

DESIGN OF A HORIZONTAL ANAEROBIC REACTOR

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Abstract

Adequate security measures at schools are essential, not only in Vojvodina but in all secondary schools. This work outlines the opinion of secondary school teachers concerning the mechanical and electronic protection of secondary school institutions. The present research aims to shed light on the significance of school security, and problems caused by its lack, as well as to offer suggestions towards increased security and protection.

Keywords: *mechanical protection, electronic protection, school security, access control system, the security camera system.*

1. Foreword

Security, considering its common meaning, denotes the state, or status in which a person or an object is protected from dangers, harm, unlawful interventions, general abuse. [1] In order to ensure the unobstructed functioning of an educational institute, an adequate level of security is required. Secondary education is essential these days, as is the mechanical and electronic protection of educational institutes. The security of pupils should represent a primary aspect.

2. Mechanical protection

In the case of educational institutes, electronic protection is not sufficient, so it is advisable to extend it with solutions involving mechanical protection. Modern schools today possess numerous technical means, such as:

- computers,
- projectors,
- professional printers,
- tablets and smartphones.

These, however, need to be protected, as computers can store a great quantity of important data which is crucial in the schools' operation, such as:

- electronic class books,
- personal data of pupils and employees,
- administrative records.

2.1 Outdoor mechanical protection

Mechanical protection starts even in the esplanade of the building. Solutions and means of outdoor safeguarding and obstruct the unwarranted invader in the incursion of the safeguarded area or building complex. [2] Schools are often surrounded by fences. (Figure 1-3.) These are of a major significance, as the protection of the pupils playing in the schoolyard is of superior importance.

The media often reports of kidnapping, drug trafficking and substance abuse. As the majority of schools are located near vastly populated areas, these dangers threaten the pupils too. Fences



Figure 1. *The fence of Secondary School, Bosa Miličević*



Figure 2. Lazar Nešić Secondary School beside a busy road in the center of Subotica



Figure 3. The fence of Secondary School, . Lazar Nešić

and well lockable outdoor entrances can greatly augment pupils' sense of security and their protection.

2.2 Mechanical protection of objects

A strongbox or safe, as a typical asset of protection of objects, can be found in every school participating in the present research.

Additionally, safes can be grouped considering the type of their locks: there are those with keys, ones with combination locks, requiring a numerical combination, ones with electronic combination locks, and mixed systems. There is no significant difference between the prices of more advanced safes, the only option to consider in determining the most convenient solution for the user – to keep a key, or to remember the code. The electronic locks of lower tier safes are often supplemented with an emergency option of using a mechanical key, this is important when the code is forgotten, so the safe can be open with the help of the key. Modern safes are characterized by highly advanced technology. [3]



Figure 4. The entrance door of Secondary School, Bosa Miličević

2.3 Protection of buildings

Doors and windows represent the most common entry points of buildings in an incursion, particularly when they have a full or partial glass cover (Figure 4.). Security foils can be successfully utilized for the protection of these glass surfaces. These are multilayered, laminated, plastic-based elements of protection, which are applied afterwards to the glass surface (backed, glued, applied etc.) so it prevents the instant collapse of the glass in an attack. Holding together the glass surface, they lengthen the time-frame in which an opening can be cut through the surface, and by splintering, they represent a great risk of injury to the attacker. The security foils are able to diminish the rate of ultraviolet radiation, as they can also be coated with a colouring layer. [2]

The utilization of security foils in elementary schools represents an expedient solution, as windows with metal bars do not always contribute to the best ambience. It is advantageous for an educational institute to radiate a pleasant impression, so the pupils can feel comfortable, as the major part of the day is spent inside the walls of the educational institution. [4]

3. Electronic protection

3.1 Fire- and smoke sensors in schools

In fire protection, the effects of the human factor show primarily during the phase of evacuation. In contrast with the firefighters prepared to face this danger, the baffled civilians involved do not have a clue about the escape routes and the

principles of extraction from the building. In the case of a fire, people are usually clueless about the correct behaviour. [5]

In schools, however, pupils can be instructed to practice the evacuation, as these drills can save lives. This does not require additional financial support, as it is merely a question of organization. In the case of a fire alarm, the pupils would know the correct procedures and they would be able to leave the educational institution in full order.

3.2 Security camera grid

The surveillance grids using cameras play an important role in secondary schools, as it is a common data when there are classes in these institutions, and when there are holidays, during which time the whole building is virtually vacant.

Outdoor and indoor camera grids can be differentiated. Through the outdoor surveillance system, the immediate surroundings and the schoolyard can be surveyed (Figure 5.).

By the constitution of a school security camera grid, numerous aspects have to be considered. In the case of security CCTV systems, the use of WLAN grids can secure great flexibility for the designer, the effector and the owner-operator. The expansion of an existent grid can be soundly completed by a well-placed Access Point, regarding a CCTV system having an IP base. At this point, the calculation of bandwidth required for the expansion of the grid becomes of high importance. In case of an imprecise or erroneous calculation it would commonly happen that the video stream from a deployed camera (depending on its parameters and settings) could not reach the DVR continuously, as the overloading of the grid, the so-called “packet collisions” would be increasingly common, slowing the grid’s data traffic significantly.[6]

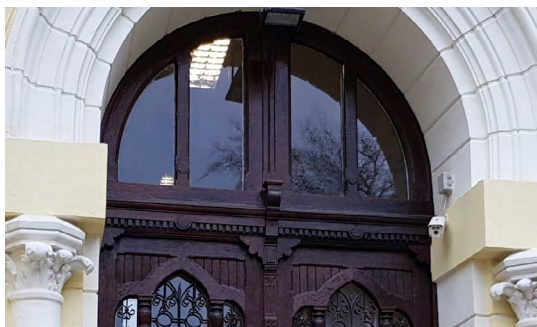


Figure 5. Security outside camera system of Lazar Nešić Secondary School

Concerning security, naturally, the encryption methods in the case of computer grids can be utilized even with the cordless systems, but it would have been taken into account that the use of encryption can enhance the bandwidth needed. [7]

3.3 Check-in systems

Nowadays, controlled entry can be an important aspect even in secondary schools. The purpose of the check-in systems is to filter out trespassers, and to alert the staff inside thereof, likewise to prevent some persons from gaining unauthenticated access to areas not granted to them. It is widely known, however, that the deployment of a high-quality check-in system accounts for a serious investment for the schools, thus, no institutions participating in the present research possessed them.[8] [9]

4. Empirical research

In the sample researched, there were 31 teachers from 2 liminary secondary schools in Vojvodina (Secondary School of Economy, Bosa Milićević, and the Secondary School of Chemistry and Technology).

4.1 Hypothesis

It can be assumed that the teachers examined in the present research consider both mechanical and electronic protection important.

The teachers examined in the present research, independently from their institutions (x2 test: $p=0,062$), considering the question “Which type of protection do you consider important, the mechanical or the electronic one?” gave answers as follows in the Table 1. below:

The research has uncovered that the teachers from secondary schools consider mechanical protection of more importance than electronic. It is important to note, however, that there is a

Table 1. Considering secondary schools, which type of protection do you consider important, the mechanical or the electronic one? ($n=31$)

Schools	Mechanical protection	Electronic protection
Secondary School of Economy Bosa Milićević	54%	46%
Secondary School of Chemistry and technology	51%	49%

very small difference of choice between the two offered answers.

The teachers support their answers, that strengthening a lock or a door requires less financial funding than introducing a modern electronic security system, according to their views, although there is a demand towards the later ones too. They have stated in their answers that in their opinion, schools have to negotiate with a modest financial budget. None of the schools participating in this research possesses a deployed security camera – grid, although, complying with the state-wide regulations of protection against fire, smoke- and fire sensors are present.

5. Conclusions

The research has uncovered that the teachers employed in the secondary schools consider both mechanical and electronic protection of importance. Regrettably, however, negotiating with meagre financial funding, schools cannot build the security systems, whereas they would raise the level of their security.

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