Intrusion detection systems (IDS) for physical security rely on sensors attached to fence structures to pick up vibrations and enact a response. The response can turn on a warning siren, light up a section of fence or surrounding field, or activate video surveillance. In order to ensure that these sensors detect real intrusions, and not signal false alarms, sensors must be matched up properly with the most suitable fence structures.

Wire-based barriers such as chain link fencing and gates have entirely different vibration characteristics than panel-based structures like ornamental fencing. As you can imagine, someone climbing a chain link fence can cause it to “sway” back and forth in a low frequency manner when the mesh is not engineered for a high security application that prohibits mounting. On the other hand, scaling a panelized ornamental fence produces almost imperceptible high frequency vibrations due to the denser material. Cutting, sawing, and touching both types of fences creates even more types of vibrations.

Computer-based decision support systems (DSS) are available that can discriminate between different types of vibrations and can very closely suggest what type of breach is taking place. However, before the software is installed and programmed to read the sensor’s alert system, it is very important that the correct type of sensor be attached to the appropriate fence.
Chain link fences need a sensor that can pick up minute to extreme disturbances. For instance, the sensors should be able to pick up the regular swaying motion of wind blowing through the fence and via the programmed control mechanisms, ignore the characteristics of such natural phenomena as non-intrusive. So-called “shaker” systems or fence vibration detectors such as Master Halco’s 390B model are well suited for open-mesh, wire-based fences. Shaker devices are usually electro-mechanical in nature, with the mechanics designed to pick up the vibrations and change the electrical characteristics to a current passing through the sensor.

Some other types of sensors you can use with chain link include wire, magnetic, and fiber optic. Wire sensors work especially well with chain link fences. They are capacitive (telephonic) in nature, but they may not be able to sense directional characteristics of vibrations as well as shaker sensors can. Magnetic sensors sound an alert when someone has broken the magnetic protective field. Fiber optic sensors produce a response similar to wire sensors, but are better to use in areas that suffer frequently from storms and static in the air. There are some very sophisticated fiber optic systems in the marketplace that are connected to DSS systems that will work well on almost any type of barrier.

For denser, more rigid fences, a sensor like Master Halco’s DualSense works well. This type of sensor measures kinetic energy that is released within a structure when it is disturbed. These sensors are good for high frequency pickup, and they work well
with DSS systems. Some types of sensors can be used with any type of barrier, but perform best in combination with sensors attached to the fence. These include: Infrared, Microwave, and Acoustic standalone devices. Many consider new intelligent video systems (IVS) as sensors, but intelligent video systems are really response devices. They can be turned on at all times, or through the use of an external alarm or via a control center operator.

For both rigid and mesh fencing, there are a number of mounted and buried types of sensors that will work for both types of structures. A taut wire supplementary fence can be constructed to signal a response when the wires are pulled. When a series of wires run horizontally down the line of fence, the combinations or “order” in which the wires are pulled can indicate the nature of the disturbance. As well, you can design the entire fence with taut wire so that the fence itself becomes the sensor.

As previously mentioned, wire and fiber optic are optional fence sensors when mounted on chain link. However, you can bury these two sensors underground for use with both mesh and dense panel fencing systems. Capacitive cable or fiber optic can sense motion above it, and leaky coax cable can send a balloon of magnetism out and over the ground, which will cause a response when someone walks through it.

Buried seismic sensors can be installed in close proximity to any type of fence, but they are very sensitive and will pick up all types of nearby vibrations such as traffic. Buried seismic sensors should generally be used in normally quiet or remote environments.
Intrusion detection is a vital part of your perimeter security plan no matter what type of fencing barrier you may design and build. Mounting the right sensors will increase your ability to detect real threats to your facility and vital assets.

Author’s Bio:

**Bob Gruber, PSP** (certified Physical Security Professional), holds a Master of Science degree in Information and Telecommunications Systems Management. He is a former United States Marine and has been a Naval Intelligence Specialist and a CIA officer. He currently works as a Specified Sales Engineer for Master Halco’s Security Solutions Group, the world’s leading distributor and manufacturer of perimeter security and fencing. Bob serves on the academic and physical security councils of ASIS International and ASTM 54 Specification Committee, Physical Security. He is the author of “Physical and Technical Security: An Introduction,” 2006, Thomson Delmar Learning.

Email: bgruber@fenceonline.com
Phone: 1-877-337-4358, ext. 52416