

# Calpipe Security Bollards™

Security with Style

A Division of

**CALPIPE INDUSTRIES™**  
Incorporated

## About Calpipe Security Bollards

- Headquartered in Rancho-Dominguez, CA, is a division of Calpipe Industries™
- Specializes in fixed, removable, lighted and retractable bollards made from carbon and stainless steel
- Full range of bollards from simple industrial products to custom aesthetic designs and tested vehicle stopping bollards that are used for anti-terrorist or high-threat applications
- For more information about Calpipe Security Bollards, visit our website at [www.calpipebollards.com](http://www.calpipebollards.com)



## Protecting the Santa Monica Pier From Vehicle Incursions.

### A Project Overview from Calpipe Security Bollards

Calpipe Security Bollards is a division of Calpipe Industries Inc. Since 1998, Calpipe has offered the industry's broadest range and largest selection of bollards from our own manufacturing facilities in Southern California. Headquartered in Rancho Dominguez, California, Calpipe offers a wide range of safety and architectural bollards, lighted and standard landscaping bollards, and crash tested and engineered high security bollards for anti-terrorist or high-threat applications.

## The Santa Monica Pier

The Santa Monica Pier is one of America's most visible public spaces with millions of visitors each year. Because the wooden structure itself was completed in 1909, the job required that any installation had to be done without compromising the structure itself. In addition to respecting the historical status of the pier, many natural and municipal challenges presented themselves:

- The very corrosive salt water environment of the Pacific Ocean would be just fifteen feet below the proposed bollard structure

## Challenge

- Calpipe Security Bollards was hired to develop a system that would defend the world famous Santa Monica Pier from accidental or deliberate vehicle intrusions

- The very corrosive salt water environment of the Pacific Ocean would be just fifteen feet below the proposed bollard structure

- An impact-resisting mounting plate would have to be fabricated and installed

- The bollard array needed to be retractable in order to allow access to emergency vehicles onto the pier

- Tight timing and budget requirements were imposed by the city of Santa Monica



- An impact-resisting mounting plate would have to be fabricated and installed, and be able to run horizontal to the wooden beams and joists of the pier
- Tight timing and budget requirements were imposed by the City of Santa Monica
- The bollard array needed to be retractable in order to allow access to emergency vehicles onto the pier

## Construction Concerns

Calpipe Security Bollards' engineering staff put together plans and drawings for an array of stainless steel retractable bollards that met the security requirements of the City of Santa Monica and yet could fit within the structural limitations of the wooden pier itself. The stainless steel bollards had to be supported in such a manner that the weight of the bollards themselves was spread across a large area of the pier, and that any expansion of the pier due to afternoon heat did not cause the bollards to move in their positions. A custom steel frame was designed and fabricated to carry this load and to help absorb the impact energy of any vehicle that struck the bollards. As a result, the whole array can act as one barrier, and not five individual barriers. This was essential to prevent damage to the pier while meeting the security requirements of the project.



# Project Challenges and Solutions

One of the challenges faced during the fabrication process was welding three plate sections of  $\frac{3}{4}$ " steel diamond plate to form one large 20'x4' reinforcement plate. The plate sections were welded together to prevent the plate from warping, which might cause the plate to not lie flat on the wooden pier. While structural requirements dictated a full penetrated weld, to avoid any deformity the plates were welded at different locations along the seams to prevent warping of one side of the plate assembly by uneven concentration of heat.

Another challenge was designing the bollard array to be somewhat flexible and not damage the pier if a car accidentally bumped into the bollard at a very low speed, 5 mph. To accomplish this, die springs were slipped over the bolts used to secure the bollard to the metal plate and wooden deck. The die springs were designed to compress and alleviate the moment/force acting upon the wooden pier beams. However, if a larger force was applied to the bollards, the force would be distributed throughout the metal plate, bollard casing and wooden beams, as well as the bolts holding the bollard in place.

## Conclusion

The end result of the project was an aesthetically pleasing bollard array that protects pedestrians while also allowing access to emergency vehicles. The city of Santa Monica was pleased with the fact that the pier was not irrevocably altered and that the safety of pedestrian and the structure itself was ensured. This array now provides the only day-to-day authorized vehicle access onto the Santa Monica Pier and was conceived and completed within a matter of months.



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## Solution

- Within a few months, Calpipe Security Bollards conceived and completed the project by creating an array of stainless steel retractable bollards
- The array met the security requirements of the city in a manner that allows any impact energy from a vehicle strike to be spread across the whole array and the load transferred into the structure of the pier and distributed across a wide area to minimize potential damage