DETERMINING OF SOFT TARGET'S VULNERABILITY

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Abstract: *This article is focused on Soft targets, especially on their vulnerability. We create a methodology of scoring of vulnerability, which is based on the methodology of "Soft Target Vulnerability Assessment" published by Ministry of Interior (MI). We connect this methodology with our database of violent attacks, so in the end, we have the methodology, which reflects actual trend of attacks. In the first part, we describe Soft targets and our database of violent attacks. In the other part, we present our methodology.*

Key words: *soft targets, terrorist, attack, vehicle-ramming attack, firearms attack*

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1. Introduction

In our research, we create the methodology of scoring of vulnerability. The methodology aims to help security professionals, but also laymen, to become more familiar with the issue. It is based on the methodology of "Soft Target Vulnerability Assessment" published by Ministry of Interior (MI). This methodology is supplemented by information from the database of violent attacks, which is processed by the Soft Targets Protection Institute, which provides up-to-date information on the selected targets of attacks, selected weapons, etc. During our research, we analysed more than 100 attacks in Europe from 2014 to 2018.

The violent attacks, especially terrorist's attacks are a large problem in the present day. Security experts try to find out methods for classification of Soft targets and determine their vulnerability.

2. Soft targets

Ob. Cit.: "As "Soft Targets" can be referred to those objects, (open) spaces, or events characterized by the accumulation of a large number of people, the absence or low level of security measures against violent assaults and their omission among critical infrastructure and hard target objects." [1, 2]

For terrorist's attacks analysis, we create our database of violent attacks in Europe and some part of Russia from the year 2014 to the present [3]. This information is very important for us because we need to know details about attacks – place, time, modus operandi, type of Soft target etc. [4]

All monitored parameters:

- Earth
- City
- Year
- Month
- Day
- Day of the week
- Soft Target Type
- Soft target type detail (transport, touristic centre, religious, etc.) + other details
- Whether it is a terrorist attack or not
- Epicentrum (Location)
- Modus operandi
- Time/hour of the attack
- Was the attack in peak?
- Who signed up for the attack
- Number of dead
- Number of injured

- What was the potential of the victims
- Information about the attackers
  - Number
  - Names
  - Gender
  - Age
  - Nationality
  - Origin (also the number of generations of immigrants from where they were roots, etc.)
- Linking with other attacks
- Notes (differences in attack, insights, interests)

Location of the attack, we distinguished whether it was an attack on open space (squares, public places) or objects. In the case of objects, we then distinguish whether the attack took place inside the object, neat the building, on the coat of the building, or at the entrance to the building. Generally, we perceive the effort to attack people, not the object itself.

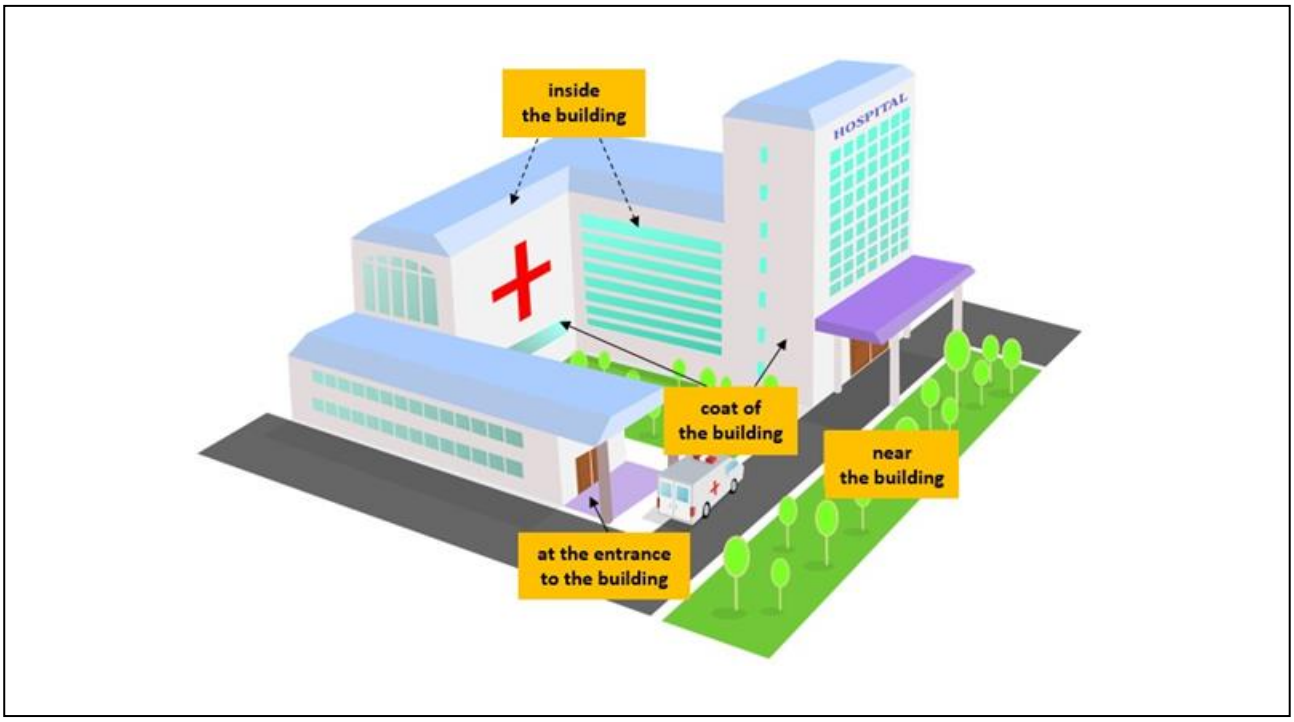

Fig. 1. Example

3. Methods

Our method works with the following categories:

- Assets
- Threat
- Location
- Time
- Probability

  - Availability of resources
  - The occurrence of a given attack mode
  - The complexity of attack execution
- Impact
  - Life and health
  - Per object
  - Financial impact
  - Directly affected community
- Vulnerability

Subsequently, two other categories were added, which we evaluated as necessary:

- Type of soft target
- Responsibility for asset protection

Type of Soft Targets
Transport system
Places and areas where refugees/immigrants are
Religious targets
Hospitals
Night bars / clubs
Trade/shopping centre
Social, cultural events
Sports events
Schools
Tourist centre
Street/shopping street
Government buildings

Tab. 1. Type of Soft Targets

Availability of resources	**Index (I_D)**
without weapons	7
weapon commonly available (e.g. knife, arson)	6
more weapons commonly available; weaponless commonly available (e.g. car)	5
commercially available biological or chemical weapon (eg acid)	5
weapon for permission; possibly more such weapons (e.g. firearm)	4
weapon obtainable by criminal activity (black market, etc.) without the need for professional training	3
a weapon obtainable by criminal activity, requiring professional training with a short delivery time	2
a weapon obtainable by criminal activity, with the need for training with a long delivery time	1

Tab. 2. Availability of resources

The occurrence of a given attack mode	**Index (I_V)**
has occurred many times in the Czech Republic	7
has occurred many times in the relevant country	6
has occurred several times in the Czech Republic	5
has occurred several times in the relevant country	4
occurred rarely in the Czech Republic	3
occurred rarely in the relevant country	2
it has never occurred in the Czech Republic or abroad	1

Tab. 3. The occurrence of a given attack mode

The complexity of performing a given attack method	**Index (I_{SP})**
an individual without the help of other persons, publicly accessible place	7
an individual without the help of other persons, inaccessible to the public	6
requires the involvement of more people, a publicly accessible place	6
simple or one-time cooperation with a local criminal group, a publicly accessible place	5
difficult or long-term cooperation with a criminal group, inaccessible to the public	4
one-time cooperation with a local terrorist group, inaccessible to the public	3
coordinated action at a local level in cooperation with a terrorist group, inaccessible to the public	2
an internationally coordinated, long-term action by a terrorist group, a place open to the public or inaccessible	1

Tab. 4. The complexity of performing a given attack method

Impact on life and health	**Index (I_{DZ})**
serious injuries to a larger number of people and deaths to a larger number of people	7
serious injuries to a greater number of persons and deaths of individuals	6
serious injuries to a large number of persons	5
serious injury to individuals	4
slight injuries to a larger number of people	3
slight injuries to individuals	2
shock; minor injuries	1

Tab. 5. Impact on life and health

Impact on object	**Index (I_{DO})**
destruction of the object, eventually violation of statics, cancellation of the action	7
extensive restrictions on the functionality of the building or the possibility of organizing events	6
limiting the functionality of a part of an object or part of an action	5
local restrictions on the functionality of a room or part of an event	4
major damage to the object or disruption of the action without impairing functionality	3
minor damage to the object or disruption of the action without limiting functionality	2
no or negligible damage to the object or disruption of the action	1

Tab. 6. Impact on object

Financial impact	**Index (I_{FD})**
economically liquidation impact	7
impact over CZK 500,000 not covered by insurance	6
impact over CZK 100,000 not covered by insurance	5
impact over CZK 100,000 solvable by insurance	4
impact in the order of tens of thousands of CZK	3
impact up to CZK 5,000	2
without impact, possibly negligible	1

Tab. 7. Financial impact

Impact on the functioning of the affected community	**Index (IF)**
termination of participation / activity	7
temporary suspension of activities	6
the real risk of endangering persons when participating in other activities	5
general concern to be active in the community, greater restrictions on activities	4
less activity restrictions	3
weak impact at individual level	2
without any apparent impact on the community	1

Tab. 8. Impact on the functioning of the affected community

The vulnerability analysis is linked to the processed database of terrorist and other violent attacks. As a result, the outcome of the threat is current and always responds to trends in attacks.

The following parameters that are associated with the database are specified:

- Availability of resources
- Location of the attack
- Type of soft target

It was necessary to normalize the calculated indices. The indices of these three categories were determined on the basis of their occurrence, with the number of attacks doubling for the last closed calendar year. The philosophy is as follows. In 2014, religious targets were often attacked, with one more attack in 2016, but in 2015, 2017 and 2018, attacks on this type of soft target were significantly less. In 2018 it is only sixth in the selection of the target. With a simple sum of attacks, one strong year would affect the outcome and it would be irrelevant whether it was a year or four ago. But in the vulnerability analysis this is very important. Are they constantly attacking the same way every year, or was it used in 2014 and no longer used, or did it become widely used only in 2018? Therefore, in 2018, the number of attacks is doubled, thus increasing their importance.

The next step was to normalize the values. The other parameters are in the values of 1 - 7, but in these three categories they were much larger, so there would be a significant advantage for these groups. Therefore, a coefficient was introduced to reach the specified range of 1-7.

$$P_S = P + 2P_A \tag{1}$$

where P is the number of attacks in previous years (2014 - 2017), P_A is the number of attacks in the last calendar year (2018) and P_S the sum of attacks.

$$k = \frac{P_S}{P_{SMAX}} \tag{2}$$

where k is the coefficient and P_{SMAX} is the maximum P_S value

$$I = 7k \tag{3}$$

where I is an index.

Type of Soft Targets	$\mathbf{k_{MC}}$	$\mathbf{I_{MCAO}}$
Transport system	0,62	4,36
Places and areas where refugees/immigrants are	0,17	1,19
Religious targets	0,60	4,23
Hospitals	0,00	0,00
Night bars / clubs	0,23	1,58
Trade/shopping centre	0,28	1,98
Social, cultural events	0,34	2,38
Sports events	0,06	0,40
Schools	0,38	2,64

Tourist centre	1,00	7,00
Street/shopping street	0,70	4,89
Government buildings	0,13	0,92

Tab. 9. Type of Soft targets index

$$I_{MCAO} = 7k_{MC} \quad (4)$$

where I_{MCAO} is the Soft Target Type Index.

Location	**k_L**	**I_{LAO}**
At the entrance to the building	0,05	0,36
Coat of the building	0,28	1,97
Inside the building	1,00	7,00
Near the building	0,32	2,24
Open space	0,62	4,31

Tab. 10. Location index

$$I_{LAO} = 7k_L \quad (5)$$

where I_{LAO} is the Locations Index

The exception was the category Availability of resources, because the MI methodology sets the initial value, therefore the prescribed value multiplied by a coefficient.

Availability of resources	**H**	**k_D**	**I_D**
without weapons	7	0,03	0,19
weapon commonly available (eg knife, arson)	6	1,00	6,00
more weapons commonly available; weapon less commonly available (eg car)	5	0,31	1,55
commercially available biological or chemical weapon (eg acid)	5	0,01	0,05
weapon for permission; possibly more such weapons (eg firearm)	4	0,58	2,33
weapon obtainable by criminal activity (black market, etc.) without the need for professional training	3	0,58	1,75
a weapon obtainable by criminal activity, requiring professional training with short delivery time	2	0,34	0,67
a weapon obtainable by criminal activity, with the need for training with a long delivery time	1	0,34	0,34

Tab. 11. Availability of resources index

$$I_D = Hk_D \quad (6)$$

where k_D is the Resource Availability coefficient and H is the value according to the Soft Target Risk Assessment methodology according to MI.

where O_{AO} is the current vulnerability according to the Vulnerability Analysis.

O_{AO}	Qualitative expression of threat
12 - 1314	Low vulnerability
1315 - 2617	Medium vulnerability
2618 - 3920	High vulnerability

Tab. 12. Current vulnerability

If the vulnerability reaches red numbers, it is essential that the safety of the object or action is immediately addressed. In the case of the highest risk category, it is advisable for the owner/operator/founder to start actively addressing safety, preferably in cooperation with a specialized company.

Orange is the medium level when an object or action is at risk but to a lesser extent. Green numbers indicate that the object/action is at low risk.

4. Conclusion

The vulnerability is very important information, with the help which the security manager can react on actual situation in object or event. In this article, we presented our methodology, which we use. In the end, I have three types of Soft targets, and I know which level of vulnerability I have.

Then I can plan the security measures more effectively. It is difficult to plan the process of security and safety, when I do not know what problem I have and in which level I have it.

5. Acknowledgements

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