Southeastern PA Cold War Historical Society

Preserving History Through the Memories of Those Who Created It

Did you know?

The Greater Philadelphia Region has a rich aerospace heritage!

With the recent news of the rescue of 2 US Air Force pilots ejecting from their F-15 jet over Iran this past week, there was mention on the news about the “G forces” they encountered when they ejected from their aircraft.

Did you that the Navy performed research on acceleration (G forces) experienced from pilots in ejection seats with an ejection tower originally from the UK? And some of that research was performed at the Philadelphia Navy Yard and the Naval Air Development Center, formerly in located in Warminster, PA?

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Sir James Martin was the co-founder of the Martin-Baker Aircraft Company in 1934 in the UK.

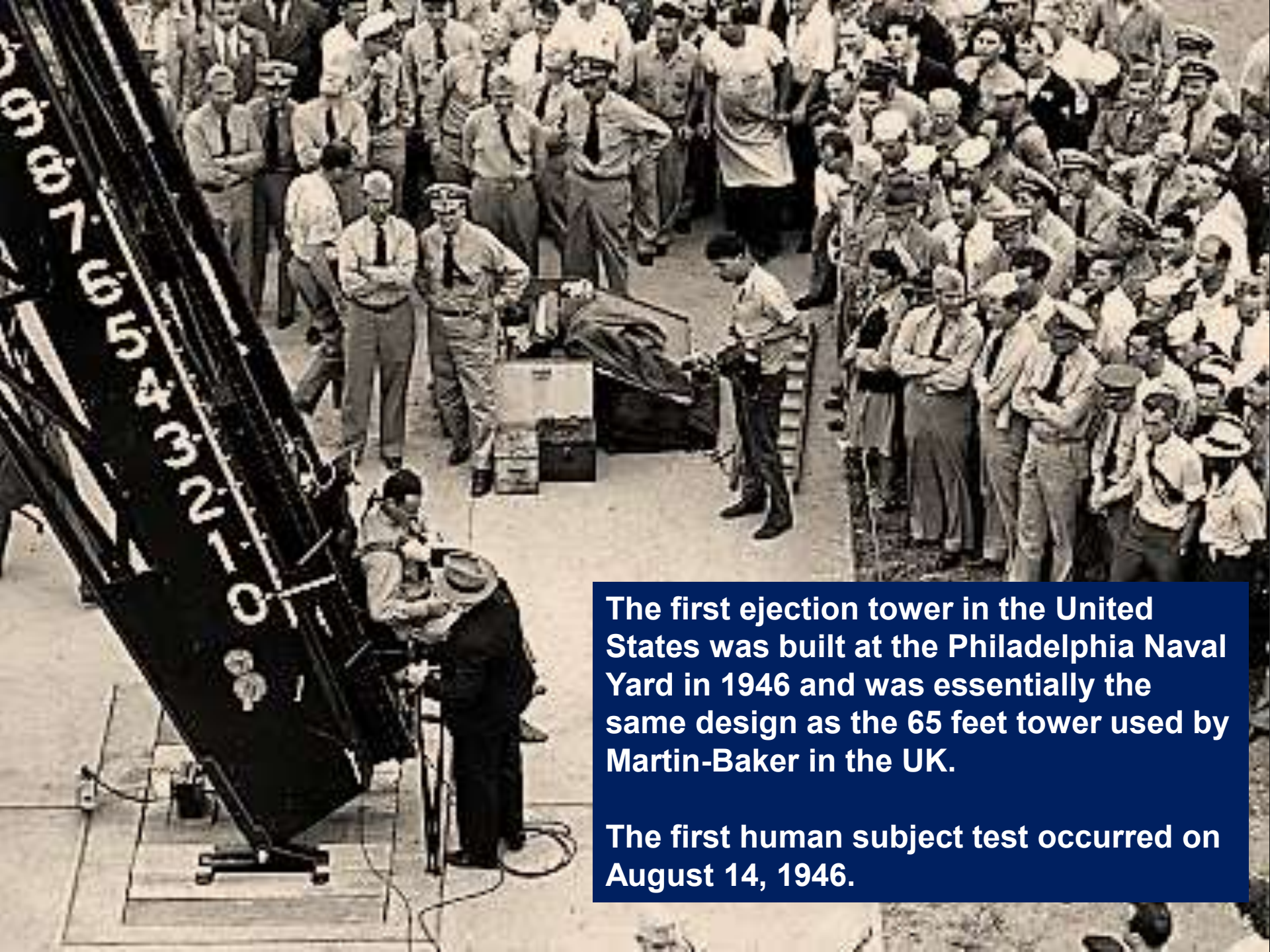
Martin’s business partner and test pilot, Captain Valentine Baker, died in a crash of one of their aircraft in 1942.

Baker's death affected his partner deeply, so much so that pilot safety became Martin's primary focus and led to the reorganization of the company to focus on ejection seats.

In order to evaluate ejection seat designs, Martin-Baker built a 16-foot test rig in the form of a tripod, one of the legs being in the form of guide rails.

The ejection seat was propelled up the guide rails by a gun, consisting of two telescopic tubes energized by an explosive cartridge. The guide rails were provided with ratchet stops every 3 inches, so that the seat was automatically arrested at the top of its travel.

This basic design and function of the test rig was carried through to the operation of the Navy's own Martin-Baker ejection tower; that is, the tower, along with explosive ordnance, was used to produce dynamic conditions simulating the initial propulsion phase of an ejection from an aircraft.



The first ejection tower in the United States was built at the Philadelphia Naval Yard in 1946 and was essentially the same design as the 65 feet tower used by Martin-Baker in the UK.

The first human subject test occurred on August 14, 1946.

Philadelphia Evening Bulletin reporter Carol Gelber riding the ejection seat tower at the Philadelphia Navy Base, 9/18/1959

The tower was relocated from the Philadelphia Navy Yard to the Naval Air Development Center in August 1976.

These series of photos show the reassembly of the ejection tower following its relocation.

The ejection tower is 150 feet high, inclined at an angle of 20 degrees from the vertical. Could provide accelerations up to 30 G, with onset rates of up to 500 G/sec with a payload of 600 lbs.

The red and white checkered paint pattern was a visibility enhancement for low-flying aircraft when the Naval Air Development Center was open. It is painted all-white today.

What was it like to be sent up the ejection tower?

”I don’t care who you are or how tough you think you might be, but when you’re sitting in that chair and the countdown starts, you start to perspire and get nervous.”

Paul Minnich
Hospital Corpsman, 2nd Class
February 1991

The test was fairly simple. Put on a helmet, sit in a seat and reach over your head and pull the curtain down. No problem. The initial shock to your body would be ten times the force of gravity. The seat would reach maximum altitude and you would fall back to the ground riding the track. A hydraulic piston would absorb the shock of your fall so that there was a miniscule amount of pressure to your body. Isn't that just grand?

In reality, I pulled the curtain down and forward. By time the curtain was passed my face, I had already traveled up the one hundred feet and came all of the way down! 2 seconds, if you blinked. Most likely a second and some small change! I walked away but my back will never be the same.

Emil DiMotta
Naval aviator and 1962 graduate of the U.S. Naval Academy who flew in the South China Sea during the Vietnam War

What the ejection tower looks like today