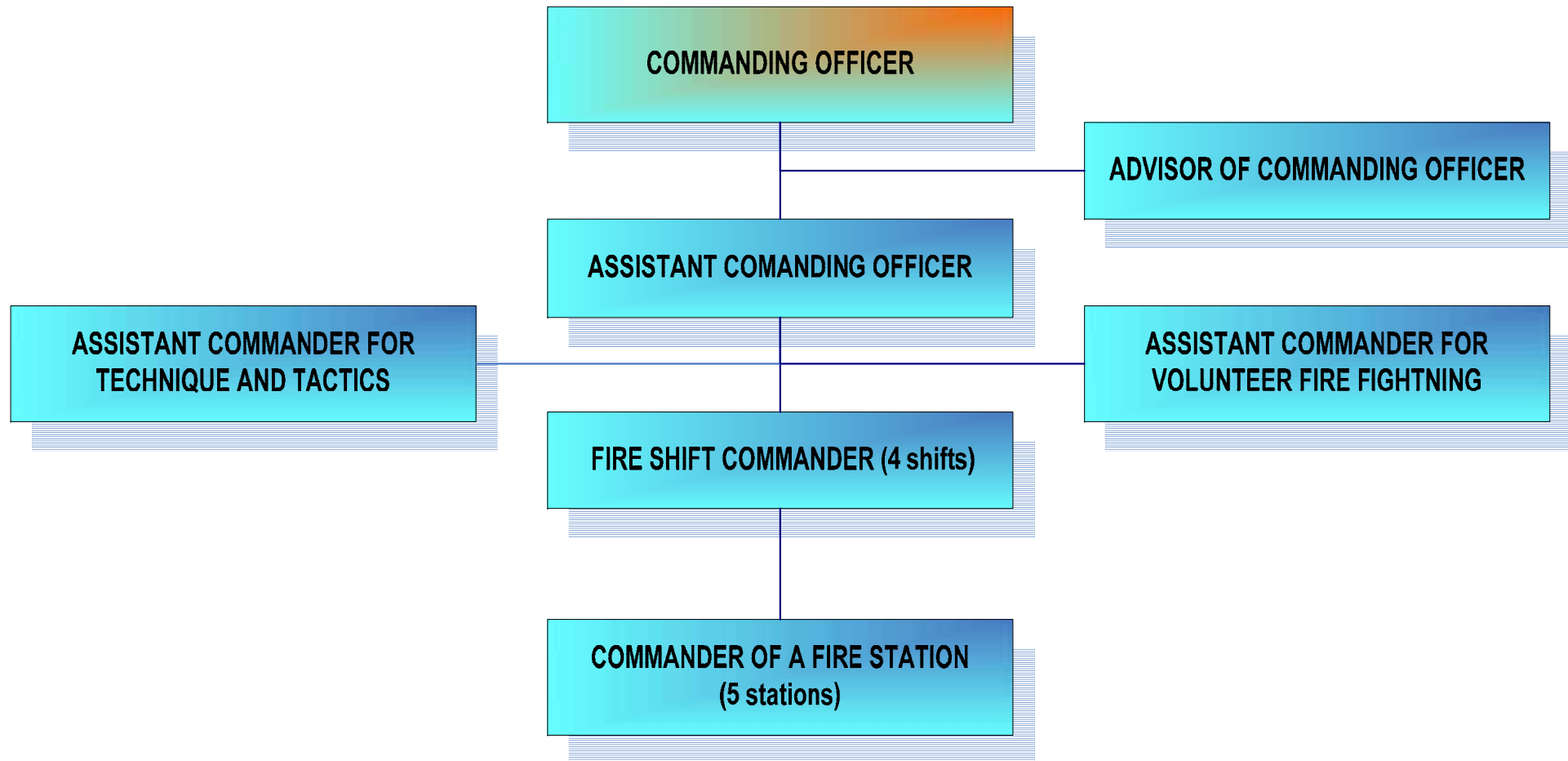
Public fire brigade Zagreb



JVP GZ – PUBLIC FIRE BRIGADE ZAGREB
 VZ GZ – FIRE SERVICE ZAGREB

- WORKERS' COUNCIL
- 2 SYNDICATES
- 2 ASSOCIATIONS

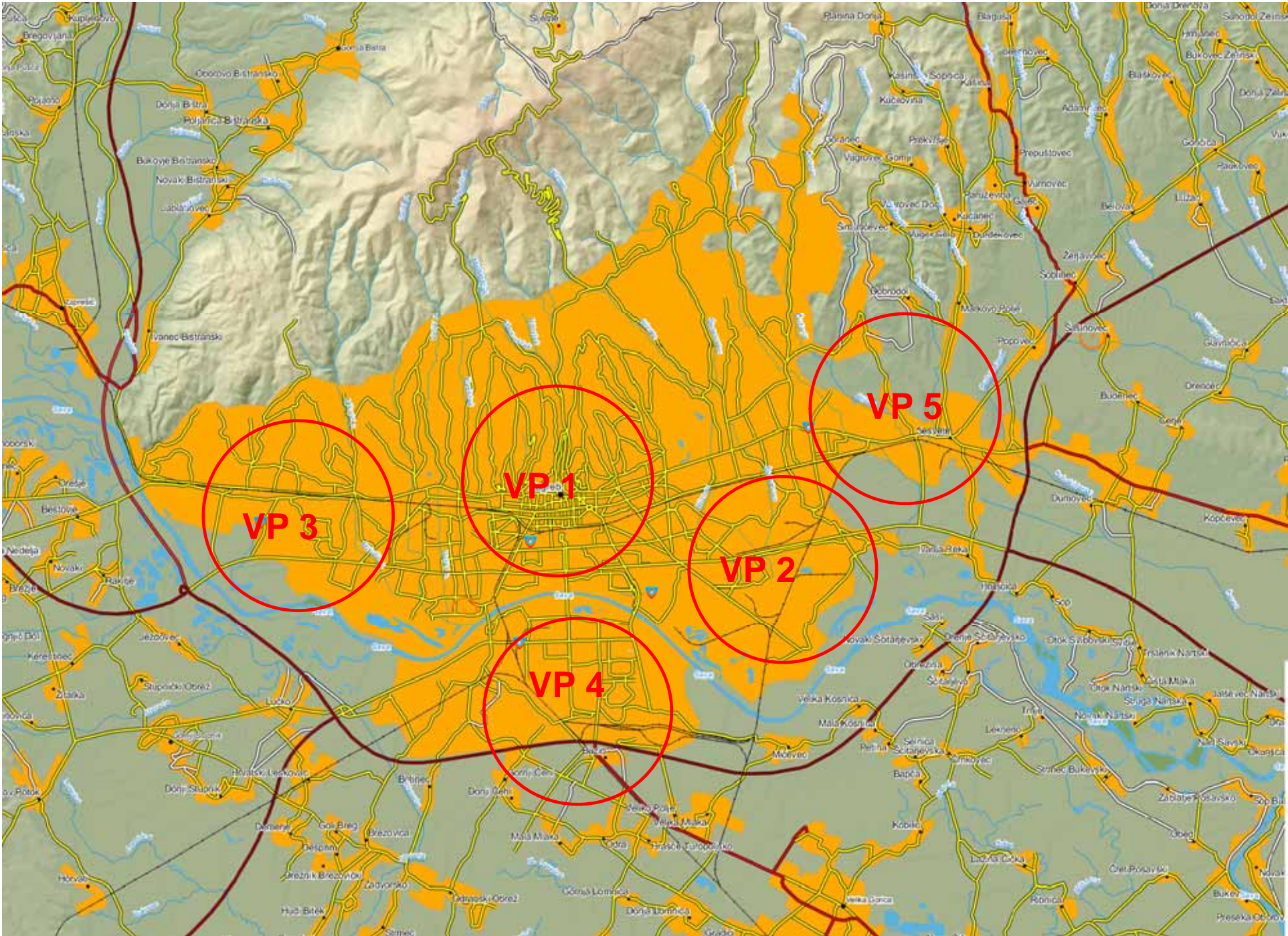
Commanding officer



Zagreb fire brigades



- Today, Zagreb has five fire stations
 - VP Centar,
 - VP Žitnjak,
 - VP Jankomir,
 - VP New Zagreb and
 - VP Dubrava
- placed in a way that the time from announcement to arrival is shorten as much as possible.



Zagreb fire brigades



Fire Station 1- Centar

was opened on October 1st, 1910.



Fire station 2-Zitnjak

was placed in service on 08. May 1973.

It is located in east part of Zagreb. This part of Zagreb is mainly industrial district with chemical plants and other industrial areas.

Zagreb fire brigades



Fire station 3- Jankomir

was built and opened in 1979.

**It is located in
west part of the
town**



Fire station 4-Novi Zagreb

was placed in service on 26. July 1983.



**It is located in south part of Zagreb, right across
the west entrance of Zagreb trade fair and in the
heart of the new urban part of town.**

Zagreb fire brigades



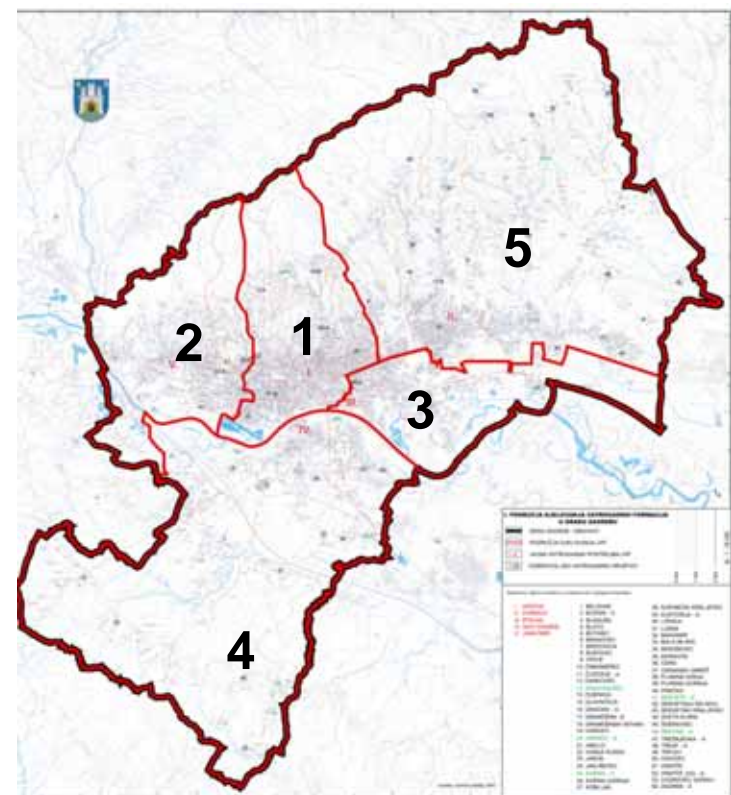
Fire station 5-Dubrava

is the youngest fire station in Zagreb, it was built and opened in 1986.

It is located in east part of the town and it covers mainly residential area with part of Sljeme mountain.

1-5 Profesional fire brigade

54 Volunteer fire brigade





Training the fire fighters



Special firefighter intervention unit



77 members of Zagreb fire department are also members of Republic founded special firefighter intervention unit. They are specially trained for fighting forest fires and others catastrophic events in Croatia and in neighboring countries.

Public Education



Every year
Open days

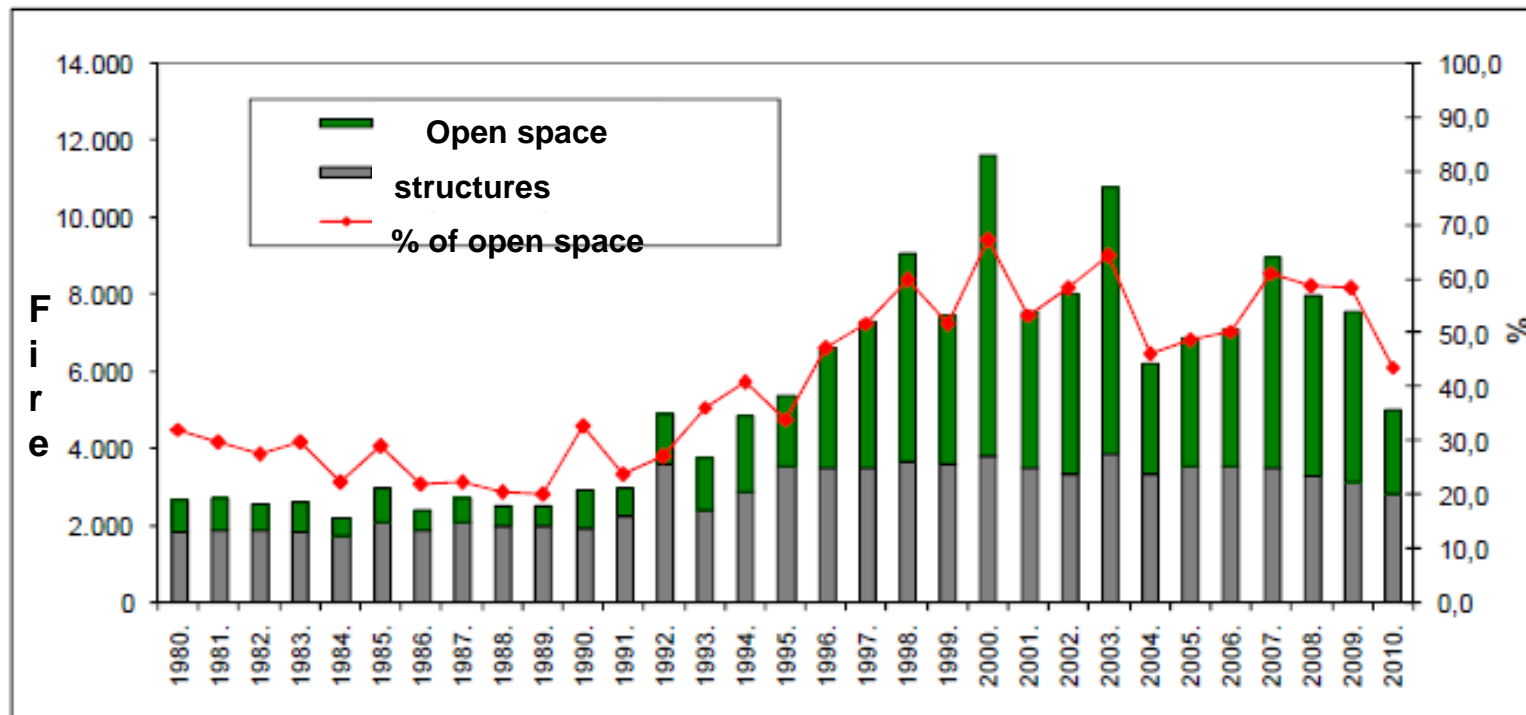


Fire brigade interventions



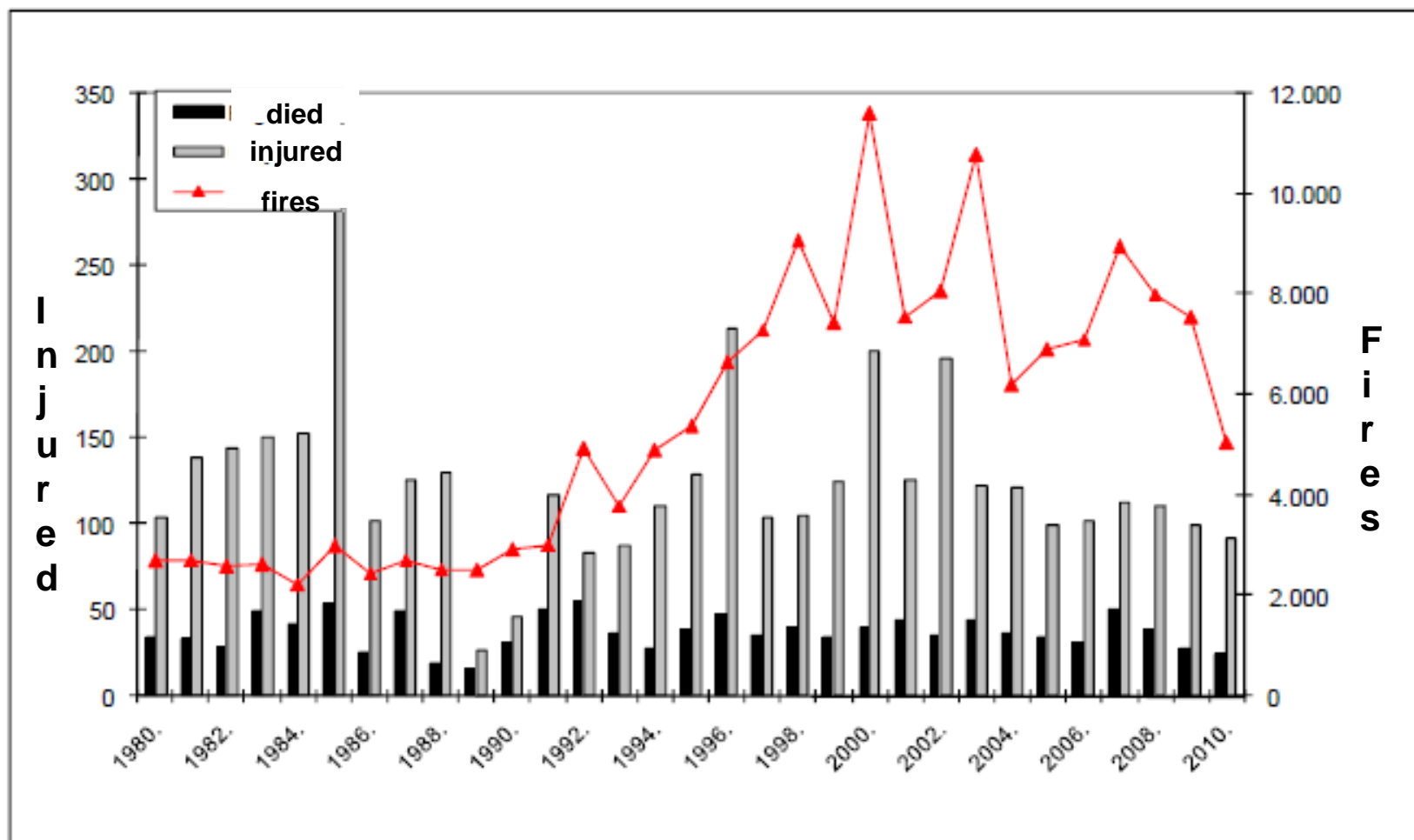
- The Croatian fire service carries out some **14.000 interventions every year**, among them:
 - 8.000 are fire fighting interventions,
 - 6.000 are technical operations and
 - some 100 of them are interventions due to hazardous materials.

Statistical data of the fires occurred in the recent years in Croatia



Source: Bilten o požarima 2010, Ministarstvo unutarnjih poslova RH

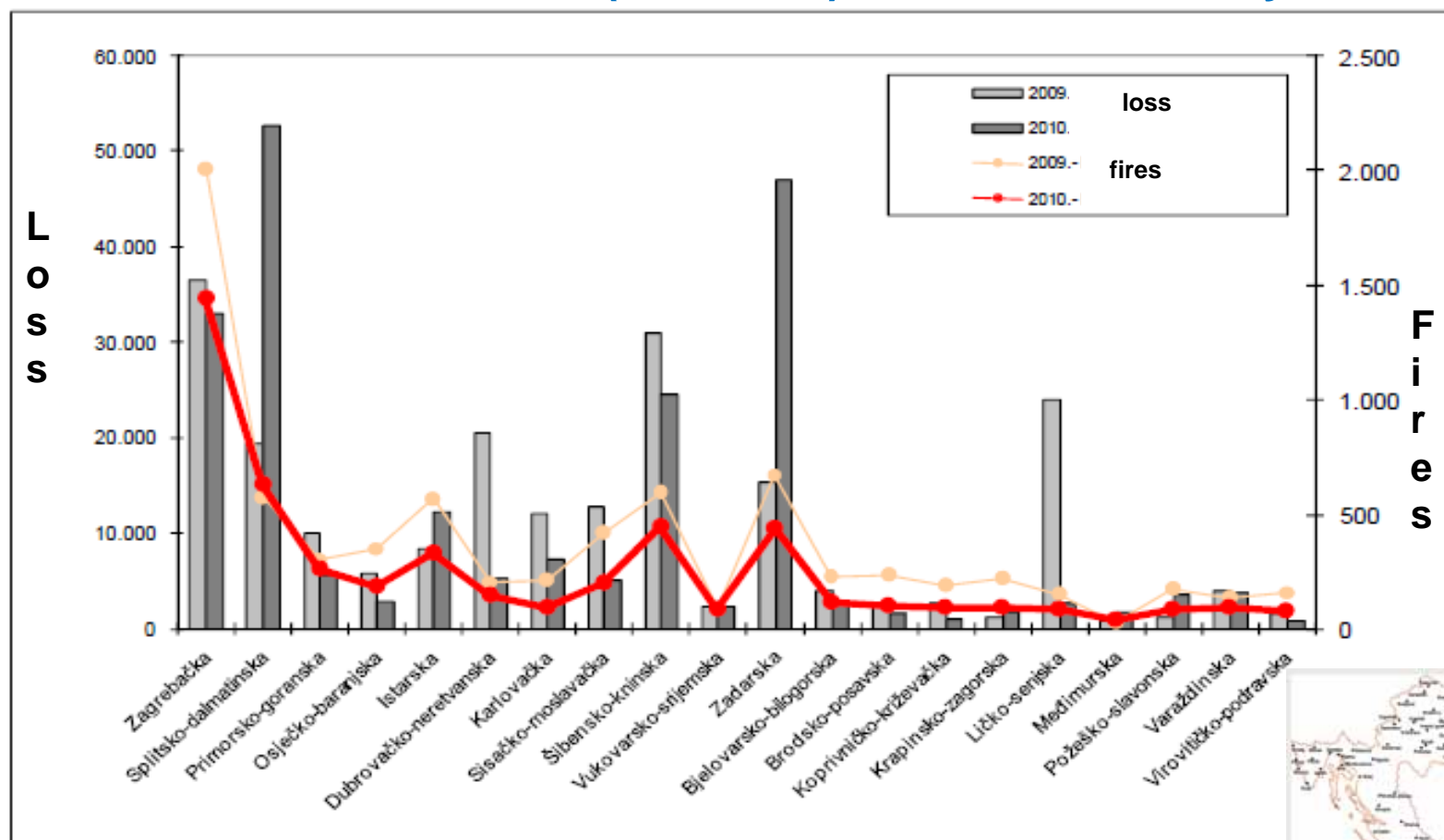
Statistical data of the fires occurred in the recent years in Croatia - injured people



Source: Bilten o požarima 2010, Ministarstvo unutarnjih poslova RH

Statistical data of the fires occurred in 2009 and 2010 years in Croatia

Fires and loss (in 000 kn) in 2009 and 2010 y



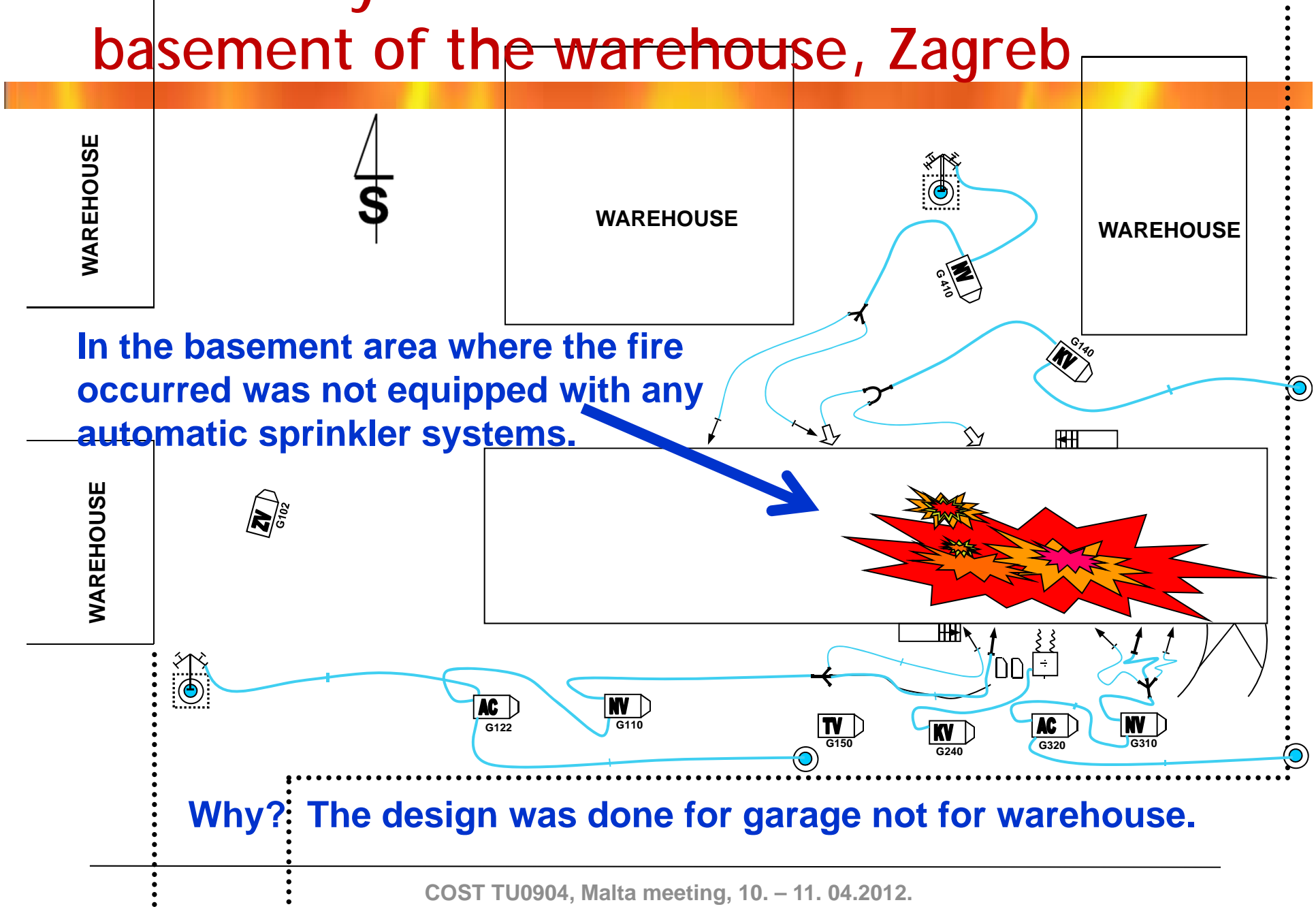
Source: Bilten o požarima 2010, Ministarstvo unutarnjih poslova RH

Case study of fire occurred at the basement of the warehouse, Zagreb



- Study of operating the fire occurred at the basement of the warehouse near Zagreb in September 2005.
- **The fire started when two workers performed welding operations without proper supervision.**
- The firemen arrived very quickly (the time from alarm to arrival at the point of intervention was less than 5 minutes), but fire already spread and developed huge amount of heat.

Case study of fire occurred at the basement of the warehouse, Zagreb



In the basement area where the fire occurred was not equipped with any automatic sprinkler systems.

Why? The design was done for garage not for warehouse.

Case study of fire occurred at the basement of the warehouse, Zagreb

- **Consumed materials for fire fighting :**
 - **Water:** approximate 336 m³ of water was consumed in the intervention - taking into account the time spent on fire fighting and the average number of jets;
 - **Foam:** approximately 10.000 liters.
 - The exact amounts could not be determined, as with all foam barrels delivered to the place of intervention were not fully charged (donations and foam for training).
 - **Powder:** approximately 1500 kg of ABC powder;
 - **The bottles with compressed air:** 79 pieces of 6l/300 bar.

Conclusions



- The fire occurred in the building with applied fire measures requested for garage spaces instead of the warehouse spaces
- it indirectly influenced the effectiveness of the fire fighting intervention and property damage.

Conclusions



- Fire loads for garage spaces according to literature data (TRVB 126) is around 200 MJ/m² while for the warehouse spaces fire load is determined on the basis of the quantity and type of stored goods.
 - In this case fire load of stored goods were higher by about 10 times more than designed
 - Fire protection measures such as fire extinguishers and hydrant internal network were not adequate for extinguishing the initial fire.

Conclusions



- According to Croatian legislation for warehouse space of such size and fire load the following protection systems are requested:
 - an automatic fire sprinkler-type system and
 - automatic smoke and heat exhaust systems

Conclusions



- The existence of prescribed fire protection systems would have a significant impact on the course of fire because the fire burned area would be significantly smaller which could provide a much more effective fire fighting intervention.

Conclusions



- Acc. the low the change of space use should be re-designed
- There not exist any control in that sense



Thank you
for your kind attention!!

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