ELECTRIC FENCES AND REMOTELY MONITORED CAMERA SYSTEMS CAN DETER AND DETECT INTRUDERS. EACH APPROACH HAS ITS STRENGTHS AND WEAKNESSES, BUT MUCH DEPENDS ON YOUR FACILITY'S SECURITY GOALS, DESIGN, AND LOCATION. **BY ELLEN RYAN**

What's the best way to secure a scrapyard? There isn't a one-size-fits-all answer to that question. Instead, each scrap processing facility must consider related questions: Secure the yard against what, and when? Do you want to keep thieves and vandals out, or catch them in the act? What's best for the size, shape, layout, and location of your yard? And how much are you willing to spend initially and every month?

Two of the most popular security approaches are electrified fences and remote video monitoring systems. Each has its proponents and detractors in the scrap industry, but there are plenty of outdated assumptions and mistaken beliefs, too. And some companies use both. "The combination could slow someone down even more," says the president of a Kansas security consulting business that does remote monitoring. But at least for cost reasons, most yards pick one or the other. To choose wisely, consider the pros, cons, costs, benefits, and requirements of each.

Today's security cameras (above left) can use remote monitoring to spot and deter intruders. Electric fences (above right) use the threat of electric shock to deter illicit entry. Both technologies can sound an alarm and contact owners or local authorities.

ISTOCKPHOTO.COM/ADULDEJ (LEFT); PERIMETER SECURITY SYSTEMS (RIGHT)

ELECTRIC FENCES

A person attempting to scale or cut an electric fence will receive an electric shock, which at the fence's voltage "feels like getting hit with a 2-by-4," says Jonathan Colner, president and CEO of Phoenix Metal Trading, which uses the technology. Proponents of electric security fences often swear that such a shock is "perfectly safe"—but they do so quietly. "People's natural fear of getting shocked" helps make these fences effective deterrents, says the chairman of a North Carolina company that installs such systems, "so we don't want to discourage that feeling amongst thieves. However, they will not cause any injury or lasting harm."

The threat of electric shock is the selling point—and the biggest curiosity for both yard customers and thieves. A South Carolina company's fence packs 7,000 to 10,000 volts, it says. "It has the kick of a mule," says the company's CEO. "Demonstrations are the worst part of my job. It's safe but extremely unpleasant." To protect the innocent—and the fence, somewhat—these companies require a perimeter fence outside the electric fence. Kids and dogs can touch that one with no problem. Typically, the electric fence is 1 foot from the exterior fence, but it can be as close as 6 inches, the North Carolina chairman says, or it can be farther away.

The South Carolina company describes how its system works: A pulse goes around the fence every 1.3 seconds. If the system gets a clear pulse along the line, good. If something interrupts it, the interruption sets off an alarm and triggers a call to the designated contact. Thieves can attempt to defeat a fence by using an insulating material—tossing a blanket on it or setting rubber (such as tires) against it, but the interruption also sets off the alarm and triggers the call, typically to the police, a security company, or the facility's owner, says the North Carolina company's chairman.

Pros. Deterrence is this technology's strong suit. A low hum and a few signs with lightning-bolt symbols generally do the trick. "The system is deterrent first and foremost and detection as the second layer of defense," says the chairman, who started as a customer of his company. Scrapyard thefts tend to be spontaneous, he says, pointing to a 2012 study of incarcerated burglars conducted by researchers at the University of North Carolina at Charlotte. Among its findings were that 41 percent of the burglaries were "spur of the moment" events, and 60 percent of respondents said the presence of an alarm would cause them to seek an alternative target. Therefore, with an electric fence, "they see the warning and move on to an easier target."

Solar panels can power electric fence systems, ensuring a disruption to the power supply will not leave a facility vulnerable to theft.

Fences are particularly useful in extremely remote, nonresidential locations where police response time is long. Joel Squadrito, corporate security director at Steel Dynamics (Butler, Ind.)—including its scrap company subsidiary, OmniSource Corp. (Fort Wayne, Ind.)—has one facility where police are at least 20 minutes away. Under monitored cameras' gaze, brazen thieves might disguise themselves and make off with tons of metal before the police make it to the scene, so the company relies on the deterrence of an electric fence.

Fence proponents also tout its simplicity. "Most of our customers don't want to be involved with the bad guys," the South Carolina company CEO says. "They don't want to be in court; they don't want to deal with audio or video. Catch a guy and go to court over and over—that's not security." Further, these companies say fences can protect yards with uneven perimeters and hidden pockets better than cameras can, and installation costs tend to be relatively low compared with remote monitoring systems.

Cons. False alarms are the No. 1 complaint of scrapyard electric fence users. Squadrito says the number of wind- and debris-caused false alarms he experiences with his electric fence gives him headaches. Almost anything blowing up against the fence, or an animal running into it, can set it off, he says. (Providers of these systems say that more advanced fences now can distinguish among levels and durations of contact.) A determined thief could intentionally set off the alarm repeatedly until no one pays attention.

Along those lines, it's important to keep the fence clear of vegetation and other materials. "You have to keep the weeds down, or it shorts out," says Phoenix Metal Trading's Colner. The North Carolina chairman says that previously, when he was an electric fence customer, his employees would walk the perimeter of his fence regularly to check for problems. Two fence companies say they give their customers herbicide to discourage plant growth near the fence. A short-circuit could make a 10,000-volt fence drop to 2,000 volts, which packs less of a wallop. Although "most thieves don't know that," Colner says, those who do could clean out your yard.

Piles of scrap, trash, or anything else touching the fence—including snow and ice—can be problematic, too. These companies say they can route electricity around such obstacles, but they discourage doing so.

Electric fences are at risk of the same types of damage as other fences. "They break; they fall in windstorms," Colner says. Trucks hit them, too. Although the electric fence vendors contacted for this article repair their fences at no charge to the customer, damaged fences can leave a yard vulnerable to theft in the interim. "I saw a yard that suffered a $100,000 loss [of scrap] when the fence was cut" by a determined thief, says the vice president of sales at a Texas remote monitoring company. It's also possible to tunnel under a fence, although add-ons are available to counter this possibility.

Although some detractors say thieves could cut the power, phone line, or both to disable the fence, today's systems can operate off the grid on solar power, or they can use different electric and telecommunications circuits than the rest of the yard.

PERIMETER SECURITY SYSTEMS

What about liability? Employees or contractors working near an electric fence risk getting a shock. At Phoenix Metal Trading, "if our own people get zapped by mistake," Colner says, "they don't want to do it again." One fence system provider says in 20 years it's never had a liability claim, and even if it did, its service fee includes liability insurance. Another company says it co-insures its clients.

Return on investment. The fence system providers interviewed for this story say the monthly service fee covers installation, maintenance (except in the case of negligence), and cell-phone monitoring of alarms. That means "no big capital expenditure," the North Carolina chairman points out. One company integrates a simple camera system with its fence so you can see what's causing the alarm.

One company says a typical monthly fee might be $1,000 for a small yard with about 2,000 linear feet of perimeter; $2,000 for an average yard. Colner says he pays $600 a month for his 5-acre yard, though linear feet of perimeter is a better measure than acreage. Beyond the length of the perimeter, the shape of the yard's footprint matters, the providers say, as does the number of entrances. "It's very expensive with a large area," says Squadrito, and others agree.

In addition to cost, comparison points might include deposit payment required, contract length, frequency of routine service, and how quickly the company can make repairs. For example, one company conducts two preventive maintenance sweeps a year and tries to respond to service calls in as little as a few hours or as much as a few days, depending on the urgency of the problem. Colner says the response time for service calls to his yard is "same day or next"; Squadrito's experience is that service takes 24 hours to arrive.

The electric fence providers say their fences easily last 25 years or more, and they attribute most repair needs to scrapyard damage and negligence. Squadrito begs to differ: The enormous electric fence his company inherited, now 15 years old, needs nearly daily repairs. "Moisture gets into a plug. A part comes undone."

Even so, one company says it has a 96-percent renewal rate: 3 percent of customers move or cease operations, it says, and another 1 percent "think they no longer have a crime problem or go in another direction." Perhaps more important, 95 percent of that company's customers say break-ins stopped after they installed the fence; 5 percent say the problem diminished but didn't stop completely. "We don't claim to be perfect," the CEO says. Indeed, the North Carolina chairman admits that remotely monitored cameras can do things an electric fence cannot, but given his past experience with both cameras and electric fencing when he owned an equipment business, he still believes the electric monitored security fences are superior.

REMOTE VIDEO MONITORING

With remote video monitoring, software-enhanced cameras along the perimeter of the yard—or covering high-value areas—monitor activity. Older systems had poor picture quality and limited range, making it hard to use them to identify trespassers. Newer, higher-resolution systems offer color images, pan and zoom capability, thermal or infrared imaging that indicate the presence of a person or vehicle—even with low or no light—or detect fire, and more.

Previously, camera-based security consisted of having the cameras record after-hours activity and then consulting the recording after a break-in. Alternatively, they were monitored by people who might get bored staring at what's usually a static image—or who might have been looking elsewhere when suspicious activity occurred. With video analytics, however, the technology can compare what the camera is recording now with what it expects to find. If something unexpected appears, the system alerts a trained professional, who checks the monitor and takes action if warranted. This all but eliminates false alarms such as animal activity and weather-related movement. Squadrito confirms that Steel Dynamics' facilities with monitored video systems experience fewer false alarms than those with electric fences. Providers of these services say there should be none.

The presence of a camera alone might not be much of a deterrent to theft, but the staff at the central station monitoring the yard, upon seeing an intruder, can activate a speaker in the yard and say, for example, "You in the blue shirt and the red baseball cap, in the southwest corner of the yard: Leave immediately, or we will call law enforcement!" The typical intruder response, according to the president of a Michigan security company, is "they look up in shock and then run. It's hilarious."

If police or security arrive while the intruder is still on the premises, whoever's monitoring can offer them real-time guidance: where the intruder is, what the person is doing, if there's a vehicle in sight, and so on. The operator might be able to zoom in for a close-up on the screen the way you would on your mobile phone. The resolution quality might even allow the person monitoring to spot tools, weapons, or a license plate number. "A good-quality camera is like HDTV," adds the national sales director for a Georgia company. "That can be used as evidence in prosecution."

To an outdoor monitored system, you can add indoor recording cameras to keep records of transactions, watch suspicious employees, and give managers a view of operations when they're not on site. One Maryland security company says a scrap company client experienced a customer interaction that got violent. The customer was arrested, and the video clearly demonstrated to the police that it was the customer

who had caused the ruckus, eliminating any potential liability for the scrap company and its employees. Recording cameras also can catch false workers' compensation claims. "It's great to walk in to [a plaintiff's attorney's office] with the tape and say, 'Do you really want to go forward with this?'" Squadrito says.

Pros. Remote monitoring services tout their ability to detect and respond to problems quickly—the cameras can see suspicious people as they approach the property and see whether they breach the perimeter. And when police know you have a thief in sight and can provide a location and description, "response will be immediate," say Squadrito and others.

These companies also say remote monitoring systems can result in lower insurance and liability expenses. Some insurance firms offer discounts for reporting, tracking, and reducing claims via monitored video systems, and the live response can deter thrill-seekers as well as thieves. "In some yards, we catch more kids than adults," says the president of an Ontario security firm. "They go to play ball or find cranes and junk cars enticing. A double fence doesn't protect you if they sneak in." Plus, the Texas VP says, "no employee will be injured by a camera."

Cameras used for both monitoring and recording have additional benefits. Recorded incidents can be used with police or courts, in an employee action, for training, or with an insurance application or claim. "You can show the insurance company, 'See, it really was a break-in,'" says the Maryland company president. Further, some remote video monitoring companies offer value-added services such as forensic review assistance. "A customer can tell us, 'I think something was taken between 3 and 5 p.m. Tuesday near the scalehouse cameras,' and we'll review the video, find the incident, and send it to the customer," says the executive vice president and general manager of a Virginia company.

Video storage capacity varies based on the hardware, frame rates, camera resolution, and other factors. Some cameras have built-in storage; server-based storage capacity will depend on the size of the hard drives and is, "essentially, limitlessly scalable," he says. Most of his customers want at least 30 days of storage; some want as much as six months.

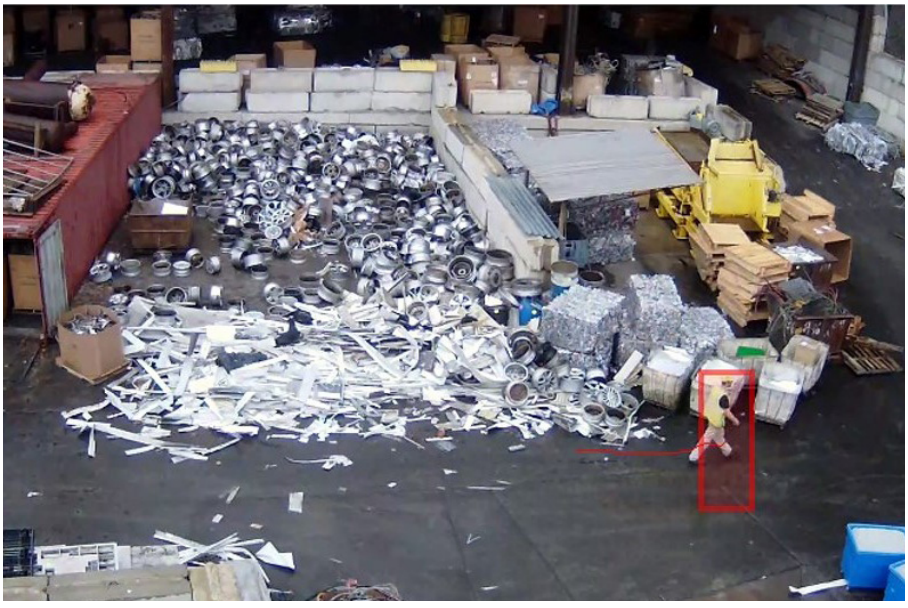
The systems' versatility is another selling point. Many yards only use the service to spot intruders at night, but some systems can

- remotely give pre-approved vehicles or people access to a locked yard or building.
- "escort" repair people working when the facility is closed or employees who open and close the facility on their own.
- detect pre-combustion temperatures in scrap piles with thermographic cameras. The technology and human monitors can tell first responders where to find the problem, the wind direction and speed, and what hazards they might encounter, such as stored fuel or flammable material.
- identify internal fraud or theft. Steel Dynamics' older camera system once showed workers returning after hours, shutting off alarms, and filling trucks with metal. Once it started using live monitoring, "we caught them all in a textbook manner," Squadrito says.

The Michigan company president makes the assertion that when managers watch employees via camera during the workday, employee productivity goes up 2 to 15 percent.

Cons. Remote monitoring has its limitations as well. The facility still needs a fence, wall, or other barrier to entry. "Video monitoring is more for detection and apprehension" than deterrence, says the Ontario firm president—though most thieves leave when they hear the voice from above. Some might get away with stolen material, and a few don't care if someone sees them doing it.

Each monitoring technology has its



EYEWITNESS SURVEILLANCE

Remote camera monitoring systems can identify intruders, communicate with them remotely, and track their movement within the facility, providing valuable information to authorities. Some systems use infrared technology to spot people or vehicles in low or no light.

trade-offs, which is why vendors recommend you work with a company that takes the time to understand your objectives and explain the pros and cons of your various options. For example, thermal, analytics-enabled cameras are ideal for long-range detection at distances up to 1,000 feet where there is no lighting, says the Virginia executive, but they don't deliver the forensic and operational benefits of a visual-spectrum day/night camera. Infrared cameras have a shorter range, reportedly up to 400 feet. And both cost more than standard video cameras. The trade-offs and variables make a purchase of this type of security system more complicated. Each facility needs to select the number and type of cameras, where to place them, what hours to have them monitored, whether to buy or lease, and more.

Return on investment. For outdoor monitoring, the Michigan company president says the average yard uses 10 to 12 cameras; the Texas VP of sales gives a range of 10 to 15 cameras. Monitoring and maintenance average roughly $1,000 to $2,000 a month (including replacement cameras and upgrades) if the cameras belong to the security service provider; $350 to $2,000 a month if the scrapyard buys the cameras outright. One company charges the same either way. Full-service camera providers also can install and repair them, with the latter done on a time-and-materials basis, through a monthly service contract, or as part of the overall monthly fee. The security companies who contributed to this article charge a flat monthly fee for monitoring, but others reportedly charge by "the event."

These companies say most scrapyard customers opt to buy their own cameras. Buying gives you control and no interest payments; leasing means you'll have a lower capital outlay but usually a higher monthly expense. Prices can range from $25,000 to $50,000 for a set of high-quality "megapixel" cameras and installation in an average yard, but some vendors caution that the many equipment and installation variables make it tough to generalize. Do you want to detect fires? Read license plates? Pan and zoom? See colors? Add thermal or infrared imaging? Transmit cost-effective analog signals or HDTV-quality digital signals, which provide advanced analytic data? Cameras used just for recording, not monitoring, are much less expensive—in the $500 to $1,000 range, the Maryland company president says. An average yard could spend as little as $10,000 or as much as $250,000, the Ontario company president says.

Camera life spans average four to eight years in harsh outdoor environments. Dust, vibration, and extreme temperatures can all shorten a camera's life. "The harsher the environment, the more often we need to clean them and ultimately replace them," says the Virginia company executive. But with rapid advances in technology, it's just as likely that you'll replace them before they stop working.

These systems require electricity and a relatively fast Internet connection. Most companies require the facility to have access to a fourth-generation, or 4G, wireless network; a few can use the phone company's digital subscriber line, or DSL. Cameras might be able to use solar panels or air cards to keep the system off the yard's electric and telecom network to guard against data breach, though most companies say they need a strong electric supply. No company *Scrap* talked to had found a location it couldn't work with, whether through broadband, satellite, or cellular means.

Customers "have said, 'The price was hard to swallow at the beginning, but you've stopped our theft,'" the Michigan company president says. Scrapyards "tend to hire us for external theft, but they stay for all the other benefits," adds the Maryland company president.

Squadrito credits monitored video for SDI's ability to recover 98 percent of stolen material and convict 100 percent of the thieves it has caught. (Who is the company catching? In the third quarter of 2014, Squadrito says, the company indicted for theft three employees, two subcontractors, and eight nonemployees, with two cases pending.)

If you're on the fence (so to speak) about which security approach is best for your yard, "ask questions, watch webinars, do site visits or [get] demonstrations, [and] get company references," says the Texas vice president. For any company you're considering, "Do they not only design and install the system, but do their own monitoring as well, or [do they] subcontract that out?" the Virginia company executive asks. Also look at the details of the service-level agreement, he says. "Will [the company] maintain, clean, and replace the cameras as needed?" And what will it do if it can't resolve a service problem promptly? Also, he adds, "check their reputation in the industry." Most important, these scrapyard and security professionals say, is to research the specific options that will work for your site. After all, as the Ontario company president says, "every job is a custom job." S

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