



# Physical ATM Security Threats in the U.S. and How to Prevent Them

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# Introduction

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In recent months, there has been an increase in the frequency and variety of physical attacks on ATMs in the United States.

Criminals are using new methods to attack ATMs, including using vehicles to pull open the ATM safe doors; drive-up island ATMs have been particularly vulnerable to attacks like these. The U.S. is also seeing a surge in explosive attacks, and ATM customers need to plan their defenses accordingly.

This NCR Secure® white paper is designed to give you an overview of these attacks and outline a range of security options available to help reduce your risk.

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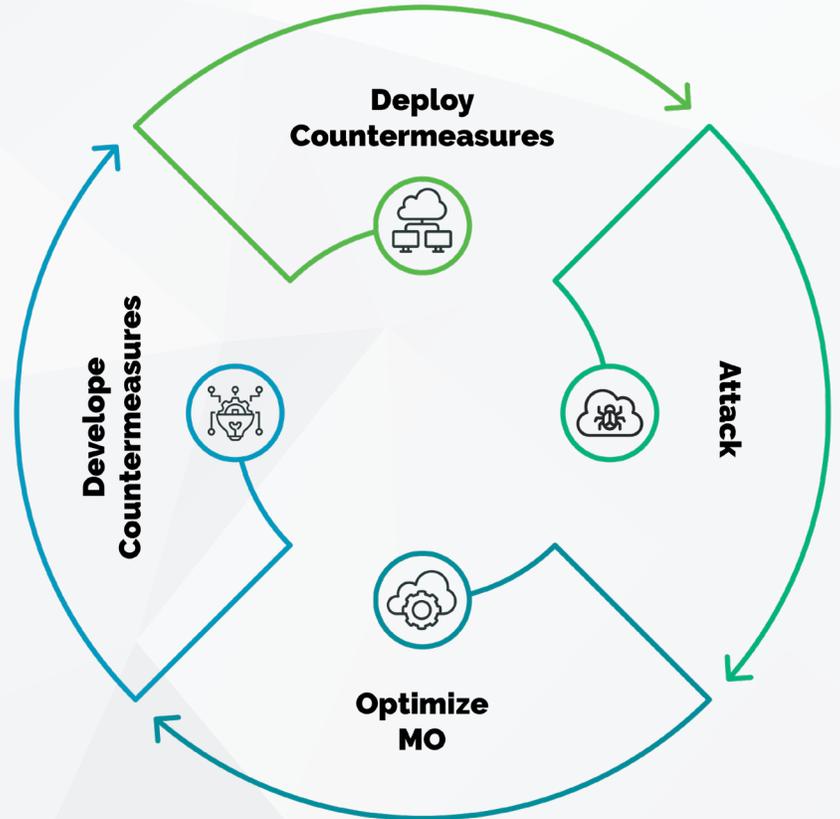
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## Understanding ATM crime—The evolution of the modus operandi

Criminals always seek new opportunities and continue to attempt crimes until they see that their efforts are unsuccessful. Then they move on and try something new—it's a never-ending cycle. Understanding this mindset is key to understanding how ATM crimes evolve.



There are four stages in the attack/countermeasure cycle (as seen in the diagram above). Each stage is not of equal length. Developing countermeasures can take time due to additional pressures placed on the industry, such as resources, budgets and the like.

The first phase, criminals have found an opportunity to attack units using a new type of vector. Since there are many test vehicles available to criminals, this new attack vector will see many iterations until the modus operandi (MO) is optimized by the criminals (second phase). In the third phase, manufacturers and banks develop protection and countermeasures to prevent attacks from occurring. When these are released, we see a deployment of countermeasures into the field (fourth phase).

Time, budgets and resources usually mean that the third and fourth phases can take considerably more time. Once the countermeasure is deployed and becomes effective, criminals need to develop new ways to compromise the ATM, and consequently the cycle begins again as new MO arises.

For example, in Europe, criminals moved from onsite tool attacks to ram-raid/pull-out attacks, to gas explosives, to solid explosives. For each attack type, new countermeasures had to be developed and deployed over a 10 year period. Due to evolving MOs, many European countries now mandate higher security safes (CEN 3 or 4) as standard and other countermeasures, such as note degradation systems. As a result of the changing landscape, NCR has made the strategic decision to move forward with the CEN 3 GasEx as an offering in all of our ATMs.

## Changing criminal landscapes

**According to the European Association for Secure Transaction (EAST) that tracks ATM attacks, there were 4,571 reported physical attacks on ATMS from all vendors in 2019—these include ram-raids, pull-outs, gas and solid explosive attacks. This equates to 13.7 attacks per 1,000 ATMs over the period.**

While explosive gas attacks continue to make up the majority of attacks, 321 solid explosive attacks were reported in 2019 by 10 countries, five of them major ATM deployers. Explosive gas attacks were reported by 12 countries, five of them major ATM deployers.

We can't say how many of these attacks were targeted on NCR units, the grading of these units and whether they had additional GasEx resistance, as this information is often not shared and also goes unpublished. What we do know is that certain countries in Europe, such as Spain, the Netherlands and Germany, all mandate higher security GasExplosive safes as standard in their markets.

Brazil had 1,027 physical attacks across their ATM estates in 2018—11 of which were solid explosive attacks. The numbers that Brazil are sharing are considerably lower than previous years, where they were experiencing up to 240 solid attacks per year (circa 2011) and over 35,00 physical attacks per year (circa 2013). Countermeasures, such as ink staining systems, implemented by banks in this region have helped to bring the overall number of attacks down year on year. Some of these countermeasure will be explored later in this white paper.

Physical attacks are now becoming a growing trend in the USA, with several explosive attacks reported in Florida and Washington in the first month of 2020. These attacks are occurring on ATMs from all manufacturers. A new take on the 'pull-out' attack, which began late Q3 2018 targeting drive-up ATMs, has caused a stir in the industry as criminals started using brute force to pull safe doors open using hook/chains.

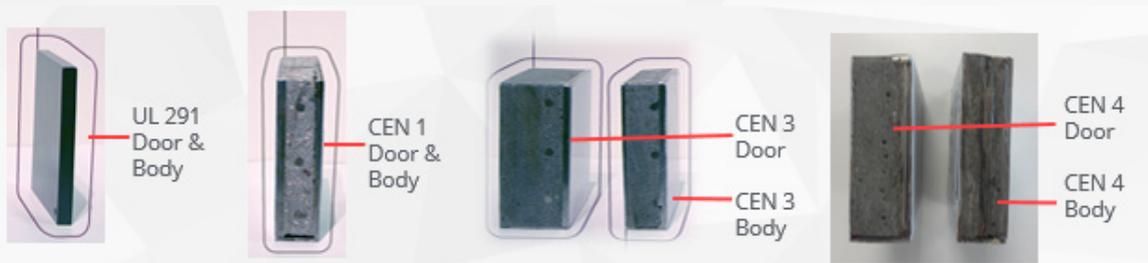
The attacks average only five or six minutes onsite with losses exceeding \$120k per unit. NCR has had 120 attacks reported so far to NCR Global Security—40 were confirmed successful. However, we believe many more are happening that haven't been reported directly to NCR and we are aware, from news reports, that these attacks are happening on competitor units, too.

The attacks are seen predominantly in Texas, but spreading to Louisiana, Florida and Georgia—though more than half of the attacks seen in 2020 so far have been in Texas. After releasing countermeasures for our CEN 1 Drive-Up range, the next step is to release higher security CEN 3 Gasex safes for standalone drive-up ATMs—not only to address the continuing threat of 'hook and chain' attacks, but also to protect against the growing threat of explosive attacks.

## Safe Strategy

**NCR has continued to evolve our safe strategy and design to put security at the forefront of all our product families. The first significant change was the move from UL® to CEN safes. UL safes are of steel construction as per the UL specification and guidelines; in comparison, the CEN safes are of composite construction, which offers greater resistance to tool attacks.**

The higher the CEN grade, the greater resistance to tool attacks such as grinders, acetylene torches and drills due to the added reinforcement within the safe body and doors. The Gas Explosive protection is offered on the higher security CEN 3 and CEN 4 graded safes. Cross sections of the safes are shown below for a comparison. The lowest grade of safe offered is CEN 1, however it was decided that CEN 3 with Gas Explosive protection should be the lowest level offered to standalone drive-up island units due to the traditional location of these deployments.



NCR has shipped over 30,000 CEN 3 GasEx and CEN 4 GasEx safes since 2014. Most of these deployments have been in Latin America, Europe and Australia. It has been observed that explosive attacks often migrate into neighbouring countries of those currently experiencing them, mainly due to geographic expansion of organised crime groups and opportunistic ease of obtaining explosives.

The GasEx safes were designed for the higher security models of safe (CEN 3 and CEN 4) but with the following features:

- Same physical space model—service footprint is maintained
- Improved boltwork—fixed bolts on hinge side to resist the explosion (on standard safes, the door was ejected after hinge side is breached)
- Improved barrier materials
- Better weld surface on locks chambers and on safe wall/door
- Additional internal materials

## Certification of Safes

ECB-S has been affiliated with renowned European test houses and all must adhere to audits, standardized testing and procedures.

The ECB-S board is composed of a balanced representation of experts from insurers, users and manufacturers of the security industry (security technology, protection against fire and burglary), as well as the management of the European Certification Body. The objective is to monitor the neutrality of the certification body, monitor the product certifications and ensure external quality surveillance audits are followed.



## Location considerations

**When planning and installing new ATMs, it's important to consider the location, general security and risk surrounding the site. Not only are financial institutions required to consider local mandates in place (for example, if deploying in Spain, the unit must have a CEN 4 GasEx safe as standard), they should risk assess every location and site.**

For example, ATMs located in-branch may be less vulnerable to certain attack vectors as they benefit from the security of the bank branch itself and the ATM is unavailable once the branch is closed. But an off-premise standalone dispenser located in a gas station forecourt, for example, may be more at risk since it's in an unattended environment. These assessments should determine which level of safe should be ordered for the site (either CEN 1, CEN 3 or CEN 4—with or without gas explosive resistance). CEN 1 safes should be considered for units which are interior and benefit from the surrounding security, whereas exterior units, in standalone environments, should consider CEN 3 or higher. If the risk of explosive attacks is high, then the GasEx version should also be ordered for these units.

Standalone drive-up ATMs can also have a high-risk assessment depending on where they are. During "hook and chain" assaults on standalone drive-up ATMs, it was found that ATMs at the end of the drive-up lane, especially where there was sufficient "runway" at the end, were more prone to this type of attack. In this situation, we recommend removing the "runway" if possible so vehicles can't drive off at speed. Some examples of removing this included the introduction of chicanes in the drive-thru lanes or addition of a bend after the last ATM. Where the runway can't be removed, some customers introduced street furniture, such as gates and anti-ram raid bollards to deter criminals from attacking their units.

We recommend all location sites be risk assessed, regardless if they're in branch or off-premise.

## Possible field upgrades

**While installing new ATMs is the best defense, it's not always practical or feasible for every financial institution.**

If you can't upgrade the safe in an existing ATM, NCR and third-party providers offer several solutions that can enhance the protection of your currently deployed ATMs. These include:

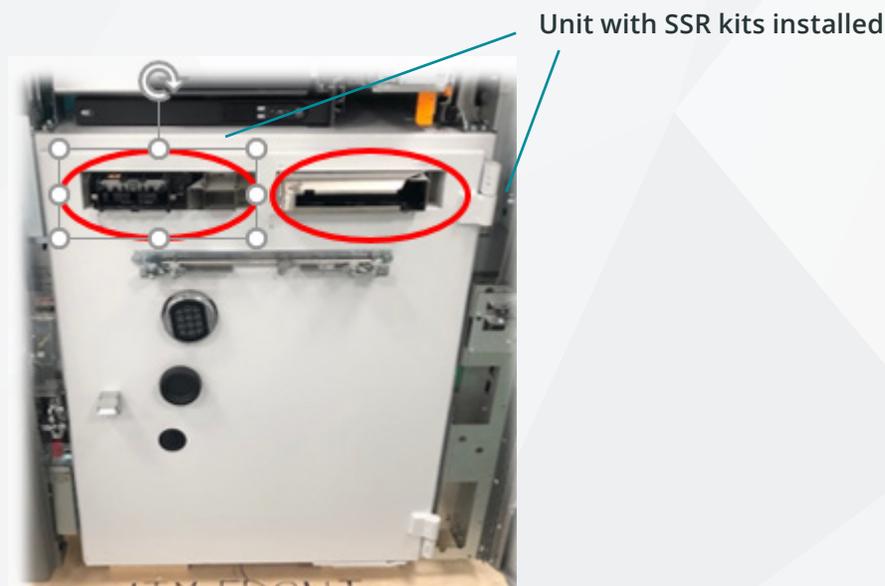
- Safe slot reinforcement kits
- Enhanced dispenser shutter assembly
- Gas detection/neutralization solutions that can be installed to detect the presence of gas used as part of an explosive attack. These devices can be configured to trigger alarms, smoke, sirens or other notifications. Gas neutralization will counteract the presence of an explosive gas to prevent an explosion from occurring
- GPS devices and ATM trackers that can be installed to notify when motion is detected on an ATM and track the location of the ATM
- ATM armor
- Cash degradation solutions like ink staining or glue solutions that will make the cash unusable if the ATM cassette is breached



## NCR Safe Slot Reinforcement Kits

With the emergence of “hook and chain” attacks in 2018, NCR looked to design a countermeasure that could be easily upgraded to our existing Stand-alone Drive-up ATMs. NCR’s release of Safe Slot Reinforcement Kits effectively removes all available space surrounding the dispenser/deposit aperture and reinforces the area around them. This makes it more difficult to damage the module transports and subsequently insert a hook through the aperture in the safe door.

Each aperture requires a Safe Slot Reinforcement Kit and has been uniquely designed for best fit around each module. Two are required for each ATM. The SSR kits are not visible once the fascia is closed.



The SSR were made mandatory features with all Stand-alone Drive-up ATMs (6688) ordered after June 2019. Upgrade kits are available for those units already deployed in the field and details are available on request.

## ATM Anchoring Systems

While all site preparation guidelines must be followed when installing an ATM, third-party anchoring systems can be used for units which may be at risk of ram-raid or pull out attacks. Anti-ram-raid plinths have various designs from concertina-effect to absorb shock loads and the unit can be pulled but not removed from its mounting, to others that include chains secured to the base of the plinths. All have been tested against heavy plant machinery, large 4x4 vehicles, car transporters and the like.

There are other retrofittable designs that can double up as physical and visual deterrents, too. Solutions have been designed for our multifunction products as well as the single function units.

Quotes are available upon request.



## Enhanced Dispenser Shutter Assembly

**The Enhanced Dispenser Shutter Assembly is a third-party solution designed to harden shutter assemblies against cash trapping attacks. The reinforcement offered by the shutter can also help protect against forced entry, removing the access required to place explosives or pump gas in the safe.**

The assembly comprises:

- Strengthened shutter, comprising stiffer blade with added reinforcement
- Sensors capable of detecting if the shutter is closed and locked, signaling if a shutter has been forced open

The Enhanced Dispenser Shutter Assembly benefits are:

- More than three times stronger due to thicker materials and reinforcement
- Improved sensors on the shutter now ensure that the shutter is in a locked state whenever the closed sensor is blocked

This is available for 6625, 6626 and 6634 (standard collar).

Quotes for products are available on request.

Other ATM models can be scoped for development for shutter protection on request.

# ATM Gas Protection System

**The use of gas explosives using butane or oxy-acetylene is increasing in North America since gas is easier to obtain than solid explosives.**

There are numerous gas protection system providers that are relatively similar in design and installation. These are designed to protect against the threat of gas explosives.

## Key Features

- Can detect any combustible gas via gas sensors
- Combustible gas can be detected in a matter of seconds
- Uses CO2 to purge any gas that has been pumped in the ATM
- Use of ignition to burn off any existing gas after the initial purge
- Can be connected to existing alarms
- Non-invasive installation

Quotes for products are available on request.



## GPS devices and ATM Trackers

**ATM trackers that use GPS technology can be installed into ATMs to allow tracking and recovery of either the cassette or the ATM itself, should they be stolen during an attack.**

The devices in use are small and of a covert design. They are fully automatic and silently and immediately notify local law enforcement of the pull-out crime as it occurs. They feature internal and external GSM and GPS antennas, and automatically detect tilt and/or motion. Tracking locations are usually updated every few seconds via secure website, and text and email alerts are sent if an ATM is attacked. The devices work on the principle that if a unit/cassette is stolen and traced, these units will become known in the criminal community as trackable. The success rate of retrieval of goods and apprehension of criminals as a result are very high according to vendor websites.

There are many companies that offer a variety of products to track objects. Most will require an initial hardware upgrade and installation fee, then an annual fee for access to their tracking services and tools. Most will tie in with local law enforcement agencies and offer 24/7/365 tracking capabilities.

Quotes are available on request.



## ATM Armor

**ATM body armor upgrades UL safes to CEN V level protection and above. Loktec's patented body armor packs (patent number GB2478534) provide the ultimate safe upgrade, providing physical and visual protection that has a proven track record with the ATM industry. Loktec armor packs are available for the ATM safe door, safe sides and safe front to provide individual protection for all areas that are commonly attacked. According to the manufacturer, the Loktec body armor has been 100% successful under physical attack; once Loktec body armor has been installed, no ATM deployer or FI has suffered a cash loss.**

This type of product will only offer protection against cutting or tool attacks only—not explosive attacks.

Once installed, the Loktec body armor provides year on year protection. The ATM body armor has been tested independently to BS EN1143-1: 2005 + A1: 2009 and exceeds the Cen V level of safe protection.

Loktec's visual and physical solutions are designed, tested and manufactured in the U.K. All ATM body armor panels are fabricated with a specially designed matrix and filled with their own Composite D barrier that exceeds normal safe protection levels to resist tool attacks.

### Key Features

- Independently tested and certified to BS EN 1143-1 standards
- Exceeds Cen V Rating
- Compatible with all ATMs
- Rapidly installed/easy retrofit With or without apertures
- Visual and physical deterrent
- Heavy duty construction
- Can be supplied globally
- Patent number GB2478534

Quotes for products are available on request.



# Cash Degradation

## **Ink staining systems are becoming more common in global deployments as a deterrent to physical attacks on ATMs.**

Whether deployed due to government mandates, Central Bank legislation or through customer preference, note degradation systems are growing in popularity.

There are many different vendors who offer ink staining systems for NCR ATMs—however NCR's preferred industry partner is Oberthur Cash Protection, which has had a long-lasting relationship with NCR and support systems for NCR customers in over 11 countries.

Ink staining systems can detectably mark banknotes through intelligent sensing systems that detect criminal activity (e.g., explosive/gas attacks/ram raids/forced doors/physical attacks). Ink staining also neutralizes the value of the notes. Many of the systems employed are designed to meet the mandatory requirements for homologated countries such as Belgium and enforced legislation as seen in countries such as Malaysia.

As a result, they offer a guaranteed 20% coverage on 100% of the notes. They are deployed globally, tried and tested on all types of currencies and substrates including polymer, and contain ink DNA to help trace notes back to the crime scene. Depending on the requirements, we can offer in-lid solutions or end-to-end sidewalk protection. The Oberthur solution includes a cassette locker to prevent false activations from cash in transit teams. Oberthur offers solutions for S1, S2, BRM and GBxx recycling solutions. The systems are designed for each module and so will fit within all products that we sell today.

The Federal Reserve Bank advises that the dye used in dye packs is not considered a contaminant, so notes stained from the dye alone should be deposited normally. Please see the below link for more details:

[frb.services.org/resources/financial-services/cash/exception-processing/contaminated-coin-currency.html](https://frb.services.org/resources/financial-services/cash/exception-processing/contaminated-coin-currency.html).

Glue solutions are still very much in development, and not generally available at the moment. The aim is to solidify the notes into a block after glue is released and set. NCR is monitoring two vendors to understand the outcome of their pilots/developments before recommending these products as part of our mainstream countermeasures.

The objective of both solutions is to 'destroy the prize' and therefore negate the crime.

Quotes are available on request.



## | Summary

**We can never expect criminals to leave ATMs alone. Criminals will continue to modify their attacks and attempt new kinds in one market and expand them to others. And physical attacks are on the rise.**

The only real defense is to stay proactive in securing your ATMs. No one solution fits all types of attacks, so layering up, slowing down the attack and working with local law enforcement is key to success.

NCR has been proactive in continuing to expand our portfolio of security products and solutions. Our teams are at the ready to help you assess the security needs for your company. To learn more, contact NCR or visit [NCR.com](https://www.ncr.com).

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