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COURSE NAME : ELECTRONIC SECURITY SYSTEMS

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TOPIC : BURGLAR ALARM

Burglar Alarm



- A burglar alarm is a system designed to detect intrusion –unauthorized entry– into a building or area. They are also called security alarms, security systems, alarm systems, intrusion detection systems, perimeter detection systems, and similar terms.

Burglar Alarm

- Burglar alarms are used in residential, commercial, industrial, and military properties for protection against burglary (theft) or property damage, as well as personal protection against intruders. Car alarms likewise protect vehicles and their contents. Prisons also use security systems for control of inmates.

Burglar Alarm

- Some alarm systems serve a single purpose of burglary protection; combination systems provide both fire and intrusion protection. Intrusion alarm systems may also be combined with closed-circuit television surveillance systems to automatically record the activities of intruders, and may interface to access control systems for electrically locked doors. Systems range from small, self-contained noisemakers, to complicated, multi-area systems with computer monitoring and control.

Burglar Alarm Design

The most basic alarm consists of one or more sensors to detect intruders, and an alerting device to indicate the intrusion.

However, a typical premises security alarm employs the following components:

- **Premises control unit (PCU)**, or **panel**: The "brain" of the system, it reads sensor inputs, tracks arm/disarm status, and signals intrusions. In modern systems, this is typically one or more computer circuit boards inside a metal enclosure, along with a power supply.
- **Sensors**: Devices which detect intrusions. Sensors may be placed at the perimeter of the protected area, within it, or both. Sensors can detect intruders by a variety of methods, such as monitoring doors and windows for opening, or by monitoring unoccupied interiors for motions, sound, vibration, or other disturbances.
- **Alerting devices**: These indicate an alarm condition. Most commonly, these are bells, sirens, and/or flashing lights. Alerting devices serve the dual purposes of warning occupants of intrusion, and potentially scaring off burglars.

Burglar Alarm Design

- **Keypads:** Small devices, typically wall-mounted, which function as the human-machine interface to the system. In addition to buttons, keypads typically feature indicator lights, a small multi-character display, or both.
- **Interconnections** between components. This may consist of direct wiring to the control unit, or wireless links with local power supplies.
- **Security devices:** Devices to detect thieves such as spotlights, cameras & lasers.

Burglar Alarm Sensor Types

1. Passive infrared detectors
2. Ultrasonic detectors
3. Microwave detectors
4. Glass break detection
5. Smoke, heat, and carbon monoxide detectors
6. Vibration (shaker) or inertia sensors
7. Passive magnetic field detection
8. E-field
9. Microwave barriers
10. Microphonic systems
11. Taut wire fence systems
12. Fibre optic cable
13. H-field

Electronic article surveillance (EAS)

- **Electronic article surveillance (EAS)** is a technological method for preventing shoplifting from retail stores or pilferage of books from libraries. Special tags are fixed to merchandise or books. These tags are removed or deactivated by the clerks when the item is properly bought or checked out. At the exits of the store, a detection system sounds an alarm or otherwise alerts the staff when it senses active tags.
- Some stores also have detection systems at the entrance to the bathrooms that sound an alarm if someone tries to take unpaid merchandise with them into the bathroom.
- Some stores with EAS have keypads by the detection systems with monitors that beep showing the response time on the screen when the alarm sounds to ensure that employees respond to the alarm. The keypad keeps beeping until an employee responds to it.
- For high-value goods that are to be manipulated by the patrons, wired alarm clips may be used instead of tags.

Types of EAS

- There are several major types of electronic article surveillance systems:
- Magnetic, also known as magneto-harmonic
- Acousto-magnetic, also known as magnetostrictive
- Radio frequency
- Microwave
- Video surveillance systems (to some extent)



Magnetic EAS systems



- These tags are made of a strip of amorphous metal (metglas) which has a very low magnetic saturation value. Except for permanent tags, this strip is also lined with a strip of ferromagnetic material with a moderate coercive field (magnetic "hardness").
- Detection is achieved by sensing harmonics and sum or difference signals generated by the non-linear magnetic response of the material under a mixture of low-frequency (in the 10 Hz to 1000 Hz range) magnetic fields.

Acousto-magnetic EAS systems



- These are similar to magnetic tags in that they are made of two strips, a strip of magnetostrictive, ferromagnetic amorphous metal and a strip of a magnetically semi-hard metallic strip, which is used as a biasing magnet (to increase signal strength) and to allow deactivation. These strips are not bound together but free to oscillate mechanically.
- These tags are thicker than magnetic tags and are thus seldom used for books. However they are relatively inexpensive and have better detection rates than magnetic tags.

Radio-frequency EAS systems



- These tags are essentially an LC tank circuit that has a resonance peak anywhere from 1.75 MHz to 9.5 MHz. The most popular frequency is 8.2 MHz. Sensing is achieved by sweeping around the resonant frequency and detecting the dip. Deactivation for 8.2 MHz label tags is achieved by detuning the circuit by partially destroying the capacitor. This is done by submitting the tag to a strong electromagnetic field at the resonant frequency which will induce voltages exceeding the capacitor's breakdown voltage, which is artificially reduced by puncturing the tags.

Microwave EAS systems

- These permanent tags are made of a non-linear element (a diode) coupled to one microwave and one electrostatic antenna. At the exit, one antenna emits a low-frequency (about 100 kHz) field, and another one emits a microwave field. The tag acts as a mixer reemitting a combination of signals from both fields. This modulated signal triggers the alarm. These tags are permanent and somewhat costly. They are mostly used in clothing stores.



- An electronic lock (or electric lock) is a locking device which operates by means of electric current. Electric locks are sometimes stand-alone with an electronic control assembly mounted directly to the lock.
- More often electric locks are connected to an access control system.
- The advantages of an electric lock connected to an access control system include: key control, where keys can be added and removed without re-keying the lock cylinder; fine access control, where time and place are factors; and transaction logging, where activity is recorded.

Authentication Methods of Electronic Lock

Electronic locks offer a variety of means of authentication; those described below are not considered exhaustive.

- **Numerical codes, passwords and passphrases**

Perhaps the most prevalent form of electronic lock is that using a numerical code for authentication; the correct code must be entered in order for the lock to deactivate. Such locks typically provide a keypad, and some feature an audible response to each press. Combination lengths are usually between 4 and 6 digits long. A variation on this design involves the user entering the correct password or passphrase.

- **Security tokens**

Another means of authenticating users is to require them to scan or "swipe" a security token such as a smart card or similar, or to interact a token with the lock. For example, some locks can access stored credentials on a personal digital assistant (PDA) using infrared data transfer methods.

Authentication Methods of Electronic Lock

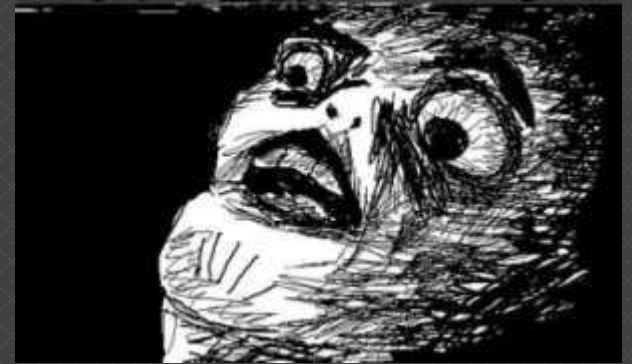
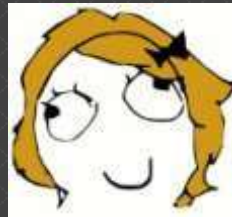
● Biometrics

As biometrics become more and more prominent as a recognized means of positive identification, their use in security systems increases. Some new electronic locks take advantage of technologies such as fingerprint scanning, retinal scanning and iris scanning, and voiceprint identification to authenticate users.

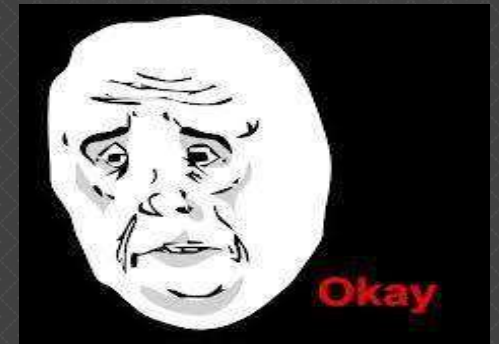
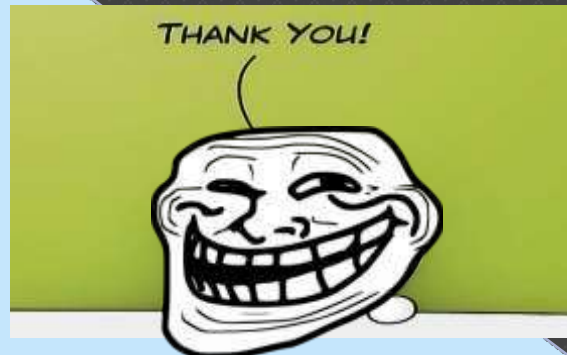
● RFID

Radio-frequency identification (RFID) is the use of an object (typically referred to as an RFID tag) applied to or incorporated into a product, animal, or person for the purpose of identification and tracking using radio waves. Some tags can be read from several meters away and beyond the line of sight of the reader. This technology is also used in modern electronic locks.

THE END



Thank you for your Attention !



We Hope this Seminar made you aware about the Electronic Security System

