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Multiple Blasts: More Evidence

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A new study analyzing explosive tests conducted by the U.S. Air Force against a reinforced concrete structure may provide an important key to understanding the April 1995 bombing of the Alfred P. Murrah Building in Oklahoma City, which took 168 lives. The report, based on testing data and photographs supplied by the Armament Directorate, Wright Laboratory at Eglin Air Force Base in Florida, lends powerful support to the arguments of those experts who have challenged the official government position that a single, large ammonium nitrate/fuel oil (ANFO) truck bomb parked outside the Murrah Building was solely responsible for the massive death and destruction.

Led by Brigadier General Benton K. Partin (USAF, ret.), former director of the Air Force Armament Technology Laboratory and one of the world's premier explosives and ordnance authorities, critics have argued compellingly that the blast wave from the ANFO truck bomb was totally inadequate to cause the collapse of the massive, steel-reinforced concrete columns of the federal building in Oklahoma City. This fact, together with much other forensic evidence from the crime scene, they contend, points inescapably to the conclusion that additional demolition charges had to have been placed on columns inside the building. Which means that this terror bombing was a much more sophisticated operation than the federal authorities admit, requiring more hands, brains, and brawn than any lone bomber could supply. If that is true, the other bombers are being let off the hook by the government's insistence that Timothy McVeigh was the sole efficient cause and the truck bomb was the instrumental cause of "the deadliest terrorist attack on American soil."

The new Eglin blast study convincingly proves the fundamental points set forth by General Partin: That air blast is an inefficient mechanism against hardened, reinforced concrete structures, and that "the pattern of damage [to the Murrah Building] would have been technically impossible without supplementing demolition charges." Entitled ***Case Study Relating Blast Effects to the Events of April 19, 1995 Alfred P.***

Murrah Federal Building, Oklahoma City, Oklahoma, (hereafter referred to as the ***Eglin Blast Effects Study***, or ***EBES***), the 56-page report includes photographs and data from the Eglin blast tests, as well as extensive technical analysis of those tests, conducted by construction and demolition expert John Culbertson. The study relates the Eglin parametric data to the Murrah Building and presents a serious challenge to the federal prosecutors' official bombing scenario. The report also contains letters from engineers and technical experts who have reviewed the study for THE NEW AMERICAN.

The blast effects tests conducted by the Wright Laboratory at Eglin Air Force Base involved a three-story reinforced concrete structure 80 feet in length, 40 feet in width, and a total height of 30 feet. The Eglin Test Structure (ETS), according to the***EBES***, "while not as large as the Alfred P. Murrah Building in Oklahoma City, has many similarities and therefore provides an excellent source for data." The study continues:

The ETS is similar to Murrah in its basic layout with three rows of columns in the long axis and a series of narrow bays in the short axis. The ETS was constructed of six-inch-thick concrete panels similar to the six-inch-thick floor panels of Murrah. In addition, a series of 14-inch square columns supported the panels in the corners of each room and at the edge of the floor panels. This configuration bears a similarity to the Murrah building's system of columns, T-beams and floor panels.

While noting the similarities in structural layout of the ETS and Murrah, the ***EBES*** also makes note of the major differences in construction methods and overall structural integrity between the two buildings, stating that the ETS "must be considered an inferior structure in terms of strength and blast resistance," and that the ETS "is actually more indicative of some structures to be found in third world countries and is not representative of concrete structures to be found in the United States." The Murrah Building's floor panels were reinforced "with approximately five times the amount of steel" used in the Eglin structure's panels. An even greater contrast is found in the columns and beams, where "the steel fill in the Murrah Building was much higher than the ETS, in most cases by a factor of 10 or more." The study also observes that "while the ETS did not use stirrups in its columns and beams, the Murrah Federal Building did, thereby increasing strength to a level far above the ETS." Additionally, the ETS lacked a roof panel, which "reduces the overall rigidity of the structure, and in particular the third story wall panels, making the third story more susceptible to

damage from an explosive device." Finally, since concrete develops strength with time, the relatively fresh concrete of the ETS must be considered weaker than the mature strength of the Murrah Building's concrete.

All of the foregoing is of particular significance since, as the Air force tests demonstrated, air blast alone was singularly ineffective in causing major damage to the ETS. And if air blast could not effect catastrophic failure to the decidedly inferior Eglin structure, it becomes all the more difficult to believe that it was responsible for the destruction of the much stronger Murrah Building.

Three different explosives tests were conducted on the Eglin Test Structure. The first test used 704 pounds of Tritonal, which is equivalent to 830 pounds of TNT, or roughly 2,200 pounds of a properly prepared ammonium nitrate/fuel oil (ANFO) mixture. The Tritonal was contained in a light aluminum case and was placed outside the structure at ground level 25 feet from the vertical surface of the 40-foot side wall. This test most closely parallels the truck bomb at the Murrah Building and provides important parametric data for assessing blast-wave damage at the Oklahoma City site. Besides being external to the ETS, the aluminum casing provided a container similar to the light shell of the Ryder truck. Like the truck bomb, the Tritonal test attempted to effect damage to the concrete structure with an air-couple blast wave without the help of heavy shrapnel.

By contrast, the second and third tests used steel-cased warheads detonated inside the ETS. The second test used a standard Mk-82 warhead (equivalent to 180 pounds of TNT) placed within the first floor corner room approximately four feet from the exterior wall. The third test involved a 250-pound penetrating warhead (having an equivalent explosive weight of 35 pounds TNT) which was placed in the corner of a second floor room approximately two and a half feet from the adjoining walls. As the photographs from Wright Laboratory graphically show, these two explosive devices, although much smaller than the Tritonal device, effected far greater damage to the ETS. This disproportionate destruction was largely a function of three critical factors: distance, mechanical coupling of the blast wave, mechanical coupling via shrapnel, and contained pressure (due to being confined within the structure).

As General Partin has taken great pains to emphasize, the inefficiency of a blast wave through air is dramatic -- particularly outdoors, where the blast energy is dissipated in all directions -- with its pressure and destructive force falling off more rapidly than an inverse function of the distance cubed (distance expressed in radius units). This means that the blast wave from an explosive device which yields a maximum blast pressure of one-and-a-half million pounds per square inch at the center of the device will have dropped off to under 200 pounds per square inch by the time it has traveled 20 radii. This makes air blast alone very ineffective against hardened concrete structures, such as heavy, steel-reinforced columns.

The photograph from Wright Laboratory of the first test involving the external Tritonal explosion confirms this very important principle of blast effects. The six-inch-thick concrete wall panels on the first floor were demolished by the air blast, though the reinforcing steel bars were for the most part left in place. The 14-inch columns remained unaffected either by the blast pressure wave or the stresses produced by the pull of the reinforcing steel in the wall panels as they broke up. Damage to the second floor wall panels is considerably less than that to the first floor walls, and very little damage can be seen to the third floor wall panels, even though there is no ceiling to provide stability.

A detailed pressure map matrix for the entire vertical face of the ETS was prepared for the ***EBES***, providing a one-foot grid which gives the maximum potential blast pressures for any given point on the face. According to the pressure map, the vertical face in the first test experienced a range of maximum blast pressure from 34 psi (pounds per square inch) to 174 psi (page 32). Maximum blast pressure on the six-inch-thick wall panels for the first floor ranged from 74 psi to 174 psi. Wall panels on the second floor had a maximum blast pressure ranging from 53 psi to 141 psi. The third-floor panels had blast pressures of 34 psi to 84 psi, yet experienced no damage even though a significant portion of the panels was subjected to pressures exceeding the 70 psi yield factor for the six-inch-thick walls.

Computing the blast pressure for the Ryder truck's estimated 4,800-pound ANFO bomb, the ***EBES*** determines that the radius from the center of the device that would manifest a pressure of 70 psi or more would be 42.37 feet. "It can therefore be expected," explains the study, "that within a radius of 42.37 feet from the center of the explosive, any six-inch reinforced concrete panel positioned so as to have a major face

perpendicular or nearly perpendicular to the travel path of the blast pressure wave from the explosion would be damaged." The study notes that the floor panels in the Murrah Building were of the same thickness as the ETS panels and, starting with the third floor, had a similar positional relationship to the device as the panels in the Eglin test. Accordingly, the ***EBES*** found: "A limited area of the third and fourth floors of the Murrah Federal Building immediately adjacent to the position of the Ryder truck would be affected. On the third floor a roughly circular shape extending into the building and approximately 40 feet down the north face of the building from the center point of the explosive, which was located some 14.5 feet north of the north face of the building. This circular area contained approximately 1,250 square feet of six-inch panel.... The fourth floor panel that experienced 70 psi and above was limited to a roughly circular-shaped pattern of approximately 400 square feet."

The conclusions of the ***Eglin Blast Effects Study*** are compelling and carry stunning implications. With the ETS having significantly less integral strength than the Murrah Building, the ***EBES*** conclusions have a built-in margin of error that, if anything, overstate the extent of damage to be expected at the Murrah Building. Moreover, the computations for the Ryder truck bomb also are overly generous. "Because ANFO is also a low-energy explosive (approximately 30% that of TNT) and due to the inherent inefficiency of eight barrels forming the explosive assembly [according to the government's estimates], it is doubtful that the device produced blast pressures close to the calculated maximum potential blast pressure," the study asserts. "This being the case, it is doubtful that the radius of damage even approached the 42.37 foot range as calculated herein."

Finally, the ***EBES*** concludes:

Due to these conditions, it is impossible to ascribe the damage that occurred on April 19, 1995 to a single truck bomb containing 4,800 lbs. of ANFO. In fact, the maximum predicted damage to the floor panels of the Murrah Federal Building is equal to approximately 1% of the total floor area of the building. Furthermore, due to the lack of symmetrical damage pattern at the Murrah Building, it would be inconsistent with the results of the ETS test [number] one to state that all of the damage to the Murrah Building is the result of the truck bomb.

The damage to the Murrah Federal Building is consistent with damage resulting from mechanically coupled devices placed locally within the structure....

It must be concluded that the damage at the Murrah Federal Building is not the result of the truck bomb itself, but rather due to other factors such as locally placed charges within the building itself.... The procedures used to cause the damage to the Murrah Building are therefore more involved and complex than simply parking a truck and leaving....

Mike Smith, a civil engineer in Cartersville, Georgia commissioned to review the Eglin Blast Effects Study, states:

The results of the Blast Effect Test One on the Eglin Test Structure present strong evidence that a single Ammonium Nitrate and Fuel Oil device of approximately 4800 lbs. placed inside a truck could not have caused the damage to the Murrah federal Building experienced on April 19, 1995. Even assuming that the building had structural deficiencies and that the ANFO device was constructed with racing fuel, the air-coupled blast produced from this 4800 lb. device would not have damaged the columns and beams of the Murrah Building enough to produce a catastrophic failure.

Robert Frias, president of Frias Engineering of Arlington, Texas, after examining the ***EBES***, concluded: "The Murrah Building would still be standing and the upper floors would be intact had the truck loaded with explosives been the only culprit." Moreover, Frias, a practicing engineer for over 40 years and a registered engineer in Texas, New Mexico, and Louisiana, stated: "Explosives had to have been placed near, or on, the structural columns inside the building to cause the collapse that occurred to the Murrah Building."

Likewise, Alvin Norberg, a licensed professional engineer in Auburn, California with over 50 years of engineering experience on over 5,000 construction projects, writes that evidence from the ETS data "verifies that the severe structural damage to the Murrah Building was not caused by a truck bomb outside the building," and that "the collapse of the Murrah Federal Building was the result of 'mechanically coupled devices' (bombs) placed locally within the structure adjacent to the critical columns."

Kenneth Gow of Whittier, California, with over one-half century of engineering experience in the aerospace industry, writes in his evaluation of the ***EBES***: "The Eglin Test Structure report ... further reinforces the conclusion that a substantial portion of the Murrah Building damage was by internal explosions.