

NATIONAL TRANSPORTATION SAFETY BOARD
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SAFETY RECOMMENDATION(S)

P-83-14

About 2:15 p.m., c.s.t., on November 4, 1982, a tile plow installing field drainage tile on a farm located 4 miles west of Hudson, Iowa, struck and punctured a well marked, 20-inch-diameter natural gas transmission pipeline. Natural gas escaping at about 820 psig ignited immediately, and the ensuing fire killed five persons, destroyed five pieces of excavation machinery and two pickup trucks, and burned several acres of soybean stubble. 1/

Excavation damage to pipelines is the largest single cause of all reported pipeline accidents. Since 1969, the Safety Board has issued 58 reports of major pipeline accidents of which 21, or 36 percent, were directly caused by excavation equipment or excavation processes. Because of its concern for the increasing number of excavation accidents, the Safety Board conducted a symposium in Washington, D.C., on April 18, 1972 on Prevention of Damage to Pipelines. The symposium discussed excavation caused damage to pipelines and reviewed some damage prevention programs and regulatory action taken by the Federal, State, and local governments. From material developed in part from the symposium, the Safety Board issued a special study on the prevention of damage to pipelines. This study discussed the damage prevention responsibilities of excavators, contractors, and pipeline operators and concluded that:

1/ For more detailed information, read Pipeline Accident Report—"Northern Natural Gas Company Pipeline Puncture, Explosion and Fire, Hudson, Iowa, November 4, 1982" (NTSB-PAR-83-2).

Pipeline accidents caused by excavation and construction activities, including blasting, can be prevented. The operators of all underground systems must work together with local government officials, contractor associations, individual contractors, State officials, planners, and developers. . . The assistance of the excavator and his machine operator in determining methods of and cooperation in avoiding damage should be enthusiastically sought. They should be educated as to the damage and loss of life which they can cause and should be given as much assistance as necessary to help them avoid hitting a pipeline (emphasis added). On the other hand, both contractors and machine operators should be licensed and have their licenses revoked if they will not cooperate and if they continue to cause accidents. A concerted effort by all parties involved can drastically reduce the numbers of excavation accidents.

Statistics are not readily available to indicate the number of pipeline punctures caused by tiling and other agricultural operations. Department of Transportation pipeline accident report forms do not specifically identify this cause or lend themselves to automatic data processing retrieval. However, data from the U.S. Department of Agriculture indicates that farm drainage tile and farm sub-soiling operations have been increasing yearly. Also, new pipeline installations have been increasing yearly. Because of these construction activities, the Safety Board is concerned about the potential for additional accidents similar to the November 4, 1982, accident.

The Safety Board believes that excavation-caused damage to pipelines can be prevented by pipelines being well marked, by notifying pipeline operators in advance of proposed excavating activities, by having pipeline operator representatives on site during excavation, and by utilizing contractors who perform their work in a careful, conscientious manner. In this accident, these precepts had been met. The contractor had notified the company of his intention to excavate well in advance of work commencement as well as on the day of the excavation, and the company had responded by marking its facilities and sending a maintenance man to monitor the operations. The contractor, in the presence of the maintenance man, had successfully excavated across both pipelines, and the maintenance man had determined that both pipelines were 8 feet deep where they were crossed; up to that point everything had been done correctly. However, two things were then done which negated all of the previous good work and which set the stage for this accident.

First, the contractor changed his plans, but did not inform Northern's maintenance man. Second, the maintenance man left the job site before all work over the pipelines had been completed. The contractor had previously excavated 10 feet south of the 20-inch pipeline, from which point he reportedly had said that he would continue with two strings of 5-inch tile, one in a southerly direction and one in a southeasterly direction (away from the pipelines). This would have necessitated the installation of a 6"x5"x5" Y-tile at this point. Apparently, between the time that Northern's maintenance man left and the time that the contractor resumed tiling, the contractor decided to start the 5-inch tile installation between the 20- and the 26-inch pipelines, rather than to the south of the pipelines.

The contractor may not have wanted to take the time to obtain the necessary additional 6-inch tile needed to "hand lay" the 30 to 35 feet to clear the pipelines before he started to install the 5-inch tile. However, it is unlikely that the contractor, who had been so cautious and attentive when first crossing the two pipelines and who had about 30 years of experience and was well aware of the hazards of excavating near high pressure pipelines, would have started tiling from a point between the two pipelines unless he believed that the lines were as deep 35 feet to the east as they were at the first crossing. For whatever reason the contractor changed his plans, he did not inform Northern's maintenance man.

The maintenance man left the job site before the tiling operation had been completed across both pipelines. Although the excavation had been completed across both pipelines, a 6-inch tile installation and a backfill operation had yet to be completed, and the maintenance man should have remained at the job site. If he had remained, the maintenance man would have learned of the change in plans and, based on his prior actions, it seems likely that he would have measured the pipeline depth with his spotting bar at the point of the new crossing. Based upon the shallower depth, which thus would have been determined, it would have become obvious to the maintenance man and to the contractor that the new crossing would have required hand excavation because the use of mechanical equipment would have been too dangerous. In this case, if either the contractor had mentioned his change of plans to the maintenance man or if the maintenance man had remained at the job site, preventive measures would likely have been taken to avoid the puncture.

As a result of its investigation, the National Transportation Safety Board recommends that the American Gas Association, the Interstate Natural Gas Association of America, and the American Petroleum Institute:

Notify its member companies of the circumstances of the accident in Hudson, Iowa, on November 4, 1982, and urge them to emphasize to their employees the importance of communicating fully with excavators about the extent of the proposed work and about the importance of remaining on the job site until all excavation activities are clear of the pipelines.
(Class II, Priority Action) (P-83-14)

The National Transportation Safety Board is an independent Federal agency with the statutory responsibility ". . . to promote transportation safety by conducting independent accident investigations and by formulating safety improvement recommendations." (P.L. 93-633). The Safety Board is vitally interested in any actions taken as a result of its safety recommendations and would appreciate a response from you regarding action taken or contemplated with respect to the recommendations in this letter.

BURNETT, Chairman, GOLDMAN, Vice Chairman, and McADAMS, BURSLEY, and ENGEN, Members, concurred in these recommendations.


By: Jim Burnett
Chairman