



GE Panama Canal Mule ELECTRIC TOWING LOCOMOTIVE

The 48-mile long Panama Canal opened in 1914. One of the largest and most difficult engineering projects ever undertaken, the Canal with its system of locks greatly reduced the time for ships to travel between the Atlantic and Pacific Oceans. As a safety feature, ships were guided through the lock chambers by electric locomotives known as mules (named after the pack animals traditionally used in Panama). Mules are used for side-to-side and braking control in the locks. Forward motion into and through **the locks is provided by the ship's engines.**

The Panama Canal Towing Locomotive #686 was one of a fleet of 40 built by General Electric in Schenectady, New York between 1914 and 1915. Its operators referred to it as a "lock mule" or "mule". At one time, more than 100 of these mules operated at Gatun, Pedro Miguel, and Miraflores lock stations.

A total of forty GE mules were produced, only five still exist.



These are the third generation of electric locomotives on the canal. The track is 5' gauge with a rack in the middle and power conduit on the land side. The locomotives do not pull vessels through the locks. The ship provides its own propulsion. The "mules" act more as a brake and to keep the vessel in the center of the lock. The vessel is under the control of the canal pilot during the transit. While known as mules, animal traction was never used in the Panama Canal.



Panama Mule # 686 was manufactured in 1914 and was a **"Pacific Locks Mule"** which operated at the Pacific end of the canal. Atlantic mules, by comparison, differed slightly in appearance.

No. 686 has dual electrical and mechanical controls, permitting operation from either end. It was powered by a three-phase, 220-volt, 25-cycle motor geared to traction equipment. The gearing provided a speed of 5 miles per hour, with a manual gear shift for two miles per hour, for rack and pinion operation while towing ships.

A special electrical connection enabled motors to operate at 1 mile per hour when towing larger ships.

When #686 was retired in 1964, the governor of the Panama Canal donated it to a proposed "American Museum of Electricity" in Schenectady. (Museum was never opened) In 1972, Dorn Thomas, a member of the Roanoke Chapter, of the National Railway Historical Society ([NRHS](http://www.nrhs.org)) and a former resident of the canal zone discovered the mule. It was brought to the Museum in 1974, where it was restored and painted by Roanoke Chapter NRHS members. The #686 was then formally donated to the Museum by the Roanoke Chapter of the NRHS.



Wasena Park 1974

Through the efforts of the Thomas family, the “Mule” is getting a second restoration. (see story below). The work is being coordinated and done, again, by members of the Roanoke Chapter, of the National Railway Historical Society. The old paint has been sand-blasted, a new grey primer and paint have been applied, and new wood bumpers are being supplied by North-Fork Lumber from Goshen, VA. A before picture is at right. Finished picture soon available.



Specifications:



Length: 32 ft
Width: 8 ft
Weight: 42 tons

Towing capacity: 25,000 lbs.
Electric motor: 220-volt, 25 cycle

Wheelbase of 12 feet and operates on a track gauge of 5 feet.

GE MULES WORKING CANAL

Panama Mule No. 686 Dedicated to Dorn Thomas

*In memory of Dorn Thomas and to honor his work to save Mule #686 and bring it to Roanoke, the Museum and his family and friends raised over \$10,000 to provide Panama Canal Towing Locomotive No. 686 a much-needed new paint job, eliminating built-up rust and corrosion and restoring it to pristine condition for future generations, to continue to honor **“the Men and Women that participated in the construction and operation of the Panama Canal.”***



Dorn Thomas with Mule #686

*J.E. Dorn Thomas: Born in Colon, the capital of Panama's Colón Province lived his first 24 years in the Canal Zone. Following high school, he earned his Journeyman Electrician license working for the Panama Canal Company, playing football on the side for the Working Boys. He then served three years of active duty in the U.S. Air Force, **stationed in the Canal Zone. He “went stateside” in 1955 to enroll at Georgia Tech, graduating with a Bachelor of Electrical Engineering degree in 1958.** Thomas worked for 32 years for General Electric in engineering and management positions in Roanoke, Richmond, and Charlottesville, VA, retiring in 1990.*

*Thomas never strayed too far from his Canal Zone roots. On a company business trip in 1972, he came upon Panama Canal Towing Locomotive No. 686 – **one of the original 40 “Mules”** built by General Electric in 1914. It had been abandoned and needed a home. Over the course of the next two years, Thomas raised the funds to transport No. 686 to a permanent home at the Virginia Museum of Transportation, located in Roanoke, VA. When its restoration was **completed in 1974, No. 686 was dedicated “To the Men and Women that participated in the construction and operation of the Panama Canal.”***

[A MUST READ
DEDICATION ADDRESS:
"PANAMA MULE" NO. U. S. 686
By J. E. Dorn Thomas May 24, 1975](#)

*Thomas was one of the founders of the Panama Canal Museum and served on its Board of Directors until his death. As part of his volunteer efforts on behalf of the Museum, Thomas initiated and administered the **Museum's Roosevelt Medal Recognition Certificate***

Program. He was married to Dolores McCaffrey for 56 years, and together they raised three children. Thomas passed away on July 1, 2014 at the age of 83, in Richmond, VA.

From Panama to Schenectady NY. to permanent home in Roanoke, VA. The mission of Dorn Thomas.
[Read GE Reporter September 1974](#)



Additional Links:

History & Picture of Mule #686 with Dorn Thomas
<http://www.czbrats.com/Builders/towingloc.htm>

<https://www.panamarailroad.org/loco.html>

https://en.wikipedia.org/wiki/Panama_Canal_locks

Then & Now: <http://www.canalmuseum.com/100years/100yearspanamacanal-22.htm>

<https://ufpcmcollection.wordpress.com/2014/04/04/locks-towing-locomotive/>



In the fall of 1906 President Theodore Roosevelt visited the Canal Zone and, in a speech at the close of his visit to Cristobal, he said: "I shall see if it is not possible to provide for some little memorial, some mark, some badge, which will always distinguish the man who for a certain space of time has done his work well on this Isthmus." The Roosevelt Medal was given to all citizens of the United States who rendered two years satisfactory service or more on the Isthmus. <http://www.czbrats.com/Builders/roosemedals.htm>

<http://www.coins-of-panama.com/canalmedals.html>

The Museum of Transportation

The Virginia Museum of Transportation is the Official Transportation Museum of the Commonwealth of **Virginia**, and a partner in **Virginia's Rail Heritage Region**. We are proud of **our heritage and contributions in preserving the history of Roanoke and Virginia's** transportation legacy.

The Museum's collection, housed in the original 1918 Norfolk & Western Freight Station, includes approximately 10,000 objects, including more than 50 pieces of rolling stock—locomotives and other rail cars—including the largest collection of diesel locomotives in the South. The Museum has expanded its galleries to include a diverse collection of historical automobiles and transit vehicles, historical aviation items, and other unique artifacts representing the transportation culture of Virginia communities.

Today, the Virginia Museum of Transportation welcomes guests from across the nation and around the world to celebrate an American success story of innovators, industry and a community that continues to reach new successes in the 21st Century.



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