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THE LA GUARDIA-PYKE BOMB CARRIERS*

James A. Pyke†

Soon after the World's Fair bomb explosion of July 4, 1940, in which two members of the New York Police Department were killed and several injured, the Honorable Fiorello H. La Guardia, Mayor of the City of New York, summoned the author, as Commanding Officer of the Bomb Squad, to the City Hall for the purpose of discussing the catastrophe and means of preventing a recurrence. As the result of this and several other conferences the "La Guardia-Pyke Bomb Carriers" were developed.

The purpose of these carriers is to take a bomb from a congested area to a remote or suburban district and to do so in a manner which will protect the public and the police. With the construction adopted should the bomb explode enroute the explosive forces are reduced to a minimum by means of a triple air-cushioning effect produced by the baffle screens of woven steel cable. This construction allows for the expansion of the gases in event of explosion but at the same time retains the fragmentation of the bomb.

THE FIRST LA GUARDIA-PYKE BOMB CARRIER

In September 1940 the first La Guardia-Pyke Bomb Carrier was completed by the Engineering Bureau of the Police Department. This carrier was built from a condemned 8-ton truck upon which was built a frame work to support blasting mats woven of flexible steel elevator cable. Within this enclosure of framework and mats was suspended a mat folded somewhat like an envelope in which the bomb would be placed for transportation and ultimately exploded.

On the morning of September 30, 1940, the carrier, having been taken to the test grounds in an old ash dump off Avenue U and East 76th Street, Brooklyn, N. Y., was prepared for the tests. The purpose of these tests was to determine: (A) The effect upon adjacent obstacles of an exploded charge, suspended in mid-air surrounded by a cushion of air; and (B) The effect of the surrounding cushion of air together with an enclosing perforated or air loose medium upon the destructive force of an explosion. The truck was then subjected to three explosion tests with the following charges: (1) two half-pound sticks of (40%) dynamite, (2) ten half-pound

*This article is published with the special permission of His Honor, Mayor Fiorello H. LaGuardia, and Police Commissioner Lewis J. Valentine.

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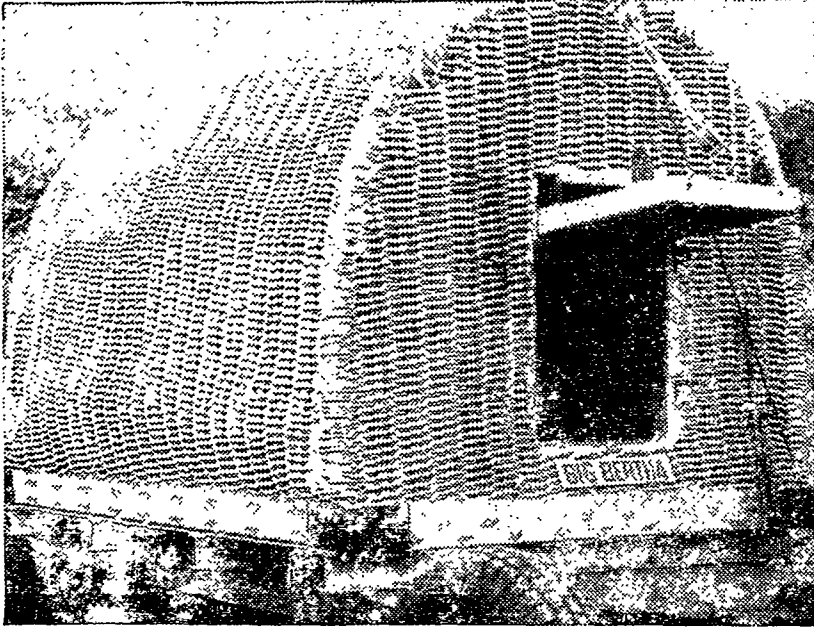


Figure 1

A side-rear view of the Second La Guardia-Pyke Bomb Carrier reveals its characteristic "Covered Wagon" design. The rear door which is open must be entered by the detective in order to place the bomb in the cradle, an unsatisfactory procedure which was eliminated in later designs.

sticks of (40%) dynamite, and (3) twenty-five half-pound sticks of (40%) dynamite.

The results of these tests showed that although the none too strong truck suffered damage, the wire matting withstood the force of explosion with little damage. In each test a ladder with a cardboard box located ten feet from the truck was left intact. The three test explosions supplied valuable data to aid in future designs of retarding detonation chambers. The basic principles of construction of this bomb carrier—that of suspending the charge in mid-air surrounded by a cushion of air—proved to be satisfactory and was incorporated into the design of subsequent carriers. These tests indicated that the perforated enclosure greatly reduced the destructive effect of the explosion and would consequently protect both property and lives.

THE SECOND LA GUARDIA-PYKE BOMB CARRIER

Following the test of the first bomb carrier, which had been constructed principally for the purpose of testing the practicability of the theory of suspended, air-cushion explosion, the carrier was dismantled—the mats being salvaged and the truck, which had already been condemned, being returned to the Department of Sanitation for salvage. Almost immediately plans were undertaken

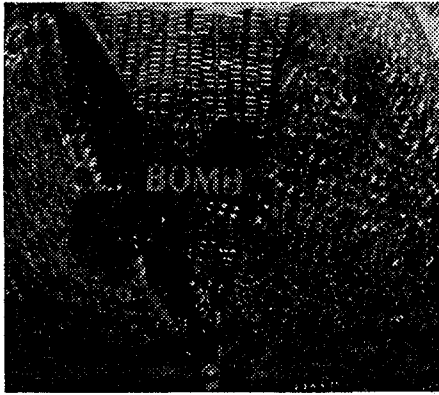


Figure 2

An interior view of the Second Carrier, taken within the bomb cage, shows the bomb cradle in an open position with a bomb suspended within. This cradle is secured shut before the bomb is transported.

for the construction of the Second La Guardia-Pyke Bomb Carrier which incorporated the lessons derived from the previous tests.

The carrier, built on a separate trailer, resembles a '49 Pioneer covered wagon (Figure 1). The steel framework is covered with $\frac{5}{8}$ inch steel cable forming the bomb-proof cage. In the rear of the cage is located a door by which the explosive charge can be placed within the cage. This door is secured shut with two one-inch bars secured with "I" bolts. Suspended within the cage is a ball-shaped bomb cradle which is covered with $\frac{3}{8}$ inch cable. The bomb is placed within the cradle which is hinged so as to open into two hemispheres and is secured shut by means of three half-inch steel "I" bolts (Figure 2).

On April 12, 1941, this carrier was taken to the testing ground and subjected to a series of severe tests.¹ The first test consisted of exploding three sticks of 40% dynamite which were tied together and suspended in the center of the cradle. This resulted in no damage to either the cradle or the other covering of the bomb carrier. The second test doubled the charge of dynamite and caused slight damage to one of the "I" bolts holding the cradle shut. After the damage was repaired the third bomb, consisting of a time bomb built in a 15-inch airplane luggage type case and holding twelve sticks of dynamite, was exploded (Figure 3). This bomb closely simulated the bomb which exploded at the World's

¹Persons in attendance at the demonstration and tests of the Bomb Carriers included: His Honor, Mayor Fiorello H. LaGuardia, Police Commissioner Lewis J. Valentine, First Deputy Police Commissioner Louis F. Costuma, Chief Inspector John J. O'Connell, Assistant Chief Inspector John J. Ryan, Deputy Chief Inspector Daniel J. Durtayne. Other organizations represented were as follows: Department of Public Works, New York City; Fire Department, New York City; U. S. Secret Service; U. S. Department of Justice; U. S. Naval Intelligence; U. S. Army Intelligence; U. S. Army Ordnance; U. S. Coast Guard; U. S. Bureau of Mines; New York State Police; Nassau County, N. Y., Police; Jersey City, N. J., Police Department; Jersey City, N. J., Fire Department; Newark, N. J., Police Department; Massachusetts State Police; E. I. duPont de Nemours & Company; Bethlehem Steel Corporation; Association of American Railroads, Bureau of Explosives.

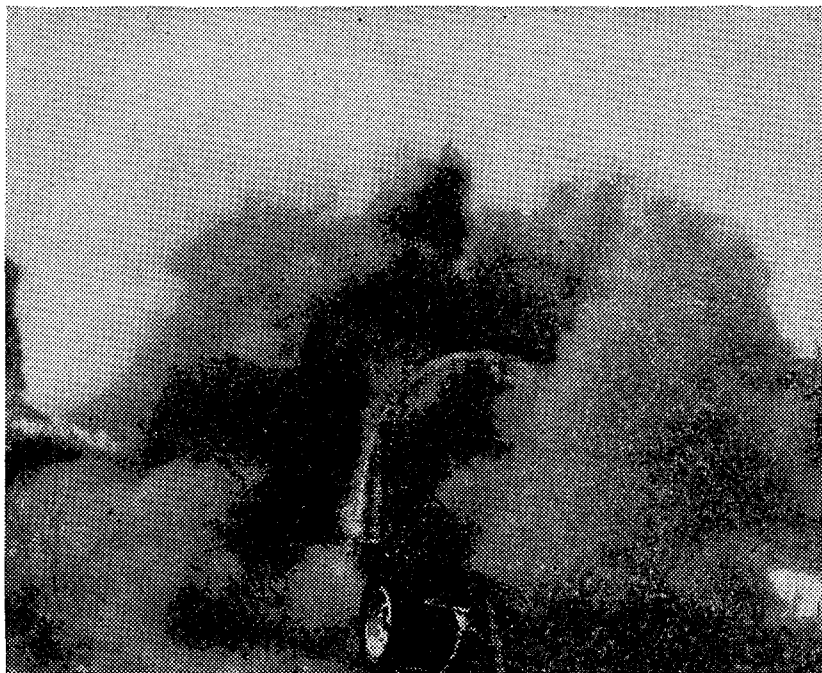


Figure 3

A photograph taken during the testing of the Second Bomb Carrier shows the manner in which the smoke (explosive gases) are allowed to escape while the bomb fragments are held. This is the fundamental theory of the design of these carriers. This photograph was taken during the explosion of test number 3.

Fair on July 4, 1940. The explosion parted the steel ring on the left side of the cradle and caused a slight bulge in the outer covering together with discoloration of the cage from the flame and smoke of the explosion. The fourth test was the explosion of a 20-inch (3 inch diameter) "pipe" bomb containing fourteen sticks of dynamite. The explosion of this bomb was terrific. It shattered the cradle in the interior and tore the outer cable covering in several places. Some fragments of the reinforced steel from the cradle were embedded in the steel covering of the cage while some of the smaller pieces of the bomb were blown through the outer covering.

Prior to the final test it was necessary to remove the remains of the inner compartment (cradle). Upon the completion of this task, which involved the use of an acetylene torch, the truck was prepared for the fifth test. This consisted of the explosion of a second luggage case time bomb charged with twenty-four sticks of 40% dynamite. In this test the bomb was suspended in the center of the conveyor without any inner net around it. While the explosion caused a split in the weld on one of the cross beams on

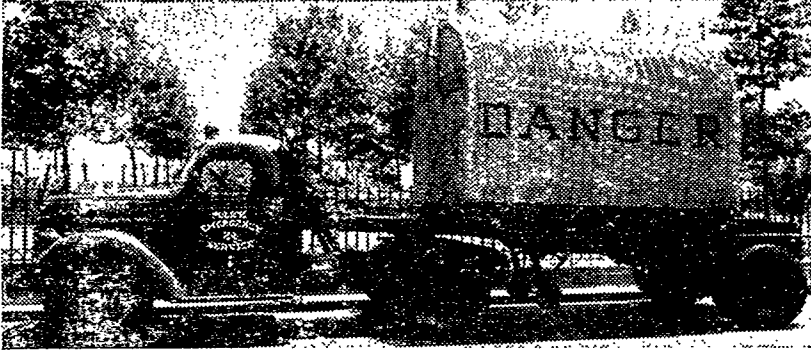


Figure 4

Although the exterior design of the Third La Guardia-Pyke Bomb Carrier closely resembles the Second Carrier the interior construction has been greatly improved. Note the additional safety precaution of the armor plate immediately behind the cab of the truck placed there to protect the driver in event of explosion of a bomb while in transit.

the right bottom side of the cage and some slight bulge of the cable covering, the carrier withstood the blast of the twenty-four sticks of dynamite remarkably well.

It will be noted that the greatest amount of damage to the carrier was caused by the explosion of the "pipe" bomb. This was due principally to the manner in which the dynamite was packed and confined, and the addition of the fragments of the steel bars with which the cradle was made as well as the shrapnel of the pipe itself. It should be pointed out, however, that the explosion of the pipe bomb is not the most practical test for the conveyor for if such a bomb were found unexploded there could be only a remote possibility of its premature firing unless the fuse be ignited or an electrical current supplied.

THE THIRD LA GUARDIA-PYKE BOMB CARRIER

A month after the tests of the second carrier a conference was held between His Honor Mayor La Guardia, Acting Commissioner of Public Works H. R. Seely, and the author to determine what structural improvements could be made in the construction of the third La Guardia-Pyke Bomb Carrier (Figure 4). All of the results of the tests on the second carrier were carefully considered, and it was decided that the only major change to be made would be in the inner construction of the Bomb Carrier. This consisted in the elimination of the bomb cradle, thus removing the possibility of shrapnel hazard, involved in the destruction of the cradle itself, and replacing it by a second inner cylindrical cage (Figure 5). This inner cage would be covered by blasting mats similar to the mats covering the outer cage. The two mats would be separated by ten inches of air cushion. By this means a series of sepa-

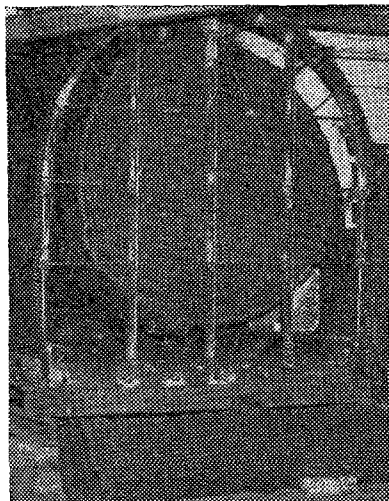


Figure 5

This photograph of the Third La Guardia-Pyke Bomb Carrier in the process of construction shows clearly the arrangement of the inner cylindrical cage within the outer bomb cage. The rear mat appears rolled below the framework. The suspected bomb is placed within the inner cage for transit.

rate and distinct "air cushion" areas are provided with the mats functioning as baffle screens which permit a sufficiently rapid escape of the gases while preventing the passage of bomb fragmentations.

Another improvement was incorporated in the inner construction of the new carrier. A framework in line with the door opening and leading past the center of the inner compartment was included and was so arranged that the regulation Bomb Tank² used by the Department could be pulled into the center of the compartment by means of a cable and pulley and locked into place. With this improvement the door of the bomb carrier is opened, the tank is placed on the carriage, which rolls out to the door to receive the bomb, it is then drawn into position and the door is locked.

All of these features have been incorporated in the third La-Guardia-Pyke Bomb Carriers, three of which are today in use. The following are the main improvements made in the construction of this carrier:

1. New mats were woven to required size with $\frac{5}{8}$ inch improved plow steel wire rope, with independent wire rope center. Each rope has a breaking strength of 18 tons.
2. The interior cage is of a cylindrical shape with a volume ten times greater than that of the sphere. It is built of the same size rope as the exterior shell instead of the $\frac{3}{8}$ inch wire rope used in the sphere.

²This tank is twenty-nine inches long, twenty-four inches high, and eighteen inches wide. It weighs, when empty, forty-eight pounds and has a capacity of fifty gallons. It is constructed of No. 26 gauge galvanized iron. The tank is equipped with a strap arrangement which holds the suspected package in place and keeps it from floating to the top when the tank is filled with oil.

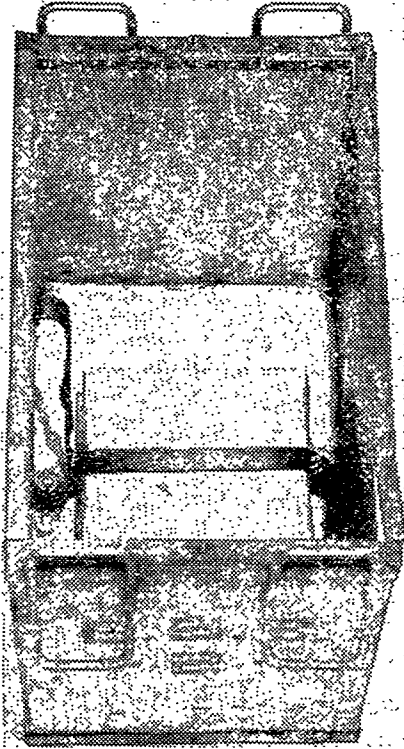


Figure 6

A view of the New York City Police Department's Bomb Tank (opened) with a suspected package strapped in place. The tank is closed by means of a heavy metal top.

3. The interior cylinder is separated from the exterior shell by $8 \times \frac{1}{2}$ inch steel plate ribs, and both the interior cylinder and the exterior shell are fastened to the ribs at closer intervals.
4. The door is larger, thereby making the handling of the bombs easier. It is also deeper and is made-up of four mats of $\frac{3}{8}$ inch wire rope woven around two sets of steel grilles.
5. A carriage is installed in the interior cylinder which rolls out to receive the bomb. Wooden construction was used for the carriage and its supports to avoid metal fragments in the event of explosion and shattering.

It is estimated that the new carrier will hold a bomb containing over one hundred cartridges of dynamite. (By term "will hold a bomb" is meant that it will retain the bomb fragments while the gases of explosion are allowed to escape.)

All of the carriers have been used in transporting suspected bombs from congested places to a suburban area where the objects were either exploded or worked upon with greater safety, both to the public and to the police. Today the third carriers are in active service, while the second is still in serviceable condition and is held in reserve.

To further aid in the handling of suspected bombs the New York Police Department has twenty trucks of the Emergency Service Division located at strategic points throughout the city. Each truck is equipped with bomb tanks (Figure 6)—in addition to the other two hundred pieces of special equipment. In the event of the discovery of a suspected bomb it is possible for one of these trucks to be at the scene within three minutes at almost any point in the city.

The test and the experiences gained through use indicates that with the present model of the La Guardia-Pyke Bomb Carrier an efficient means of transporting suspected bombs from the scene of discovery to some outlying district has been found in which there is little danger to lives and property of the public or the police. Here is a carrier in which even the largest of bombs encountered in police investigations could be moved without serious danger from premature explosions.

TECHNICAL APPENDIX

DETAILS OF THE THIRD LA GUARDIA-PYKE BOMB CARRIER

Constructed by the Department of Public Works, City of New York.

Shape resembles that of a '49 Pioneer Covered Wagon.

Trailer (Fruehauf):

Length: 18' 0"; Weight: 3850 lbs.; Chassis: A-2 Oval Front.

Beams: 7" Channels, Wheels: 10.00-20 dual.

Truck:

General Motors, 6 cyl. 1942, 85 H. P. at 2800 Rev.

Wheelbase: 136"; Cab: 60"; Weight 6600 lbs.; Tires: U. S.

Royal 10.00-20 10-ply plus 2 shock jacks.

Bomb Proof Cage:

Length: 11'; Width: 7' 8"; Height: 8' 10"; Weight: 18,000 lbs.

Height as mounted on chassis; measurement from street level to topmost part of carrier: 12' 11½".

Inner Construction:

Wire rope center, 6" x 19".

a. Inside cylinder dimensions:

Length: 9' 4"; Width: 5' 8"; Steel Cable: ⅝".

b. Entrance door—at rear of truck:

Length: 54"; Width: 30"; Depth: 8".

c. Number of woven steel mattings in door section—size of cable used:

Number: 4; Cable used: ⅜" x 6" x 37".

d. Doors locked in place by two steel bars:

Size: 2" diameter.

Total Weight: 28,450 lbs. Bomb-Proof Cage, Trailer and Truck.

Cost: Approximately, each carrier, \$15,000.