

JOURNAL
OF THE
House of Representatives
OF THE
REGULAR SESSION
OF THE
Forty-fifth Legislature

BEGUN AND HELD AT
THE CITY OF AUSTIN
JANUARY 12, 1937



CAPITAL PRINTING CO., INC.



PROVIDING FOR COMMITTEE TO
INVESTIGATE CAUSES OF
EXPLOSION IN NEW
LONDON, TEXAS

Mr. Gibson offered the following resolution:

H. C. R. No. 70, Providing for committee to investigate New London gas explosion.

Whereas, On Thursday, March 18th, 1937, an explosion occurred at the New London School, in Rusk County, Texas, demolishing the high school building and killing teachers and students estimated at more than five hundred; and

Whereas, The horror of this calamity has scarcely been exceeded in the history of this country; and

Whereas, The causes of the tragedy are unknown, there being various rumors in this respect; and

Whereas, If the conditions causing this explosion, whatever may be their nature, are permitted to exist in other school buildings in Texas, many thousands of school children will be seriously endangered; and

Whereas, It may be possible to prevent future catastrophes similar to the New London tragedy, if the causes are made known, by more rigid building and inspection requirements; therefore, be it

Resolved by the House of Representatives, the Senate concurring, That the Speaker be authorized to appoint three Members of the House, and the

Lieutenant Governor be authorized to appoint three Members of the Senate, who shall constitute a committee of six, who shall make a full and complete investigation of the facts surrounding the New London tragedy and recommend to the Legislature necessary legislation, if necessary, to minimize the probability of similar occurrences in the future; and, be it further

Resolved, That said committee shall have full and complete authority to formulate rules of procedure, to summon witnesses, to issue subpoenas, subpoenas duces tecum, attachment and all other writs and process necessary to effect the purposes of this resolution, to administer oaths to said witnesses, and to punish for contempt; and, be it further

Resolved, That said committee be authorized to employ such help to assist it in making such investigation and in the formulation of the report, and further to pay the actual necessary and reasonable expenses of witnesses brought before the committee, and such other expenses as may be necessary to facilitate the work and purpose of the committee; and that such expenses be paid by and through the Chairman of the Contingent Expense Committee upon the certificate of the chairman of the committee, out of the Contingent Expense Fund of the Forty-fifth Legislature, provided further that the hearings as to the

facts of this explosion shall be held at or near New London, Texas.

GIBSON,
McCONNELL,
MORRIS,
WOOD,
HOSKINS,
TENNANT,
LEATH.

The resolution was read second time, and was adopted.

JOURNAL
OF THE
House of Representatives
OF THE
REGULAR SESSION
OF THE
Forty-sixth Legislature

BEGUN AND HELD AT
THE CITY OF AUSTIN
JANUARY 10, 1939



CAPITAL PRINTING CO., INC.



REPORT OF THE COMMITTEE TO
INVESTIGATE THE NEW
LONDON SCHOOL
EXPLOSION

Mr. Tennant submitted the following report:

Hon. Walter Woodul, President, State Senate.

Hon. Robert W. Calvert, Speaker, House of Representatives, Austin, Texas.

Mr. President and Mr. Speaker:

We, your Committee, appointed by virtue of House Concurrent Resolution No. 70, of the Forty-fifth Legislature, Regular Session, to investigate the circumstances surrounding the New London tragedy and make recommendations to the Legislature as to necessary legislation to prevent the recurrence of similar catastrophes in the future by the enactment of more rigid building and inspection laws, have completed our labors and beg to make the report attached hereto.

HILL,
REDDITT.

On the part of the Senate.

LEATH, Chairman.
WOOD,
TENNANT.

On the part of the House.

Honorable Walter Woodul, President,
State Senate,

Honorable R. W. Calvert, Speaker,
House of Representatives,
and

Members of the Forty-fifth Legislature:

Pursuant to House Concurrent Resolution No. 70, your undersigned committee met in the Randolph Hotel, Henderson, Texas, on the morning of March 22, 1937, at ten o'clock,

for the purpose of investigating the circumstances surrounding the explosion of the New London school building, in an independent school district located in northern Rusk County, Texas, which occurred approximately three p. m., March 18, 1937, and caused the death of 284 pupils and 14 teachers.

Due to the fact that Governor James V. Allred had, prior to the passage of this resolution, as Commander in Chief of the Texas State Militia, ordered a military court of inquiry into the cause of said explosion, your committee, in the interest of economy and as a matter of expediency, thought it best to sit in at that hearing in order to prevent a duplication of testimony. The Bureau of Mines of the United States Department of Interior also conducted an independent investigation through its representatives. Your committee at different intervals after the completion of said hearing interrogated under oath expert witnesses in every field of construction work, including electrical engineering, plumbing, chemical engineering and architectural engineering. The committee also availed itself of the opportunity of studying the building codes of the following municipalities: Richmond, Virginia; San Francisco, California; Detroit, Michigan; San Diego, California; Seattle, Washington; Portland, Oregon; Philadelphia, Pennsylvania; Chicago, Illinois; Los Angeles, California; New Orleans, Louisiana; St. Louis, Missouri; Baltimore, Maryland; Boston, Massachusetts; and New York, New York.

The following citizens, their positions and the groups they represent were examined: L. V. Denning, Sr., American Gas Association; A. M. Crowell, Gas Engineer for Texas Railroad Commission; Dr. E. P. Schoch, Professor of Chemistry, University of Texas; E. P. Schmidt, Engineer Lone Star Gas Company; Mr. J. Fred Horn of the Department of Education, Director of School Plant Division; G. C. Hawley, Chief Engineer, Fire Insurance Department; R. M. Conner, Director of the American Gas Association Test Laboratories of Cleveland, Ohio, and Los Angeles, California.

Your committee wishes to acknowledge the help and assistance of the Attorney General's Department and especially the assistance of the Hon-

orable Scott Gaines, former First Assistant Attorney General, and the Honorable Wm. M. Brown, Assistant Attorney General. Appreciation is also expressed to the witnesses who voluntarily appeared at their own expense for the purpose of helping this committee in its work.

Based upon a thorough and comprehensive analysis of the information gathered from the above mentioned sources, your committee reached the same conclusions and recommendations arrived at by the investigators of the Bureau of Mines in their report on file in the State Library, which are as follows:

"1. The immediate cause of the disaster was the ignition and resulting explosion of a large volume of highly explosive natural gas-air mixture that had accumulated in an inadequately ventilated space beneath the first floor of the main school building. This space extended along the west front of the building and had a volume of approximately 64,000 cubic feet.

2. Gas was present in the space because of leakage from gas lines and their fittings (possibly a broken service connection) suspended beneath the floor, with virtually no method of detecting the gas or of removing it by natural or forced ventilation.

3. The physical evidence indicates that higher concentrations of natural gas were present in the north portion of the space beneath the first floor and suggests that the leakage took place in that part of the inadequately ventilated space.

4. Natural gas did not seep through the soil from adjacent gas lines or wells; this was determined fully by evidence obtained from 71 test holes drilled to the rock below the surface formation. Numerous tests of the atmosphere in the holes were made by detectors for inflammable gas with negative results.

5. Liquid hydrocarbons, such as crude petroleum and gasoline, and their vapors from surrounding wells and pipe lines were not responsible for the explosion.

6. The source of the gas supply is irrelevant to the cause of the explosion, and the results would have been approximately the same under similar conditions regardless of the composition of the natural gas used. The composition of gas supplied to

the building for some time prior to and at the time of the explosion possibly varied from day to day (a condition that may have caused some trouble in the operation of individual heating units), but the pressure on the line was relatively constant and moderate and no appreciable difficulty should have resulted from its use. The investigation revealed that the gas line that supplied the gas to the building was provided with traps to eliminate condensate and oily material.

7. The manipulation of an electric switch on a panel in the manual-training room near an open door leading into the north end of the inadequately ventilated region under the first floor ignited the gas, and the physical evidence shows that the explosion propagated in a southerly direction through the chamber.

8. Explosive mixtures of natural gas in air from the space under the first floor excompassed the switch panel, at least partly, because of a drop in barometric pressure on the afternoon of the explosion and the simultaneous increase in atmospheric temperature. Both pressure and temperature changes, in conjunction with a calm outside atmosphere with very little if any wind velocity, caused the gas in the space to expand, and its lighter specific gravity caused it to rise. The excess gas was forced from the space and rose because of its lightness through the open door, an opening offering the least resistance. The explosive mixture issuing from this opening either was deflected or was carried to the switch by minor air currents. A spark or arc when the switch was manipulated caused the ignition of the explosive mixture. The flame carried through the door into the space underneath the floor.

9. The evidence does not indicate that the individual heating units on the first floor of the building caused the ignition of the explosive mixture. However, these heating units and the piping to them may have been involved in causing explosive mixtures to be formed in the chamber below, because moving of a heating unit may have broken a gas connection in the space below the floor.

10. Tremendous forces were developed during the explosion, as evidenced by the extent and violence

of the destruction, indicating that the natural gas-air mixture was in proportions that gave a high rate of flame propagation and pressure developments. This large volume (possibly as much as 64,000 cubic feet) of an ignited explosive mixture of gas and air was in an enclosed and virtually confined space with little or no opportunity for expansion; hence, maximum opportunity was afforded to build up high pressure as the explosion wave progressed, with consequent widespread disruptive and destructive effect. Some of the evidence of the high pressures were the passing of a brick entirely through a 12-inch brick and tile wall and the throwing of a 1,500-pound slab of concrete about 25 feet into an automobile.

11. Because the explosive natural gas-air mixture appeared to be more or less uniformly mixed, as evidenced by the violence of the explosion over the entire space under the first floor and the absence of flame and black smoke when the mixture exploded, the conclusion appears to be warranted that the accumulation was due to one or more relatively small leaks rather than to one large leak. In a shallow chamber of the dimensions given, considerable time must have elapsed to permit the natural gas to mix uniformly with the air. In view of this, the Bureau's engineers conclude that the accumulation of gas had been going on for a considerable time previous to the explosion. It is possible that highly explosive mixtures may have been present in the space for some time, but they did not explode because there was no source of ignition.

12. Obviously, it is a grave mistake to allow unfilled or unventilated spaces to exist beneath the floor of any building where combustible gas or vapors may accumulate, from piping or from seepage through or under the foundation walls from outside sources.

Recommendations

The lessons learned from this explosion warrant the following recommendations. If they are complied with, future tragedies of the type described in this report should be avoided in large measure:

1. All schools and other public buildings should be constructed so that there are no unventilated, rela-

tively inaccessible, enclosed spaces or chambers, especially in the basement under or near recitation or assembly floors. Wherever possible, the first floor should be laid directly on the ground, where this type of construction is impracticable, spaces between the floor and the ground should be filled with earth or otherwise handled, making impossible the accumulation of explosive mixtures underneath the floor. Building plans should be studied critically from a safety viewpoint with respect to this feature. Architects can assist greatly in this campaign for future safety in school and other buildings by eliminating underground unventilated or inadequately ventilated chambers, tunnels, or pockets that are exceedingly dangerous if combustible gases or vapors can leak into them and become ignited.

2. Schools and other public buildings that have unventilated basements, chambers, tunnels, or other spaces under floors and steps, and attics should be provided immediately with adequate, constantly functioning ventilation. Ventilators not only help to keep such places free of combustibles, but also act as pressure releases if an explosion does take place. If ventilators are of adequate size and are spaced at proper intervals in all sides of a chamber, they will aid in dissipating the pressure and thus reduce the violence if an explosion occurs.

3. Suitable warning agents with distinct odors, introduced into fuel gases that have little or no odor of their own, have proved to be helpful in detecting leaks in public buildings and private homes. Although use of malodorants is only one factor to be considered in providing adequate protection (as explosions have occurred with mixtures of air and manufactured gas, which has a distinct odor), study should be made of fuel-service installations, especially in schools and other buildings where the public assembles, with the view of determining the need for impregnating the gas with a warning agent that will enable users of gas to detect leakage. The malodorant should have a characteristic odor and should be added to the gas in large enough quantity to give a warning of impending dangerous conditions before explosive concentrations may be reached. Even though the teach-

ers and pupils of the New London school were accustomed to odors of gas and oil from the oil field in which they lived, it is likely that a malodorant in the gas used at the school would have given warning in time to have prevented the explosion or at least to have prevented occupation of the building until the source of the escaping gas could be determined.

4. Alarm systems based on instruments that will detect the presence of inflammable gas and bring the existence of dangerous concentrations of combustibles in confined spaces to the attention of officials in charge of school buildings, have value but do not really solve the problem. Efforts should be made to eliminate the causes, thus making alarms unnecessary. Highly explosive gas or vapor might accumulate easily in an unventilated or inadequately ventilated chamber or tunnel in so short a time that means could not be taken to eliminate the trouble before the explosion took place. The elimination of all such unventilated or inadequately ventilated places where an alarm would be placed appears to be the correct solution.

5. All gas lines, services, gas meters, and gas appliances serving schools and other public buildings should be installed in accordance with the American Gas Association requirements for house piping and appliance installation, and all electrical equipment and appliances should be installed in accordance with requirements of the National Electrical Code. They should be operated in accordance with known safe practices and should be tested and kept in repair at all times.

6. Responsibility for the construction, maintenance, and operation of gas pipe lines serving the public, and especially for the regulation of pressures in such lines, should be exclusively under the control of persons or organizations experienced in such work. Schools that use gas for heating or other purposes should purchase their fuel supply from a public service company that, through experience and regulation, may be depended upon to give a more uniform supply of gas and thus a better and safer service than can be obtained from a residue gas line not operated for the purpose of supplying the service required.

7. Responsibility for testing, lighting, and general care of an entire heating system should be entrusted only to persons who are familiar with the system and competent to handle it safely and efficiently.

8. All gas lines to schools and other public buildings should be installed in well-ventilated places, and advantages in safety may be gained by placing gas lines or headers outside of buildings, thereby minimizing the hazard of gas leakage in enclosed spaces. In some instances weather conditions, architectural design, or possibilities of aggravated corrosion may make such construction inadvisable. However, it is desirable to reduce to a minimum the enclosed piping for fuel purposes within a public building. Some types of construction may require that lines be placed in attics. Under these conditions, sufficient ventilation should be provided to dissipate gas leakage. Installation of piping in a manner that will keep it free from strains due to expansion and contraction is even more important than the location of the piping.

9. Although the Bureau's tests proved that the explosion at the New London school was attributable in no way to seepage of gas through the soil, its experience with other explosions indicates that gas may enter basements and other enclosed spaces that are partly underground. This possible hazard may be present especially where subsurface conditions permit gas to travel laterally through the soil along pipes that enter the buildings below the ground surface; in such instances all openings where pipes pass through walls and all places where gas may seep through the floor and walls should be sealed.

10. Central heating systems, with the heating plant isolated in a separate structure, have definite advantages with respect to protection against fire, explosion, and carbon monoxide. In general, the safety of a heating system, regardless of its location, depends upon tight, strain-free piping and other features of proper installation.

11. There is need for a State supervisory body to inspect structures and buildings in which the public assembles and which are outside the corporate limits of cities and towns that have municipal safety

inspection. Safety inspection by State or municipal agencies should extend not only to the construction of schools and other public buildings, but also to the plans and design, and should include structural as well as details of heating and ventilation.

12. In rural districts where school buildings are not subject to regular inspection, gas companies may be of great service in this campaign of safety through their knowledge of and familiarity with the hazards involved in the use of gas. They should make periodic inspections and offer constructive suggestions for the safe use of gas on the premises they serve. If these suggestions are not followed, gas service to the buildings should be stopped immediately until the proper corrections for safety are made. All fuel gases are highly explosive when mixed with air in certain definite proportions. As the possibilities of forming explosive mixtures are always present from the initial source of the gas to the point where it is used—care in the utilization of combustible gases is necessary in the interest of safety."

1. In addition to the foregoing conclusions and recommendations of the Bureau of Mines, your committee further recommends that bill be enacted setting up a State Plumbing Inspector within the State Board of Health patterned after the proposed bill sponsored and recommended by the Associated Master Plumbers of Texas, Inc., a copy of which is on file with your committee.

2. We further recommend that the present law requiring a malodorant to be placed in all natural gas systems be so amended so as to include the placing of such malodorant in all manufactured gases whether natural, butane, bottled or other types of industrial and domestic gases and that standard gas burning appliances be attached and installed to gas piping in all public buildings in the State of Texas, such as school buildings, churches, office buildings, store and mercantile buildings, theatres, hotels, cafes and all other buildings where persons frequently assemble or meet for business, religious worship, pleasure and other purposes.

3. In regard to recommendation No. 11 of the Bureau of Mines report which stresses the necessity of a

State supervisory body to inspect public buildings, your committee is of the opinion that said supervisory body could and should be composed of the following three officials: State Fire Marshal, Director of School Plant Division of the Department of Education and State Building Inspector for the Board of Control and that authority be delegated to such Board to promulgate rules and regulations not inconsistent with the laws of the State of Texas, to carry out the provisions of said Act and to prevent a recurrence of an explosion such as the New London school disaster.

On motion of Mr. Tennant, the reading of the report was dispensed with, and same was ordered printed in the Journal.