

NATIONAL TRANSPORTATION SAFETY BOARD
WASHINGTON, D.C.

ISSUED: October 2, 1976

Forwarded to:

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P. O. Box 1207
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SAFETY RECOMMENDATION(S)
P-76-67 through P-76-72

At 7 a.m. on March 27, 1976, a two-story building that housed Phenix Cutting and Sewing, Inc., in Phenix City, Alabama, exploded and burned. The explosion and fire killed the six persons in the building. 1/

The National Transportation Safety Board's investigation of the accident disclosed that natural gas at 20-psig pressure had leaked from a cracked, 3-inch cast iron main, which was located 12 feet from the building under concrete steps which led from the street up to the sidewalk. The 3-inch pipe was cracked circumferentially and gas which leaked from this crack was trapped from above by the concrete steps. Consequently gas seeped into a vaulted area under the sidewalk and into the basement of the building through holes in the wall, where it was ignited by an unknown source.

The 3-inch cast iron pipe was located under, and at points touching, the concrete steps, at about the same elevation as the street. Also installed under the steps were a 6-inch cast iron gas main and a 24-inch storm sewer line at depths of 2 feet and 4 feet, respectively. From an inspection made by the Phenix City Building Department on March 13, 1975, the City was aware that during heavy rains, water entered the building either from the storm sewer or from cracks in the sidewalk. Water from either source had the potential to undermine the pipe's foundation and thus enable the vibrations from traffic on this

1/ The National Transportation Safety Board will not issue a full report of this accident.

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major artery between Columbus, Georgia, and Phenix City to stress the pipe. Neither the City's Building Official's Office nor the Public Works Department notified the Utilities Department of the problem since they did not realize that the water flow could undermine the gas main.

On numerous occasions, the Alabama Public Service Commission has identified operations of the Phenix City Utilities Board that do not conform to 49 CFR 192 and has required corrective action. Although the Utilities Board corrected the deficiencies, the corrections were short-lived because management of the gas operations changed frequently. The deficiencies included infrequent and inadequate leak surveys, inadequate response to repair leaks found, inability of the gas system's personnel to find leaks found by the surveys, and inadequate repair of leaks. The most recent leak survey (April 1975) detected a Class III leak over a 2-inch cast iron main across the street from the accident site. Although gas system personnel recorded on December 12, 1975, that no leak could be found, the Alabama Public Service Commission located a leak on March 28, 1976, in the area of the original report which appeared to be the Class III leak originally detected.

On April 1, 1975, a flame ionization leak survey was performed in front of the Phenix Cutting and Sewing Company which detected gas under the eastern portion of the steps. Gas system records show that a leak at a joint on the 3-inch main was recaulked east of the steps (no leak clamp was installed 2/). There is no record that a leak check was performed after the joint was recaulked to assure that the source of the gas which was detected under the steps had been eliminated by repair.

After the explosion, four breaks were found in the cast iron mains; all but one were caused when the building wall fell. The Safety Board submitted the broken sections of pipe to an independent metallurgical laboratory (Anderson and Associates, Inc. of Houston, Texas). The tests and analysis determined that:

" . . . a crack had been present for some period of time prior to the accident . . . The crack was caused by bending stresses from external loading or possibly cyclic vibration loading. The stress was applied to a pipe wall drastically reduced by graphitic corrosion. The marginal quality of the pipe was a contributing factor. Other contributing factors were soil type and filling conditions and proximity to an area of heavy cyclic load."

Therefore, the National Transportation Safety Board recommends that the Utilities Board of Phenix City:

Inspect its cast iron piping system through
a random sampling program to determine if

2/ Leak clamp required by 49 CFR 192.753(b).

other areas are covered sufficiently to prevent damage from external loads, if piping in other areas is graphitized to a degree that it should be removed from service, and to rectify any potentially hazardous conditions found. (P-76-67) (Class I, Urgent Followup)

Perform tests after a leak has been repaired to assure the adequacy of repairs and to assure that no other source of gas was contributing to the leak area. (P-76-68) (Class I, Urgent Followup)

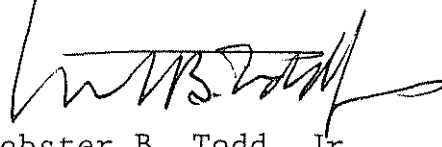
Assure that when a cast iron caulked bell and spigot joint is exposed, a leak clamp is installed as required by 49 CFR 192.753(b). (P-76-69) (Class I, Urgent Followup)

Train gas system personnel in the use of available leak detection equipment to locate areas of gas leakage and to pinpoint the source of the leakage. (P-76-70) (Class I, Urgent Followup)

Test leak detection equipment and, if necessary, recalibrate it periodically to assure its proper operation. (P-76-71) (Class I, Urgent Followup)

Correct promptly all outstanding deficiencies which have been documented by the Alabama Public Service Commission (P-76-72) (Class I, Urgent Followup.)

TODD, Chairman, BAILEY, Vice Chairman, McADAMS, HOGUE, and HALEY, Members, concurred in the above recommendations.



By: Webster B. Todd, Jr.
Chairman