

SEARS SECURITY CAR BATTERY

Organisation	Sears
Trigger	<ul style="list-style-type: none">• The battery was developed as a business expansion strategy.
Objectives	<ul style="list-style-type: none">• To increase sales revenues and profits for Sears.• To build the DieHard brand.• To reestablish the company's image as a technology leader in the car battery industry.
Tools/techniques	<ul style="list-style-type: none">• Extensive market research involving observation and interviewing of potential consumers.• Secondary research conducted to determine the need for such a product.
Enablers	<ul style="list-style-type: none">• Strong desire for profit and brand enhancement.
Tensions	<ul style="list-style-type: none">• Trade off between space availability and cranking power.
Impact	<ul style="list-style-type: none">• This product is offered at Sears stores throughout the U.S.
Lessons	<ul style="list-style-type: none">• Marketing research helps establish design parameters early on.

Synopsis

The Sears Security DieHard battery was designed to reduce incidence of car theft by disarming the battery when the car is parked. This prevents would-be criminals from driving the car away. Electrical and starting mechanisms have been used previously to prevent a car being stolen, although the limitations of the design and technology deterred widespread application. Thus, Sears combined with Johnson Controls, a manufacturer of electronic controls, to develop the necessary technologies, without moving away from the standard battery size. The Security battery is activated by the push of a button on a corresponding key fob, which prevents the battery from being functional, although it does allow a small current to maintain components such as clocks and internal lights. This case was conducted in the United States and demonstrates the importance of market research and testing of designs against all possible uses and misuses when developing new products. The battery, for example, is designed to cope with major power drains and unauthorised starts.

Background to Sears Security Car Battery

The security features which now appear on today's cars, such as immobilisers and tracking systems, have all helped to reduce the incidence of car theft for certain makes. Yet, car crime continues to be a problem. According to Robert M Bryant, National Insurance Crime Bureau (NICB) President and CEO:

"Vehicle theft remains the number one property crime in the country, constituting more than seven billion dollars each year" (www.nicb.org).

Over 1.1 million vehicles were stolen in the US during 1999. These numbers represent a reduction in theft from 1998 when 1.4 million vehicles were stolen in the US. Approximately 75% of those are thefts for joy riding. The remaining 25% are stolen for spare parts or to be retagged and resold to unsuspecting buyers, or are taken out of the country for sale to foreign buyers. Approximately 68% of stolen vehicles are recovered. The cost to individuals and insurance companies runs in to tens of billions of dollars each year, not to mention the inconvenience and annoyance. The average loss payment claim in 1998 was \$5,816 (www.nicb.org).

Sears, the giant retailer of fashion, home, garden, and auto supplies, is one of the top sellers of automobile batteries, with the DieHard line being one of the most widely recognised in the United States. DieHard car batteries achieved prominence with the introduction of the no maintenance battery, which lasted significantly longer than its competitors. While still considered a premium product, the no maintenance battery is now standard on virtually every line of automobile batteries, thus closing the innovation gap between Sears and its competitors. The design brief called for the development of a car security product that would be consistent with Sears after-market automobile products; the most prominent of these being the Sears' DieHard battery line. The aim was to make it difficult for would-be car thieves to steal cars or light trucks.

Building on its tradition of quality and innovative design, Sears developed the DieHard Security battery to address the growing concern over auto theft. Sears describes this battery as: "*The only battery engineered to start your car and stop a thief.*"

Rather than attempting to make it hard to enter a car or difficult to access the steering wheel, Sears elected to focus on the electrical system which, when disabled, prevents the car from being driven away. This case is based on telephone interviews with William Walter, Product Engineer, Larry Costello, Public Relations Department Manager and David Albritton, Media Contact, all from Sears.

Design Process

Research

Market research identified two existing products: (i) a battery sold in Australia designed not to run down in the event of, for example, the lights being left on; and (ii) a battery sold in Europe that provided some form of theft protection through a wiring lead off the battery, which attached to an LED panel on the dashboard and could be used to disable the car when parked. The problems with these products were that they were limited in their

application and/or required a lot of additional effort and expense to install.

Technology

Although the concept of disabling the car using the electrical system was old, according to William Walter, the technology was new. To develop the technology that could be manufactured in standard sizes, Sears teamed up with Johnson Controls, Inc. a major manufacturer of electronic controls, which already had experience of products such as remote car door openers. The team was able to use this technology and apply it to controlling the battery relay. However, this technology had typically been used in comparatively clean environments with only moderate temperature fluctuations. The design team therefore had to consider how to prevent the electronics from being damaged by environmental debris such as road grime or battery acid. It solved this problem by housing the electronics in a sealed compartment that sits on top of the battery. The design team also had to consider how to ensure the technology could withstand radical temperature fluctuations. The various electronics options were therefore tested under extreme temperature conditions, as William Walter explains:

"The Security battery had to operate in a harsh environment. It was designed to stand changing environments including hot, cold, acid, mist, and road debris".

The final product has been designed to work in temperatures as cold as minus 40 degrees Celsius and as hot as plus 105 degrees Celsius.

Design

Built into the top of a DieHard Security battery is a security computer chip with a unique code. The anti-theft system becomes disarmed with the touch of a remote control that sends a signal to the chip. This device is similar in size and shape to the remote door locking and unlocking devices common with most car lines today and easily attaches to a key ring. When armed, starting power is blocked, but all other accessories function properly. Only when the driver disarms the system will the car start.

To arm the system simply requires the driver to press the remote control button. Confirmation is provided through a chirp. To disarm the system requires two presses of the remote control button, which is also confirmed through two audible chirps. Sears refers to it as rolling code technology, as each time the system is armed a new code is activated.

The DieHard battery is similar in shape and size to the company's standard batteries and conforms to the required dimensions of the various automobile manufacturers from around the world. Thus, installation is essentially the same as with any other battery.

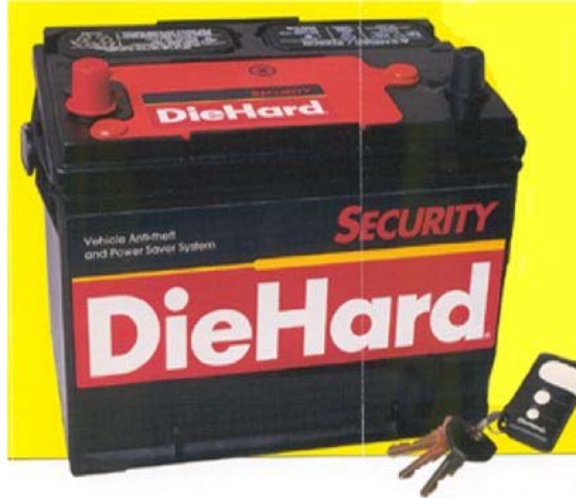


Figure 1: DieHard Battery

Misuse & Legitimate Use

When armed, the vehicle immobiliser protects against all types of unauthorised starts including: jump starts, hot-wiring and push starts. In the event that a neighbour requires a jump-start, then the owner of the car simply has to disarm the system.

In the event of a major power drain caused by, for example, inadvertently leaving the lights on, the battery is designed to turn itself off, thus reserving power for starting the vehicle. However, it recognises and allows for small power drains arising from, for instance, maintaining the electricity to the clock. An advantage of this design is that the power supply can be disconnected indefinitely, without having to remove the battery, which is a useful feature for vehicles stored for long periods of time in a garage.

If the remote control is lost, the battery can be re-programmed on the spot with a security code. Sears provides a special toll-free number for this purpose that is accessible 24 hours a day, 7 days a week.

Tensions

The design team encountered one major design obstacle. In order to produce the DieHard Security battery in standard sizes, the design team had to work out how to add the electronic security components to the battery without changing the overall size or dimensions of the battery. The sealed housing that sits on top of the battery is only about one inch in height, which meant that the height of the battery itself had to be reduced by one inch in order to accommodate the electronic components and retain industry standard shapes. To accomplish this without reducing the cranking power of the battery, the design team elected to reduce the height of the plates and altered the design of the internal grids. Although this reduced the CCA ratings for the DieHard Security battery, with very few exceptions, the new battery met the starting requirements of all major original equipment manufacturers. It was also noted that Sears offered the same warranty on this battery as they do with their standard batteries, that is a 3-year full replacement, 100-month limited

warranty.

Impact

The Security DieHard battery, which took approximately two years to develop from initial conception to market introduction, is currently being offered through Sears stores around the United States. The price of the DieHard Security battery is approximately \$130 with a trade-in battery. This price is just about double that of their standard battery and approximately 50 percent higher than their premium line. According to public relations personnel at Sears, the battery is meeting sales and profit expectations.

The Sears DieHard Security battery represents an affordable way to help prevent the theft of cars and light trucks. If combined with other security devices such as steering wheel locks and vehicle alarms, it will probably help reduce the incidence of car and light truck theft – although only time will tell.

There are, however, some limitations which need to be considered. Each DieHard Security battery comes with a sticker that can be affixed to a car's window which informs the reader that a special system has been installed. The sticker would be likely to deter joy-riders, who are typically young people who steal cars not for profit but for fun, and might prevent damage to a car arising from windows being broken and starting mechanisms vandalised. The sticker might also serve to inform professional thieves looking to resell the vehicle or its parts to bring a replacement battery or be prepared to tow the car away.

An additional problem with this design is found in the remote control device. While the key ring device is not that bulky by itself, when coupled with remote control devices for multiple vehicles a key ring could easily become very bulky. Although not a complete solution, the key fob that comes with the DieHard Security battery can be programmed to operate up to three separate DieHard Security batteries and specific models of Sears remote control garage doors.

Lessons Learned

This case study demonstrates the value of research into existing products and of the market advantage potentially gained from tackling issues of crime. It also shows the importance of considering all possible uses and misuses of a product designed to prevent crime. Although the products continues to have some limitations, it has nevertheless proved popular amongst consumers and looks likely to help Sears maintain its position with the marketplace.

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References, Related Case Studies and Further Reading

The data on auto theft rates in the US comes from the National Insurance Crime Bureau (NICB) www.nicb.org/

Povey *et al*, (2001) *Recorded Crime: England and Wales, 12 months to September 2000*. Home Office, Crime Reduction Unit. www.crimereduction.gov.uk. Statistics on vehicle crime in the UK.

www.homeoffice.gov.uk/ displays a list of car makes and their vulnerability to crime.

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Classification Index

Ekblom's crime classification	Misappropriation (theft).
BCS crime classification	Theft
DAC	Protecting vehicles and products
Primary motivation	Gain competitive advantage.
Type of designer	Engineers and technologists
Approach	Analysis of previous approaches
Sector	Automobiles
Location	Vehicles
Author	Eric Olson

DAC Sears security diehard battery