



Loss Prevention and CCTV

April 13, 2007

All Along the Watchtower

By Ann Longmore-Etheridge

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The Rock and Roll Hall of Fame and Museum in Cleveland protects its collection with sound security policy and innovative use of intelligent video.

A museum dedicated to their music would have seemed unlikely to the children of the 1950s and '60s who claimed rebellious rock and roll as their own. But as these generations have aged, the reputation of rock has evolved from disaffected youth music to cherished cultural treasure worthy of study and preservation. More than 15,000 artifacts from the makers of this glorious noise are now housed at Cleveland's Rock and Roll Hall of Fame and Museum. Protecting those artifacts and the many memories they represent is a combination of innovative technology and old-fashioned people power.

"The title 'Rock and Roll Hall of Fame' implies a certain amount of mayhem at times," jokes its security director, Paul Steiner, CPP. But anything to do with the protection of artifacts is carefully choreographed.

The building housing the artifacts—an avant-garde merger of concrete and glass on the shore of Lake Erie—was designed by internationally renowned architect I.M. Pei. The museum's permanent collection includes such relics as Jimi Hendrix's guitars, the tee-shirt and jeans worn by Bruce Springsteen in his video for "Born in the USA," glittering stage costumes worn by the members of Destiny's Child, and childhood memorabilia of John Lennon, as well as cars, guitars and drum sets, scores, handwritten lyrics, and more from early bluesmen to current teen idols.

Key among places where security needs to sing are the curatorial area; the exhibit galleries—especially one known as the jungle gym; the concert hall, which regularly hosts performances, films, and lecture series; and the plaza, where large concerts and an annual four-day music festival are held.

Jun Francisco, director of collections management, oversees the conservation, storage, and transport of the museum's more than 15,000 objects, including "papers, photos, cars, costumes, musical instruments—anything a rock star would use in their lifetime," says Francisco. Of these, about 3,000 are on display.

Access Control

The museum has a tightly controlled in-house collection storage area. It is hidden in the bowels of the building, beyond a series of unmarked doors. Only authorized staffers from the exhibitions and curatorial department are allowed into the storage area after using an access control card followed by a physical key in a door lock. All alarms from the storage area go to the around-the-clock security command center.

When a new curatorial staffer joins the museum, both Francisco and Steiner jointly agree on the level of access that he or she will be granted. Security enrolls the newcomer in its personnel management system database and provides the access control cards, while Francisco approves the issuance of physical keys.

"Only about 5 percent of the staff have access to the storage area," Francisco says.

A larger group of employees are allowed to enter with an escort. CCTV provides a visual record of all activity, while the access control system logs card activity, showing who gained entry (or tried to) and when.

Access is also granted to credentialed historians, researchers, and conservation consultants and restorers. "This is a learning institution, and our mission is to be the foremost location to learn about rock and roll," says Francisco.

When a researcher asks to come and study an artifact, or a restorer's attention is needed, an application and vetting process takes place. "We're very particular. We allow mostly major researchers from major publications and well-known researchers academically," he explains.

Researchers who pass through the vetting are issued temporary access control cards, but they still are not given unfettered access. "Once we have determined that it is all right for a person to come in, then we provide them escorted access for their studies or restorations," Francisco notes.

All staff receive ID cards for the broader access control system that controls employee entrance and administrative areas of the museum and various exhibit area doors. Temporary badges are issued to contractors and visitors. These show an expired notification after one day.

Francisco and his curators use a PC-based collection-management system to track where artifacts are at any given time (on display, in storage, or on loan to another museum) and to record physical and conservation information about each artifact. Currently, no bar code or RF tags are affixed to any item in the collection because they cannot be removed from the artifact without causing damage. However, this may change in the future if a suitable, safe

system is found.

Emergency Management

As with any museum, the objects in the collection are at risk of damage by both natural and manmade emergencies. The museum has developed procedures for a variety of risks deemed appropriate to the facility and the location, and all employees and docents are trained in these procedures through evacuation, fire, and medical drills.

The threat of an engulfing fire at the museum is negligible because of the concrete and glass construction, but fire safety is still a consideration. In case of a fire in the curatorial area, the museum selected a water mist rather than a traditional sprinkler system.

Plans have also been developed for the curatorial staff, general staff, and some others to move the artifacts to safety in the event of any severe fire or other emergency that threatens the collection.

The museum is part of an alliance of Cleveland-area museums and historic properties that pool their resources during emergencies. The alliance agrees to share storage facilities and expert assistance among its members. The group also has plans to organize a shared disaster-supply truck.

Intelligent Video

The gallery informally called the jungle gym is a completely open exhibit area lit by theatrical lighting to create a “backstage” feel. Visitors traverse the elevated walkways to view a regularly rotated display of rare costumes and instruments.

“Right now there are drumheads from The Who, ZZ Top guitars, costumes from The Mamas and The Papas, and other items,” says Steiner. “Visitors are, at most, three feet from the artifacts and none of the items in this area are behind Plexiglas.”

Although there have always been security officers stationed in the area during operating hours, Steiner decided a few years ago that security needed to be improved, but he wanted a way to enhance protection without diminishing the experience visitors could have.

The concern was not theft, he explains, “because we really hadn’t had a problem with that; we were more concerned with people touching.”

Steiner and his team began reviewing various alarm technologies, including laser beams, motion detection, microwave, IFR motion detectors, and microwave motion detectors. None of them met the jungle gym’s needs.

For example, laser systems project “two or four beams across a certain space and someone can contort themselves to reach under the beams or around them. There is no flexibility with a laser beam,” Steiner explains. A microwave system that was tried “didn’t work for us because it bled over to other alarm areas; people walking behind it would set it off.”

As Steiner cast about for other options, he recalled how a different alarm system issue had been previously solved. Much of the museum has a glass exterior and when cars drive by it at night, their headlights frequently shine inside. These lights had triggered motion-activated CCTV cameras, which filled up the hard drives with unnecessary images.

In that case, Acuity Video Communication Technology (Acuity-VCT), the makers of the Acuity Video Capture System software package that controlled the CCTV system, wrote a custom algorithm telling the cameras to ignore repetitive motion in areas defined by lines drawn on the monitor screen with a software drawing tool.

“So I thought, ‘if I can tell the program to ignore things, could I also tell it to pay attention to things?’” Steiner recalls.

He asked Acuity-VTC to write additional modifications to the software allowing him to draw a box with the property that anything that moved inside the box caused an alarm. The company didn’t know if it would be possible, but it put its software engineers to work.

What the company came back with six months later was, according to Steiner, a “complete and total beta version” of a video motion-detection system that works within a highlighted area, wherein—because the camera perceives its field of view as an arrangement of pixels—any change above a certain, scalable threshold sets off an alarm.

“It probably takes about a day to master,” says Steiner. To set up an alarm zone, the operator chooses a camera and fixes its field of view.

“I go in, I look at the monitor, I see the area I want to protect, I go to my tool section of the software, and I use the drawing tool there to literally draw around the item I want to protect,” he says. “Once I do that, I set some sensitivity controls, then I just turn it on, and it’s good to go.” A user who is fully competent with the system can create and establish an alarm area in about 20 minutes, he says.

After the software and 14 color digital cameras were installed in 2005, however, it took about a month to work out the bugs. One issue was the interpretation of shadows, which Steiner says “are a lot longer and stretch a lot further than you realize.”

For example, in one zone, the system persistently alarmed without a clear reason. An investigation revealed that at certain times and under certain conditions, one object ten feet away threw a shadow into the alarm field, and that was causing the false alarms.

Another problem was the flexibility of the elevated walkways, which caused them to move when visitors moved along them. “Who expected that?” asks Steiner. “We had to desensitize for it.”

Once the problem areas were addressed, however, the system performed well. These days, most alarms in the jingle gym are set off by excited visitors reaching into the demarcated

frame area to point at an object.

If the alarm is triggered, a blinking blue light comes on above the artifact, indicating to the officers on duty in the jungle gym where the source of the alarm is. Concurrently, a loudspeaker announcement is played, telling the visitor to move away from the item.

The alarm also sounds in the monitoring center, and the footage from the associated camera pops up on the center's CCTV monitor. Once the frame area returns to normal, the alarm turns itself off and resets.

If an artifact is taken or damaged, selected cameras that are associated with the jungle gym's alarms activate so that security can track a perpetrator through the facility.

"We've figured out all the most likely exit routes. Those cameras all come up in the security center with the alarm camera, so right in front of the officer is everything he needs to know about: who did what, how they did it, and where they went," explains Steiner.

Using the cameras, security can follow the individual through the facility. It can then direct security officers on the best way to intercept the suspect.

False alarms are now rare. Steiner says that most of these happen because of routine changes. For example, an alarm might be triggered when a curator adjusts or changes a display or there are lighting changes caused by bulb burnouts.

The software cost the museum approximately \$10,000, which Steiner termed "pretty reasonable." Acuity is currently developing a commercial version for general release.

Overall, there are approximately 70 cameras covering the interiors and exteriors of the museum—all of them now with intelligent video capability. "Anyplace I have a camera, I can have an alarm without having to bring in an alarm company. I just turn that function on with that particular camera, and that alarm is set," he says.

Sometimes when a new alarm zone is added, it takes a while to adjust the system to avoid false alarms, notes Steiner. "We have one interior gallery that is underground. Every day at 4 p.m. there was an alarm in this section. As it turned out, there was some sunlight bouncing off some surfaces and through some gallery doors, ending up in that area... It took forever to figure it out," Steiner recalls, adding with a chuckle that users of the system will eventually discover every tiny oddity of their facilities.

Other Measures

Besides their CCTV coverage, all galleries are frequently patrolled by officers and attended by docents trained in security issues. They are access controlled after hours.

In addition, artifacts in all galleries except the jungle gym are surrounded by large Plexiglas cases mounted with security fasteners. The cases are purposefully made oversized and heavy,

says Steiner.

Some exceptions are made for automobiles and instruments when the curators decide that the cases might get in the way of a good experience. They have decided, for example, that drum kits once pounded on and kicked over by musical greats such as The Who's Keith Moon lose a certain intimacy of detail when inside a display case. Here again, the intelligent video alarm system is used to create a monitored zone that protects the instrument but still allows visitors to have close access.

New Exhibits

During the creation of a new exhibit, security and curatorial staff meet to discuss how items should be displayed. Once the cases have been chosen, security examines them to make sure they are not faulty. When the artifacts are in place, security walks the exhibit to see whether any shortcomings remain.

Because the exhibits frequently contain items loaned by artists or collectors, one consideration is the level of security the owner demands. Another consideration is whether the museum has received any indication that an item may be at risk of harm. "We'll do whatever we have to do to protect it," Steiner states.

VIPs

The museum's galleries are often graced by VIPs, some of whom arrive unannounced. Several years ago, former President Bill Clinton did so, and to security's surprise, set off a commotion akin to a rock concert.

"When Bill Clinton walked in, he was swarmed; everybody wanted to be around him. So we had to close the gallery to keep people away," remembers Francisco.

Another recent drop-in was actor Tom Hanks. "We scrambled—we got as many people where they needed to be as fast as we could. When it happens, everyone kicks in to make it a success," Steiner says.

Aside from the three or four A-list celebrities who just appear at the museum each year, most VIPs prearrange their visit with security—usually sending an advance team to discuss such issues as whether they want to tour privately or with the public and, if the latter, whether they want to interact or sign autographs.

Sometimes security encourages artists to tour the galleries privately if fans might overwhelm them. Last year, for example, security arranged for members of the band Green Day to see the exhibits in the middle of the night, after performing a local concert.

"They are so very popular right now, and they are so easily recognized that it would have been a mob. Others come in who aren't as easily recognized unless you happen to be a huge fan of that person. Those people security just walks around with; others, we clear areas and then take them through," says Steiner.

Special Events

The museum hosts a number of celebrity events as well as lesser events, such as conferences and business parties. Celebrities who are appearing as part of a special event at the museum coordinate with the museum's special event manager. One event was the recent Sports Illustrated swimsuit model photo shoot.

The museum also has a lobby stage where concerts are held. They are rarely staged by big-name artists; rather, the performers are local bands, such as those that participate in an annual high school Rock Off that has more than 30 bands playing over a number of days. However, up-and-coming groups often play at exhibit openings such as in late January, when an exhibit about the Vans Warped Tour—America's longest-running touring festival—featured well-known bands Paramore, Pennywise, Bouncing Souls, and Bad Religion.

There is also the yearly three-stage, four-day summer music festival with well-known bands such as Three Doors Down, Bill Wyman (formerly of the Rolling Stones), Good Charlotte, and Fuel.

For these higher profile events, Steiner augments the museum's regular contingent of staff officers (he prefers not to comment on its size) with about two dozen extra contract officers and off-duty Cleveland police. The museum uses a contract guard provider that specializes in entertainment security.

Security Staff

The museum's staff officers are trained in CPR, first aid, and defibrillator use, and attend a 140-hour Ohio police officers course. They also receive training on dealing with aggressive, drunk, and drugged patrons.

The curatorial staff teaches the officers how to handle artifacts in case of emergency. Officers also learn where permanent collection and exhibition objects reside and their history.

Steiner says that his team is as much a customer service department as a security department. "Actually, they probably spend more time telling people where the Jimi Hendrix display is than telling them not to touch something," he states.

In the 17th century, William Congreve was eerily prescient about the music of the last half of the 20th century when he wrote "Music has charms to soothe the savage beast, to soften rocks, or bend a knotted oak."

Rock and roll has done all that and more, and so it is appropriate that its artifacts and memorabilia are protected by the level of security afforded to other cultural treasures.

SYNOPSIS

More than 15,000 artifacts are cared for by innovative security technology and procedures at

Cleveland's Rock and Roll Hall of Fame and Museum. The museum's permanent collection includes such relics as Jimi Hendrix's guitars, the tee-shirt and jeans worn by Bruce Springsteen in his video for "Born in the USA," and childhood memorabilia of John Lennon.

The museum has a tightly controlled in-house collection storage area with access control and physical locks and keys. Only a small number of the museum's staff are allowed into the area unescorted, and careful plans exist for the movement of the artifacts in case of emergencies, with reciprocal agreements with other local museums for assistance.

The museum has adopted an intelligent video alarm system throughout its galleries that uses changes in frame pixels as a marker for intrusion. Selected CCTV cameras have associated alarms so that security officers in the command center can track a perpetrator through the facility using most-likely exit paths.

All galleries are covered by the CCTV system and are frequently patrolled by officers and attended by docents trained in security issues. They are access controlled after hours.

During the creation of new exhibits, security and curatorial staff meet to discuss how items should be displayed, and once the cases have been chosen, security examines them to make sure they are not faulty. When the artifacts are in place, security walks the exhibit to see whether any shortcomings remain to be corrected.

Security also handles the visits of various VIPs and celebrities, as well as officer staffing at special concerts, conferences, and other events that occur regularly.

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