To the Graduate Council:

I am submitting herewith a dissertation written by Samuel Espinosa entitled "A Proposed Four-Year Safety Curriculum for the Seventh-Day Adventist Colleges in the United States." I recommend that it be accepted in partial fulfillment of the requirements for the degree of Doctor of Education, with a major in Health Education.

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A PROPOSED FOUR-YEAR SAFETY CURRICULUM FOR THE SEVENTH-DAY ADVENTIST COLLEGES IN THE UNITED STATES

A Dissertation

Presented for the

Doctor of Education

Degree

The University of Tennessee, Knoxville

Samuel Espinosa

June 1978

1291746

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DEDICATION

This study is affectionately dedicated to
my wife Eva Esther and to my children
Victor and David—for their love
patience, and understanding.

ACKNOWLEDGMENTS

The author is indebted to many relatives, friends, and colleagues for their support and encouragement. Especial thanks are extended to the Safety Educators, the Administrators, and the Freshman students who possessed the patience to read and answer my questionnaires. To Dr. C. B. Hirsh, Dr. Walton J. Brown, and Dr. Garland J. Millet, from the Department of Education, General Conference of Seventh-Day Adventists, for authorizing the surveying of Administrators and Freshmen from the S.D.A. institutions.

The author wishes to express sincere appreciation to Dr. Warren J. Huffman, Chairman of my doctoral committee, for his direction, time, encouragement, and advice with respect to this study. Gratitude is also offered for the several suggestions received from the committee members: Dr. Robert H. Kirk, Dr. A. F. Thompson, Dr. George Wagoner, and Dr. Bill C. Wallace.

To my mother, Ms. Blanca E. Arencibia, and five sisters, Adela, Esther, Elizabeth, Noemi, and Raquel, for their belief in me through the years.

ABSTRACT

It was the purpose of this study to develop a four-year safety curriculum that could be adopted and recommended by the Board of Higher Education of the Seventh-Day Adventist Church (S.D.A.).

The study included the review of the Bulletins of eleven S.D.A. colleges and universities and the review of the Safety Programs offered by eight colleges and universities located in the geographical area of the S.D.A. schools. The study in addition included the surveying of freshman students attending S.D.A. schools and Administrators of S.D.A. owned institutions. Two questionnaires were developed and mailed to the students and Administrators.

Safety Educators were contacted by mail and their opinion was requested on matters pertaining to this study.

Responses to the questionnaires were obtained from a random sample of the freshman students and the Administrators.

Major findings of the study were:

1. There was no significant increase in the offering of safety courses by the S.D.A. colleges and universities with the exception of Andrews University.

2. Fifty percent of the Safety Programs offered by eight colleges and universities are in Occupational Safety and Health.

3. Over 80 percent of the freshmen surveyed (83.6%) indicated that they thought a safety course should be required to every student; 17.7 percent indicated they will consider Safety as their major area.

4. The Administrators selected Occupational Safety and Health as the major area they would favor for a B.S. degree and Health Education as the minor area.

5. Forty-seven percent of the Administrators indicated that they would employ as Coordinator of the Safety Program a qualified graduate with a degree in Safety.

6. The Safety Educators indicated that Industrial Safety, Occupational Safety and Health, and Environmental Health and Safety were EXCELLENT areas for employment.

7. The Safety Educators recommended that the proposed four-year safety curriculum be developed in one of the three following areas:

a. Occupational Safety and Health

b. Environmental Health and Safety

c. Industrial Safety

A four-year Safety Curriculum was developed in the area of Occupational Safety and Health with a minor in Health Education.

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CHAPTER I

INTRODUCTION

Accident prevention is an undeniable moral and legal obligation of all school and college personnel, but in order to provide the protection that students and employees must receive, "our present framework of thinking in safety should be examined, and perhaps challenged more than it is. Much of what we do today is based upon principles developed long ago" (86:7). This is the time to restudy those principles and to consider newer principles that have come upon the safety scene. Stack and Elkow pointed out that the organized safety education movement is of recent origin (113:4).

More than 2,300,000 workers are disabled in America each year as a result of work-related accidents (128:17). This represents a loss of about 250 million mandays of work, considerably in excess of the work time lost as result of strikes. The cost to the country and its effect on the nation's economy, in addition to the human considerations, compel attention. Lost wages exceed 1.5 billion dollars annually, and during the like period, the loss to the Gross National Product is put at more than 8 billion dollars. These figures, a U.S. Senate Committee Report pointed out, understate the true picture, as there is inadequate reporting of losses in the field of occupational health (22:497).

According to the National Safety Council, in 1977 3,700,000 disabling injuries occurred in home accidents; 2,800,000 disabling

injuries occurred in public accidents (recreation, public buildings, transportation except motor-vehicles, etc.); and 1,900,000 persons were disabled in motor vehicle accidents. Persons killed in all accidents totalled 104,000, up 4,000 from 1976 (1:3 and 128:15-17).

In the eight years since Congress embarked upon the task of developing an acceptable and comprehensive occupational safety and health law, many changes have taken place in business, industry, and government. The present demand for qualified personnel in the field of occupational safety and health surpasses the available supply. According to Robert L. Marshall, Ph.D., Dean, School of Public Services, and Director, Missouri Safety Center, Central Missouri State University, the School of Public Services had more than 4,000 job openings for its 1976-77 graduates (58).

In September 1972, while serving as Assistant Director of Student Finance at La Sierra Campus of Loma Linda University, Riverside, California, the investigator was asked by the Administration at this institution to assist in the development of an Occupational Safety and Health Program. This was proposed in order to bring the institution up to the requirements of the Occupational Safety and Health Act of 1970.

While studying and preparing for the task assigned, it became apparent to the writer that a four-year safety curriculum was a necessity to be fulfilled by the Board of Higher Education of the Seventh-Day Adventist Church. There was a need to train students in what was rapidly becoming an area of study of high demand. There was also a need for qualified personnel in the field of occupational safety and health to

satisfy the increased demand from many of the Seventh-Day Adventist sponsored institutions such as schools, hospitals, publishing houses, food factories, etc. In addition, this would help to alleviate the demand from public and other privately owned institutions.

The investigator, having spent eight years in part-time and full-time teaching positions at the junior and senior college level, and having participated several years ago in the formation of a four-year business administration curriculum, accepted the challenge of finding ways to meet the apparent need for S.D.A. colleges and universities to offer a bachelor's degree in the field of safety.

I. STATEMENT OF THE PURPOSE

The purpose of this study was to develop a four-year safety curriculum that could be adopted and recommended by the Board of Higher Education of the Seventh-Day Adventist Church.

II. STATEMENT OF THE PROBLEM

A better understanding of the purpose of this study can be obtained by reviewing the various problems and questions which were solved and answered.

This study established:

1. What safety courses were being offered by the S.D.A. colleges and universities.

2. What degree of interest a four-year safety curriculum would generate among freshmen students attending S.D.A. colleges and universities.

3. What number of safety courses were being offered by eight colleges and universities offering undergraduate and/or graduate work in safety.

4. What opinions the Administrators of the several S.D.A. institutions gave regarding the development of a four-year safety curriculum.

5. What opinions the Administrators of the several S.D.A. institutions gave regarding job opportunities for qualified graduates with a degree in one of the several safety areas.

6. What opinions the Safety Educators gave regarding job opportunities for qualified graduates with a degree in one of six areas in safety listed and any other areas suggested by the Safety Educators.

7. What opinions the Safety Educators gave regarding the two or three most outstanding four-year curricular programs in Safety in the United States.

8. What recommendations the Safety Educators directing the four most outstanding Safety Programs in the United States gave concerning the safety area in which the proposed four-year safety curriculum should be developed.

III. ASSUMPTIONS

The following assumptions were made for this study:

1. The students surveyed from the S.D.A. colleges and universities were willing to give their opinion of the safety courses that each would consider taking as an elective.

2. The participating Administrators surveyed were able to recommend courses or competencies to be included in the proposed four-year Safety Curriculum and to assist in the selection of a major area in the field of safety.

3. Cooperating Safety Educators from other universities were competent to recommend areas of greater job opportunities for qualified graduates with a degree in Safety.

4. The contact person directing each of the four most outstanding four-year curricular programs in Safety in the United States was willing to recommend the safety area in which the proposed four-year safety curriculum should be developed.

IV. SCOPE OF THE STUDY

The data for this study were obtained from:

1. Safety Educators in colleges and universities where undergraduate and/or graduate programs in safety were being offered. The institutions of learning selected were located in the states or near the states where the S.D.A. colleges and universities are located.

2. Administrators of the S.D.A. hospitals, food factories, publishing houses, and other institutions were contacted to learn their particular need for trained personnel in occupational safety and health.

3. Selected freshmen students attending four of the eleven S.D.A. colleges and universities in the United States. The schools selected were located as follows: one in the east, one in the south, one in the central section and one in the west.

4. The review of bulletins and catalogs of the eleven S.D.A. colleges and universities and eight other colleges and universities offering undergraduate and/or graduate programs in safety and located near the S.D.A. institutions.

V. LIMITATIONS OF THE STUDY

1. The population sampling and design of the study limited generalization of the findings.

2. The broadness of the study was a major limitation. Any of the five areas surveyed would make a good subject for a study.

3. The schools selected for the reviewing of the safety programs did not constitute a statistically representative sample of all the colleges offering degrees in safety.

VI. IMPORTANCE OF THE STUDY

No previous study had been conducted to find the number of safety courses being offered by the S.D.A. colleges and universities and to determine the need for one or more of the S.D.A. colleges and universities to offer a four-year curriculum in occupational safety and health.

The S.D.A. institutions were in need of trained personnel in occupational safety and health in order to meet the increased need of 914 elementary schools, 83 academies, one junior college, eight senior colleges and two universities, 47 hospitals and sanitariums, three publishing houses and several other industries and businesses.

The Fall registration for 1977-78 at the eleven S.D.A. colleges and universities in the United States showed that at the end of the second week of school the total enrollment was 18,771 (93:32).

VII. DEFINITION OF TERMS

The following terms frequently appearing in this study need to be defined to clarify their use to the reader.

OSHA or O.S.H.A. Abbreviation of the name Occupational Safety and Health Act. This Act was signed by President Richard M. Nixon in December 1970 and requires that each employer offer his employee a working place free from hazards.

Safety Curriculum. This term, as used in this paper, denotes the course offerings that deal directly with the field of safety and cognate areas such as health. This curriculum also involves the teaching techniques, skills, goals, objectives, and philosophies necessary to understand and to adjust to the responsibilities involved in an occupational safety and health job.

Safety Program. This term covers not only the area given in a safety curriculum, but also the total educational experience in a four-year study of safety, including school related activities not confined to the classroom. "Program is a complete, progressive series of studies leading to the attainment of some mark of accomplishment—a grade, a diploma, a degree, or the like . . ." (90:388).

S.D.A. This is the abbreviation of the name Seventh-Day Adventist.

VIII. ORGANIZATION OF THE STUDY

Chapter I includes an introduction, statement of the purpose, statement of the problem, assumptions, scope of the study, limitations of the study, importance of the study, and definition of terms.

Chapter II presents a review of related literature and includes a brief history of safety education and the Occupational Safety and Health Act.

Chapter III presents the method and procedures used in the study.

Chapter IV includes presentation, analysis, and interpretation of data.

Chapter V presents the summary, findings, conclusions, and recommendations.

Chapter VI proposes the Occupational Safety and Health Curriculum.

Chapter VII contains the Epilogue.

List of References.

Appendixes.

CHAPTER II

REVIEW OF RELATED LITERATURE

A vast amount of material has been published in the field of safety education. However, when an examination is narrowed to the specific area of occupational safety and health, the amount of research done is more limited. Only after the signing of the Occupational Safety and Health Act (OSHA) by President Nixon on December 29, 1970, has a gradual but constant increase of the literature and research taken place.

The Bureau of Labor Statistics (131) conducted a survey in 1971 based on a carefully chosen sample of approximately 60,000 employers in private nonfarm industry, of which one-third were manufacturers. Forms were mailed directly to the employers of which over 90 percent completed and returned them. The survey forms asked for injury and illness statistics for the last 6 months of 1971, the first period when recordkeeping was required. Fewer than 20 employers indicated that they did not intend to comply with the reporting regulation.

Preliminary estimates show that 3.1 million recordable occupational injuries and illnesses and nearly 4,300 work-related deaths occurred in the nonfarm sector during the reporting period. Injuries accounted for 95 percent of all recorded cases, with illnesses the remaining 5 percent. The statistics, however, may not reflect all occupational illnesses since some illnesses of occupational origin may not have been recognized as such (131:5,6).

Second and third surveys conducted in 1972 and 1973 were based on the full calendar year. The information requested on the 1972 and 1973 forms was virtually the same as the 1971. The 1972 and 1973 samples had been expanded to reach approximately 200,000 reporting units. Farm and railroad employers were included for the first time.

Results of these surveys showed (131):

1. Approximately 1 out of every 10 workers in private industry experienced a job related injury or illness during 1973.

2. About 5.9 million work-related injuries and illnesses occurred during 1973, representing about 28 million lost workdays. In both 1972 and 1973 approximately 3 in every 10 injuries and illnesses resulted in absence from the job or work limitations. The average number of days lost per lost workday-case rose from 14 in 1972 to 15 in 1973.

3. Work related fatalities declined from 5,500 in 1972 to 5,100 in 1973 (more than 7 percent) even though more persons were employed in 1973 than in 1972.

4. The incidence rate (number of injuries and illnesses per 100 full-time workers) for all industries combined was about the same for both years (10.9 for 1972 and 11.0 for 1973).

5. All five industries (roofing and sheet metal, meat products, lumber and wood products, miscellaneous transportation equipment, and water transportation services) selected for special emphasis by OSHA because of high injury rates showed a decline ranging from 2.6 to 5.1 percent in overall incidence rates from 1972 to 1973.

According to the National Safety Council, more than 2,300,000 workers are disabled in America each year as a result of work-related accidents (128:17). This represents a loss of about 250 million mandays or work, considerably in excess of the work time lost as result of strikes. The cost to the country and its effect on the nation's economy, in addition to the human considerations, compel attention. Lost wages exceed 1.5 billion dollars annually, and during the like period, the loss to the Gross National Product is put at more than 8 billion dollars. These figures, a U.S. Senate Committee Report pointed out, understate the true picture, as there is inadequate reporting of losses in the field of occupational health (22:497).

According to the National Safety Council, in 1977 3,700,000 disabling injuries occurred in home accidents; 2,800,000 disabling injuries occurred in public accidents (recreation, public buildings, transportation except motor-vehicles, etc.); and 1,900,000 persons were disabled in motor-vehicle accidents. Persons killed in all accidents totalled 104,000, up 4,000 from 1976 (1:3 and 128:15-17).

The picture was not any better on the campuses of colleges and universities. During the academic year, more than six million youths are enrolled in our higher education institutions. The tremendous size of this student body becomes apparent if we were to imagine that all the people now living in our ten smallest states, or in any one of the states of Indiana, Massachusetts, Missouri, or Nebraska, were attending colleges and universities (134).

The National Safety Council reported that 49,457 deaths occurred in 1976 among young people between the ages of 15 and 24. Accidental deaths alone totalled 26,550 (1:8).

Of the more than 100,000 persons who die in accidents in this country each year, approximately one-fifth are 15 to 24 years of age, the group which includes the bulk of college students. The number of persons of this age group killed accidentally is disproportionately high, almost three times the number accidentally killed in the 5 to 14 age group.

A joint study of the American College Health Association and the National Safety Council revealed that an average of one out of every nine students enrolled in the eleven participating colleges were injured severely enough to require hospitalization or medical treatment at their college health service during the regular school year, exclusive of summer sessions (134).

The review of the literature is divided into the following sections:

I. Studies related to the history and development of safety education.

II. Studies related to historical events and their influence in the passing of safety regulations and laws.

III. Studies related to the implications of OSHA to higher education.

IV. Studies related to the development of the Occupational Safety and Health Act.

I. STUDIES RELATED TO THE HISTORY AND DEVELOPMENT OF SAFETY EDUCATION

Safety education, of some form or other, is as old as man. The many studies conducted on primitive men show that in order to survive, children were taught safe living by their parents, other adults, and older children (113:4).

Safety was practiced by the Jews many centuries ago; (they also had a health code) and specific recommendations were made to the people by Moses while in the exodus. In the book of Deuteronomy, chapter 22 and verse 8 the following safety recommendation was given: "When thou buildest a new house, then thou shalt make a battlement for thy roof, that thou bring not blood upon thine house, if any man fall from thence" (44:200).

The flat roof of a house was to have a low parapet to protect an unwary person from falling to the street below. The roof was often used as a place for the drying of various grains and fruits, a play area for children, and for relaxation in the cool of the evening (26:2).

In ancient times a fatalistic view of accidents prevailed, and the preventive measures occasionally advocated by medical men and humanitarians were largely ignored. The awakening of the public conscience to the need for protecting human life from accidental injury sprang from the inhumane conditions of employment in the early stages of the Industrial Revolution.

Common law gave injured workers little chance at compensation. First, an injured employee hesitated to put his job in jeopardy by

suing his employer. Second, he did not stand much chance of proving his case in a court of law. The employer had to be proven to be at fault. Gradually, England and then various of our states passed laws requiring employers to provide safe tools, and in other respects maintain safe working conditions (26:3).

According to Simonds and Grimaldi, three doctrines of the common law supplied the employer with usually adequate defense against suits brought by injured employees. The "fellow-servant" rules provided that an employer was not liable for injury resulting from carelessness or negligence of employees. "Contributory negligence" provided that the employer was not responsible if the injured worker's own negligence has played a part in causing the accident. "Assumption of risk" included the theory that an employee accepted all the customary risks of an occupation when he took the job. Even if the employment included some extraordinary hazards not customary for the work, some courts held that if the employee accepted the job and continued to work despite failure of the employer to take ordinary precautions, the employee thereby accepted the conditions and relieved the employer of liability for injury (107:17,18).

In England, where mechanized industry had its birth, the revolutionary changes that began about 1750 in mining and manufacturing processes brought men and women flocking from the farms to the cities in search of new employment. Many who had formerly plied their trades and crafts in their homes or in small shops now worked in factories under conditions so crowded and hazardous that accidents and disease took tremendous tolls (113:4,5).

In all industrialized countries, the early 19th century saw the start of legislation for the protection of workers. Legislation of this kind has been expanded either to deal with new industrial processes or to increase coverage for ever-widening ranges of employees (25:872).

Stack and Elkow pointed out that the enactment of laws in England to improve working conditions and shorten hours of labor began in 1802. In 1833 governmental factory inspection was established. In 1844 came Ashley's "Great Factory Act," requiring the protection of workers by guards installed on moving machinery. Stack and Elkow added that in 1897 England's first Compensation Act was passed and the workers began to receive adequate redress for physical suffering and financial losses. In Germany the first Workmen's Compensation Act, covering sickness only, was passed in 1884. Similar laws were enacted in Italy and France in 1898, and in Russia in 1903 (113:5).

In the United States the first industrial legislation was passed in Massachusetts in 1867 providing for factory inspectors. In 1887 additional legislation was passed in Massachusetts for the safeguarding of workers against dangerous machinery.

Employer's liability laws were passed in Alabama in 1885 and by Massachusetts in 1887. The financial burden placed on the employer by these laws was not great enough to serve as an incentive to prevent personal injuries.

The first adequate state compensation laws were passed by New Jersey and Wisconsin in 1911. By 1949 all states had compensation legislation.

Some safety devices were in operation before organized accident prevention was conceived. Those on the railroads, for example, included the locomotive steam whistle introduced in 1833, the Westinghouse air brake in 1868 and the automatic coupler in 1885. The first public exhibition on safety appliances was held in 1907 at the American Museum of Natural History in New York under the auspices of the American Institute of Social Science (26:4,5).

Many private companies established their own safety programs. The Lukens Steel Company, America's oldest independent steel company, established a formalized safety program over 60 years ago (11:5).

According to Seaton, Stack, and Loft (105:29), the literature used in the first schools of our country refers to safety long before the days of Horace Mann. It was integrated into books like the McGuffey readers and texts on science and health education. Going still further back there was some safety taught in the schools organized by the Pilgrims.

Dr. E. George Payne, president of Harris Teacher's College in St. Louis, and Albert W. Whitney, associate manager of the National Bureau of Casualty and Surety Underwriters, were largely responsible for inspiring and guiding the earliest efforts to plan a workable program of instruction in safety. The book "Education in Accident Prevention," written by Dr. Payne, was published in 1919 (113:8).

In 1926, the National Safety Council began publishing the magazine "Safety Education." In the meantime, the first well-organized safety

program was planned for Detroit under the direction of the first School Safety Supervisor, Harriet E. Beard. This program included (1) a study and analysis of traffic accidents to school children, (2) the construction of a course of study in safety education for the elementary schools, (3) the instruction of a class of students at Detroit Teachers College in the principles of safety education, and (4) the cooperation with all civil agencies concerned with public safety (26:10).

There were several important milestones that occurred during this period. The first was the meeting of the National Education Association that was addressed by Albert W. Whitney who had planned a workable program of instruction in safety. The second was the organization of the Education Division of the National Safety Council in 1922. The third milestone was passed in 1926 when the National Society for the Study of Education devoted its 25th Yearbook to safety education (26:11).

The first college courses in safety education were established in 1929 (113:13). Driver education was introduced in a few schools in the early 1930's (47:1).

In 1931 H. W. Heinrich published the book "Industrial Accident Prevention." In this book (38) Heinrich's revolutionary safety philosophy was presented. This safety philosophy stated that unsafe acts of people are the cause of a high percentage of accidents and that people cause far more accidents than do unsafe conditions.

In 1943, the National Commission on Safety Education (no longer in existence) was organized as a part of the National Education Association. It derived its main support from the Automotive Safety Foundation. Later,

additional support came from the Insurance Institute of Highway Traffic, the petroleum and tire companies, and automobile manufacturers (26:11).

The American Alliance (formerly Association) for Health, Physical Education and Recreation, has also aided in the development of the program. It has a Safety Association, American School and Community Safety Association, which holds meetings at the Association's conference and aids cities and states in planning safety activities. Its publications have been most helpful in the development of safety education (107:30,31).

Organizations, agencies, and national conferences have had a useful effect on the organization of state safety programs. According to the National Safety Council, the number of high schools teaching driver education has grown from a few hundred in 1949 to well over 13,000 in 1967 (92).

The number of colleges offering courses in various phases of safety has grown from 50 in 1940, to 269 institutions that reported safety courses for either credit or noncredit, yet do not offer a degree in safety; and 150 colleges and universities that offer a major, minor or certification and advanced degrees in safety education (20).

The National Safety Council lists over 2,000 school safety practitioners and identifies their areas of safety expertise, title, and address (77).

II. STUDIES RELATED TO HISTORICAL EVENTS THAT INFLUENCE THE PASSING OF SAFETY REGULATIONS AND LAW

In the United States, the late 18th century saw the start of legislation for the protection of workers. Legislation of this kind has been expanded either to deal with new industrial processes or to increase coverage for ever-widening ranges of employees.

In most cases legislation was not passed until many accidents had taken place and many lives had been lost. The information presented in this section appears to be a confirmation of the attitude of indifference shown through the years by the legislative bodies toward the promulgation of safety laws.

> January 6, 1787
>
> The life-saving activities of our present Coast Guard trace their beginnings to the Massachusetts Humane Society, established on this date.
>
> Wrecks were so frequent off that state's coast that the prospect of copying the British Royal Humane Society (which itself copies a similar organization formed in Holland), established to rescue shipwrecked persons, appealed to many people.
>
> Accordingly, huts were built at intervals along the shore and outfitted with food, dry clothing, and medical aids. In 1807 the first lifeboat was put into service, and the huts became life-saving stations. . . .
>
> For a number of years, Massachusetts provided the only service to shipwrecked persons in the country. (60:27)

> August 7, 1789
>
> In the ninth law passed by Congress, and the first to provide for any public work, the U.S. Lighthouse Service was created.

The Lighthouse Service is one year older than the Coast Guard and would thus be the oldest federal agency in existence. For a brief period, from 1845 to 1853, the two were merged. Then they were separated again, to remain apart until July 1, 1939. (67:48)

August 4, 1790

By Act of Congress, the Revenue Cutter Service was authorized this day. We now call it the U.S. Coast Guard.

At first the duties of the RCS encompassed stopping contraband shipping, but in 1837 Congress authorized the cutters to search for ships in distress. (67:48)

June 11, 1805

The town of Detroit had 500 inhabitants in 1805. It was thriving, and people predicted a bright future for it. But a fire on this date destroyed every building; the entire city lay in ruins.

To help them rebuild and assuage the tragedy somewhat, Congress gave a free lot to every man over 17 who had called Detroit his home. (65:44)

August 17, 1807

Almost exactly 20 years after John Fitch's first successful steamboat runs in 1787 (on the Delaware), Robert Fulton conducted his first successful run on the Hudson. His boat traveled at five miles per hour on this historic day.

The fears of many people were realized in the years following. The steamboat ushered in another dangerous use of power without any safety precautions. Until appropriate laws were passed ensuring the safety of steam travel, many ships exploded, burned, and sank carrying hundreds of people to their deaths. (67:48)

August 2, 1819

Leonardo da Vinci left some sketches of parachutes among his many scientific notes. About 300 years later, on this date, M. Guille of France ascended in a balloon to a height of about 800 feet above the Vauxhall Gardens in New York City. He descended in a parachute and landed on the other side of the East River.

In 1919, about 100 years after Guille's feat, tests with parachutes proved they could provide a safe method of escape from an airplane. (67:48)

August 9, 1819

The New York City Common Council passed a law banning the use of velocipedes in public places and on the sidewalks of the city.

These high-wheeled bicycles had appeared in New York just three months before and became such a craze, they were considered a meance to the horse and carriage trade. They were also a menace to their riders as they had no controls for steering or braking.

The laws against two-wheel vehicles remained in effect until the so-called ""Liberty Bill"" passed by the legislature in 1903, giving them the right to use public roads. . . . (67:48)

March 27, 1820

On this day the Governor of Pennsylvania signed the charter of a most unique group of fire-fighters. They called themselves the Fire Association; the membership was composed of at least five volunteer companies in the city of Philadelphia. . . . (62:45)

September 30, 1822

. . . On this date a Mr. Meyer exhibited what he called ""Life Preserving Dress"" to the people of Norfolk, Va. He ""walked"" in the water, ate and drank, fenced with swords, and performed other unusual acts, demonstrating that his invention would be able to preserve life from shipwreck or other mishaps at sea. (68:46)

October 9, 1833

Both boilers burst on the steamboat ""New England,"" killing 15 instantly and seriously scalding 10 others.

The Connecticut River Steamboat Company, owners of the ""New England,"" instigated a thorough investigation, calling in professors, engineers, and boat-builders to try to determine the cause of the explosion. Their findings were published.

This was unprecedented action at a time when boiler explosions were believed to be ""acts of God."" in fact, such complete candor would be unprecedented today! (69:51)

December 12, 1838

On this date the Secretary of the Treasury reported to Congress on the study it had requested regarding steamboats, the causes of explosions, and the progress of river navigation.

He stated that almost 400 boats plied the western (to the Mississippi) and southwestern rivers alone.

Of accidents, the Secretary cited the loss by collision of the ""Monmouth,"" which went down with 300 persons in 1837 on the Mississippi, and the boiler explosions of the ""Orinoko"" (more than 130 lives lost) and the ""Moselle"" (more than 100 lost).

He also suggested that the government study the regulations in effect in Louisiana as a possible model for new federal laws. Louisiana, in 1834, created the office of State Engineer with authority to inspect boilers and test them by hydrostatic pressure (a new idea) and impose fines and penalties for such things as improper licenses, loss of life, faulty navigation resulting in collisions, overloading, or racing.

Some few rules were imposed, but it took 14 years—and many more accidents—before our first effective national steamboat safety law was enacted (see August 30, 1852). (71:49)

March 3, 1843

On this date the second Steamboat Inspection Act of Congress was signed into law. It provided that the Secretary of the Navy appoint a Board to determine the best methods for testing the strength of boilers and the pressures which should be allowed in an effort to prevent boiler explosions.

In 1843 the legislature of Louisiana had established comprehensive pioneering steamboat inspection procedures which included a test of hydrostatic pressure to three times the steam pressure the boiler was deemed to be capable of.

It was hoped that the new federal law would investigate procedures like Louisiana's and produce a national law to check the growing number of steamboat disasters. (62:45)

March 3, 1847

The State of Massachusetts passed the first act appropriating funds for rendering assistance from shore to shipwrecked sailors. This assistance consisted of the construction of shelter huts along the coast and the building and maintenance of lifeboats. . . . On August 14, 1848, Congress appropriated funds for lifeboats, surfboats, rockets, and other life-saving devices for use on the coast between Sandy Hook and Little Egg Harbor. (62:45)

June 16, 1850

The Steamer ""G. B. Griffith"" burned with a heavy loss of life about 20 miles from Cleveland.

This tragedy, following so many other ship disasters, finally brought action by Congress. In 1851 the House of Representatives passed a Steamboat Inspection Act, but it failed in the Senate. It took another tragedy and another long list of victims, on the ""Henry Clay"" (July 28, 1852) for the Senate to agree to the bill.

Thus, the Steamboat Inspection Act was passed—our first national law calling for inspections and some safety requirements for boilers aboard ships. Unfortunately, there were few qualified inspectors and not much knowledge of what constituted a safe boiler. In addition, the law was very weak. . . . (65:44)

April 29, 1852

Dr. William F. Channing of Boston conceived of the use of wireless telegraphy as a signal for fire-fighting units almost as soon as he heard of the telegraph. And within a year of Morse's invention, Channing had devised his first alarm system.

With the cooperation of city officials, Dr. Channing invented a method whereby the fire bells throughout the city could be rung automatically all at once. He then designed a fire-box, to be placed on buildings or posts, not much different from those we have today. . . . (63:40)

July 28, 1852

The steamboat ""Henry Clay"" on the Albany-to-New York run, collided slightly with the ""Armenia."" They both backed off and went their separate ways.

But on the ""Clay,"" shortly after the collision, a fire started near her furnaces, burned out her wooden superstructure completely, and thus caused the ship to sink. More than 100 lives were lost.

It was this disaster that finally convinced the U.S. Senate that strong legislation for steamboat safety was needed. The next month it passed the bill the House had agreed to the year before, resulting in our first effective federal steamboat inspection law. (66:45)

August 30, 1852

Congress passed the first effective steamboat safety laws. The Act of this date called for the licensing of engineers and pilots of all passenger ships, an inspection system for ships, fire and life-saving equipment, rules for the handling of dangerous cargo, testing of boilers by hydrostatic pressure, and affixing a stamp on boiler plates stating the quality of iron and the manufacturer's name.

Unfortunately, enforcement of the Act was not always what it should have been. It took a number of more years and more tragedies before new rules were added, new safeguards required, and a new system was established to ensure safety. It also took more technical knowledge before boilers could be constructed for greater safety. . . . (67:48)

April 1, 1853

On this date, Cincinnati, Ohio, became the first city in the country to adopt a professional fire department and the first department to use steam-powered pumping engines. (63:40)

July 1, 1853

The steamboat ""New World"" burned at her wharf when her port boiler collapsed. The eight who died included all the firemen fighting the blaze and some of the crew.

Local newspapers said there was ""negligence somewhere""—an opinion which was proven true by a subsequent official investigation.

The report of this accident was the first made by the steamboat inspectors of New York Harbor since passage of the Steamboat Inspection Act of 1852. They said the boilers had not been inspected as required by the law. (66:45)

September 27, 1854

When the ""finest ship afloat,"" the (American) Collins steamer ""Arctic"" collided with the French ""Vesta,"" so many lessons on safety at sea became evident that one wonders why we still had to experience the ""La Burgogne,"" the ""Titanic,"" the ""Morrow Castle,"" the ""Andrea Doria,"" and other disasters in the years following.

The ""Arctic,"" in her way home from England with every passenger cabin filled and a full crew, steamed at her top speed, 13 knots, through fog so thick at times that the bridge could hardly see the bow of the ship. She had no whistle and rang no bells regularly to alert other ships in the area. She was built with water-tight compartments. Her five lifeboats could accommodate less than a quarter of the number on board. . . .

When the ""Vesta"" rammed the ""Arctic"" practically the entire bow of the ""Vesta"" was stove in, but she remained seaworthy and able to reach port. The ""Arctic,"" with a huge gash in her starboard side, was doomed. Her captain fought for four hours to keep her afloat, but to no avail. She went down, taking almost 400 persons with her. . . .

The crew had never been trained in emergency procedures; they panicked, and the captain was unable to restore discipline. The captain left the side of the ""Vesta"" before ascertaining the extent of his damage and unwisely tried to reach the nearest port without the ""Vesta's"" help. This action denied his passengers and crew the rescue they might have had.

The following month the two-year-old Steamboat Inspection Board promulgated the rule that every vessel, particularly passenger ships, must have a steam whistle to be used in fog instead of a bell. It also established rules for running lights, required a red and green on port and starboard sides, respectively, similar to the British system.

Other reforms had to await other tragedies. (68:46)

October 9, 1854

While the U.S. on this date set forth the regulation that a steam whistle be used instead of a bell, especially on passenger ships, the British Merchant Shipping Act of 1854 imposed penalties and other punishments to masters and crews if ships were found to be unseaworthy, but said nothing about shipowners! Not until 1871 did a new Act declare owners of unseaworthy craft to be guilty of a ""misdemeanor""!

The U.S. steam whistle rule resulted from the collision of the ""Arctic"" and the ""Vesta,"" Sept. 27, 1854. (69:51)

February 2, 1860

A row of tenement houses on Elm Street in New York City caught fire. The 20 victims of the fire made citizens and councilmen realize that the new tenements they had admired so much were nothing but fire-traps with limited means of escape in case of emergency. The result was the city's first laws requiring fire escapes for all buildings. (61:11)

February 8, 1865

Philadelphia, the home of the volunteer fireman, was also one of the last cities to give in to the steam fire engine. Not until 1871 did the city invest in its first powered equipment.

A fire on this date that killed 20 persons demonstrated the limitations of the old hand-pumpers. (61:11)

April 27, 1865

Historians are saying that the boiler explosion and sinking of the steamboat ""Sultana"" on the Mississippi is the worst maritime disaster of this country. . . .

The riverboat was built to carry about 376 passengers, But almost 2,400 released soldier prisoners of war, a few

women and children, and a crew of 85 were jammed onto the boat. As night fell, they couldn't even lie down on the deck; there wasn't enough room.

At 2 a.m., the badly overworked boilers burst with a blast that was heard in Memphis, seven miles away.

About 800 persons survived, leaving an estimated toll of no less than 1,600.

It is history now. Despite this overwhelming demonstration of the need for tough enforcement of strict laws, the political and economic destruction caused by the Civil War put maritime safety matters low on the list of priorities for a number of years more. (63:40)

April 16, 1866

Twelve days after the S.S. ""European,"" carrying 70 wooden crates of nitro in her hold, blew up at Aspinwall (now Colon), Panama, killing 60 on board and near the ship, some nitro exploded in the offices of the Wells Fargo Express in San Francisco. Fourteen persons were killed in this explosion on this date and numerous others were injured.

In those days, nitro was treated as casually as cases of rum. But incidents like these drove Alfred Nobel to find a safer way to pack, ship, and handle his high explosive. The result was dynamite—nitro packed in a soft, spongy earth called kieselguhr. (63:40)

April 13, 1868

George Westinghouse was only 23 years old when he received his patent on this date for the ""atmospheric brake""—his famous air brake for railroad cars. . . .

He later invented the block signal system for moving trains swiftly and safely on their routes and followed these achievements with other devices which soon drew him and his company into the utilities field. (63:40)

September 6, 1869

By 1858 there had been so many deaths and injuries in their area that the anthracite coal miners of Schuylkill County, Pa., called upon the State Legislature to provide official supervision of the mines. A bill was introduced but never came to a vote.

In 1866 the measure was introduced again and this time passed the lower house. It was defeated in the Senate. Safety was still considered to be the sole province of the owner of a business.

Early in 1869 the bill finally passed both houses of the State Legislature and was signed into law by the Governor. It called for a single inspector for Schuylkill County!

A few months later, on September 6, 1869, the shaft of the Avondale Mine in the neighboring town of Plymouth in Luzerne County caught fire. One hundred and ten miners either burned to death or suffocated in the deadly smoke and gases.

This catastrophe aroused the whole country, particularly the people of Pennsylvania, to the need for laws to protect miners. The next year Pennsylvania passed our first state coal mine safety law to safeguard the lives, health, and safety of their anthracite coal miners. The soft coal miners had to wait a little longer. (68:46)

February 9, 1870

On this date, President Ulysses S. Grant signed a joint resolution of Congress authorizing the establishment of a national weather service. Later in the year, the first official and systematized weather observations were made by the Army Signal Service at 24 stations in the country, and telegraphed to Washington. . . . (61:11)

October 8, 1871

Two of the worst fires in American history happened on this date and at approximately the same time—about 8 p.m.—at Peshtigo, Wis., and at Chicago, Ill.

A severe drought lasting through the summer had made the entire area a virtual tinder-box. Sporadic fires broke out all around Peshtigo so often that smoke and the smell of burning peat, brush, and trees filled the atmosphere for almost three weeks before this night.

There was an unnatural calm in the air, a red glow in the sky, and an oppressive heat that made everyone uneasy just before a sudden rushing wind and a dull roar announced the coming of a forest fire.

With the fury and speed of a tornado, the fire whipped through the town, destroying everything in its path. More than 1,500 people were killed by the fire, by seared lungs, or suffocation by smoke, or gases. Many animals died; the superheated waters in the shallow streams killed millions of fish; one million acres of forest land were destroyed.

One result of this holocaust was the activation of the obscure Division of Forestry within the Dept. of Agriculture. Several of its subsequent chiefs were able to influence the country to set aside national timberlands and to establish schools of forestry at leading colleges.

The fire at Chicago received so much publicity that the tragedy at Peshtigo was almost unkown to succeeding generations.

Whether or not Mrs. O'Leary's cow kicked over an oil lamp to start the conflagration, we will never know; but a good part of the city was leveled with a property loss which today would be estimated at almost $2 billion. About 250 persons died, less than a quarter the toll at Peshtigo.

This disaster led to new building codes and standards, along with changes in insurance practice. About 64 companies were bankrupt as a result of the fire.

The Chicago fire ranks with the great London fire of 1666 for destruction and the extent of the area it covered. (69:51)

May 11, 1877

Massachusetts passed the first law in the country requiring safety guards on machinery and regular inspection by official inspectors of the state's factories.

This was part of the beginning of the so-called ""safety movement"" all over the world. The movement had fostered the idea of Workmen's Compensation, introduced by Bismarck of Germany, the work of the medical inspectors of Britain, and the fire safety efforts of insurance companies and fire-fighters. (64:42)

January 31, 1882

The fire at the New World newpaper building in New York City, which broke out a little after 10 in the morning on this date, convinced firemen that new methods must be found to rescue people trapped in structures more than 70 feet high. The elevator had made taller buildings possible, but fire-fighting and protection had lagged behind. . . . (60:27)

November 18, 1883

It is difficult for us to understand today how our fore-bearers were able to establish train schedules, particularly safe ones, when there were about 48 different time systems in effect prior to this date.

The General Time Convention of Railway Managers, now the Association of American Railroads, adopted the four zones across our country established by the International Congress of Geographers and called it Standard Time. Each zone represented 15° of longitude or one hour of difference by the clock.

Train timetables and schedules became so reliable, other industries and activities used railroad time as their standard too.

The success of the endeavor must have had a great impact all over the world, for the following year the U.S. hosted an International Meridian Conference in Washington, D.C. It resulted in world-wide standard time with a line passing

Greenwich, England, as the 0° meridian, and a line through the Bering Strait on the opposite side of the earth as the 180° meridian. (70:50)

August 10, 1885

Leo Daft started the first commercial electric street car in Baltimore, Md., on this date—quite a different principle from the cable car introduced in San Francisco. He used a third rail to convey power in the manner exhibited by the great German inventor, Van Siemens.

However, there were so many complaints about small animals being electrocuted and delays due to water-caused short circuits that the third rail was put out of service in favor of two overhead wires. Current was brought down to the car through a cable and a little rolling carriage called a ""troller.""

At about the same time, Charles J. Van Depoeli started electric street car service in several other cities, using overhead wires and a carriage he called a ""traveller.""

While both men claimed great reliability for their devices, the ""trolleys,"" as everyone began calling them, had many defects. When a pair of wires had to cross another pair, the car had to be stopped in order to place the troller on the lines on the other side. Many motormen received shocks; citizens were afraid the electric wires would cause fires or electrocutions; the U.S. Senate in 1888 rejected the use of overhead wires in Washington, D.C., saying they were dangerous. Most of these defects were corrected by the brilliant Frank J. Sprague.

Earlier, in 1882, the American Transit Assocation was formed, and an accident prevention program was started almost immediately. In 1909 one of its subsidiary associations adopted a standard code of rules for city and interurban operations of electric railways—one of the earlier safety standards in our country. (67:48)

October 12, 1887

Forty-eight railroad company representatives met in New York to establish a Standard Code of Operating Rules for all U.S. trains. Special rules for telegraphically-transmitted train orders were added. All west-bound and south-bound trains were given odd numbers; east-bound and north-bound trains, even numbers. Hand, whistle, and torpedo whistles were standardized, and a special ""31"" rule was adopted for important or emergency orders, calling for authorizing or confirming signatures.

It was hoped that this standardization of rules would help to eliminate some of the accidents which had been happening so frequently up to this time. (69:51)

October 10, 1889

More than 200 tons of gunpowder exploded in the duPont yard, killing 12 workmen and injuring 20 more.

The duPont company which had, years before initiated compensation for workers or their widows, now laid down stringent safety rules for the manufacture of explosives. This was one of the earliest instances of a company endeavoring to eliminate accidents within its own industry through safe practices and procedures. (69:51)

March 3, 1893

After the Interstate Commerce Commission was created, Lorenzo A. Coffin, the great railroad safety pioneer, drafted legislation which would require rail safety appliances to be used throughout the U.S.

His rules had recently been adopted by the Iowa legislature for that state's railroads; Coffin believed the entire country should have such protection.

After four years of unceasing work, his efforts were rewarded on this date by the enactment of the first national Railroad Safety Appliance Act. It is still in effect. It included provisions calling for the use of the new Westinghouse air brake and the automatic coupler. (62:45)

March 3, 1899

Early in 1970 Congressman Henry S. Reuss of Wisconsin, chairman of a House conservation subcommittee, uncovered an old law, which was still in effect, to help in the effort to clean up the nation's waters. It was the Refuse Act (under the River and Harbor Act) of March 3, 1899.

The measure gave the Corps of Engineers authority to issue permits before industries would be allowed to pollute navigable waters. It also included penalties for violators and, under quitam action, gave informers the right to a percentage of the penalty which might be exacted.

The rediscovery of the 1899 Refuse Act electrified conservation groups, the Congress, and concerned citizens. It also resulted in the promulgation of new rules by the Corps for obtaining the permits; Chairman Reuss and his subcommittee issued instructions on how to file the citizen suits; and hundreds of suits were brought in order to speed the clean-up process. (62:45)

May 1, 1900

An accidental explosion of black powder or a blown-out shot cost 200 men their lives in Winter Quarters 1 and 4 Mines, Scofield, Utah.

This was one our nation's worst mine disasters, but the lessons learned here became part of the safe practices rules adopted later: the eventual banning of black powder; a limitation in the amount of explosives allowed underground; proper handling of misfires; and the proper storage of explosives.

July 10, 1902

When 112 were killed in an explosion and fire at Rolling Mill (coal) Mine, Johnstown, Pa., the state inspector wrote:

""I am expected to make suggestions which may add in the prevention of such catastrophes, but I despair of offering anything that would avail under the circumstances. What can we do when a miner recklessly disregards safety . . . and violates all laws and rules in the mine . . . where detection is no easy matter? No one in a gaseous district should use any but a locked safety lamp. Until a safety lamp is put on the market which will give something near as good illumination as the ordinary naked light, the men will continue their aversion to the common safety lamp. . . . The miner of today . . . all too frequently, in order to get a better light than it affords, throws caution to the winds and endangers himself and others.""

Only seven were killed by the blast and one by burns; the other 104 died of the effects of afterdamp.

Electric lighting soon replaced the old safety lamps of the miners, but electrical power systems also present dangers. (66:45)

October 30, 1903

William Phelps Eno's ""Rules for Driving"" were adopted by New York City this day. It was the first such traffic code in the world, and most of the rules became the basis for most traffic regulations since that time.

Eno was possibly the world's first traffic expert. He was called to London, Paris, Tokyo and other big cities to help them with their traffic problems; and he wasn't averse to borrowing some good continental ideas for home use.

Nineteen hundred three became our most progressive traffic year. Massachusetts passed the first state law requiring drivers to be licensed; Connecticut established the first state police; and New York City appointed the first police officials to be in charge of traffic. Sydney, Australia, also passed acts and regulations this year which included licensing and proper driving. (69:51)

February 7, 1904

Possibly our worst city fire, since the one in Boston in 1872, took Baltimore by surprise on this Sunday morning.

It started in a wholesale dry-goods store in the center of town; but when the gases from the long-smouldering fire were released, they exploded through the stairwell that went vertically through the entire building, and showered sparks in all directions. Then a store of gunpowder in a shop across the street exploded.

Engine companies from every surrounding town came in to help the harassed and beaten Baltimore firemen, but they had to stand by helplessly and watch more than 1,300 buildings burn to the ground. Their hoses and couplings did not fit the Baltimore hydrants!

This conflagration brought one good result—a move toward uniformity in all fire-fighting equipment. Standards were devised and most cities abide by them today. . . . (61:11)

June 15, 1904

Seamen might have said the steamer ""General Slocum"" was jinxed, it had been involved in so many accidents from the day it was launched. Or was it because of lack of judgment on the part of the captain, the only captain the ship ever had?

Captain William Van Schaik greeted the minister and watched him shepherd his flock of children and their mothers—about 2,000 altogether—on to the ship for their annual outing and picnic on this date. At about 9:30 a.m. the excursion steamer left her dock and headed slowly up the East River toward the Bronx.

When someone smelled wood burning, it was thought to be only the chowder cooking which would be served when they went ashore. Not until some children noticed the heat of the deck and mentioned it to a member of the crew, did they find that a small room, like a lazarette, used to stow lamps, oil, rope, hay—all combustibles—was aflame.

The crew had never been trained in fire-fighting. A dry, rotten old linen hose cracked when it was unfolded. When that happened, the emergency was reported to the Captain.

Ashore, a workman noticed the burning boat steaming up the river and ran to the nearest box to sound the alarm. Within minutes, fire-fighters raced out to the end of the pier opposite the ship's position. But she moved past them, sailing into the wind.

By this time, panic seized everyone aboard. The life preservers were so old and rotten that they fell apart at a touch. The passengers began jumping over the side. A few were picked up by the tugboats and fireboats that were now chasing behind the ""General Slocum,"" but many victims

were caught in the paddle-wheels and many more were drowned.

Captain Van Schaik decided to beach her on the rocks. The jar of the grounding sent the already weakened hurricane deck crashing down, taking more souls with it. When so many bodies had clogged the paddle-wheels the wheels couldn't move, the ship slid off the rocks and drifted across to a sand ledge on a Bronx beach.

It was less than two hours since the ""General Slocum" had left her pier at Third Street. In that space of time, almost 1,000 were already dead, more succumbed later of injuries. The toll was 1,030.

The captain, the pilot, and the chief engineer were arrested immediately. Captain Van Schaik was found guilty of failing to conduct fire drills and sentenced to 10 years in prison.

President Theodore Roosevelt fired the steamboat inspectors who had neglected to check the hose and life preservers on the ship.

Congress passed legislation to tighten steamship laws, inspection requirements, and the equipment to be maintained aboard.

And today, 72 years and many accidents later, it still takes a tragedy before effective laws are passed and enforced. (65:44)

October 27, 1904

The first New York City subway opened this day. It was a costly system in terms of human lives and health. There had been accidents from explosives and street cave-ins that caused fatalities; and 20 workers died from the bends or caisson disease. These occurred in the digging of the Long Island tunnels where compressed air had to be used.

Not much was known about the bends then. Just before 1900, a London council prescribed the first rules for tunnelers' safety: ventilation; mandatory use of shields and airlocks; a limitation in the number of hours a man could work underground; 32 pounds maximum air pressure; and compensation for injuries.

Because of the 3,692 cases of bends and 20 deaths experienced in the building of the subway, in 1905 New York passed a set of similar safety regulations for compressed air work—the first in our country. (69:51)

March 20, 1905

There has been more than 10,000 boiler explosions in our country since 1860, resulting in an almost equal number of deaths and more than 15,000 injuries. It took an

accident like the one that hit a Brockton, Mass., factory this day to bring a change in the thinking of engineers, societies, manufacturers, and legislatures toward more safety in boilers.

At the start of the working day, in this plant employing about 400 people, one of the boilers exploded. Like a rocket, it roared straight up through the building and then changed its trajectory to travel right through the home of the factory's chief engineer and plunged another 100 feet, finally crashing into another home.

Gas from the mains that were broken in the blast took fire and within minutes the entire structure was ablaze. Fifty-six died in the plant, two more a few days later. Thirteen buildings were either completely destroyed or so damaged they were beyond repair.

Shortly thereafter, the Massachusetts legislature passed the first boiler construction code in our country. After its Collingwood School boiler flue disaster on March 4, 1908, Ohio—and other states and cities—followed suit.

However, the greatest contribution to boiler safety was yet to come. In 1911 the American Society of Mechanical Engineers (ASME) formed a committee to draw up rules for ""standard specifications for the construction of steam boilers and other pressure vessels and their care in service.""

Today the ASME Code, which has been kept up to date throughout the years, with inspectors who are carefully examined and certified and with laws for boiler installation and use, has cut boiler accidents down to a minimum in contrast to our early record. (62:45)

May 11, 1905

Even as a group of railroad executives were meeting to talk about ways of preventing explosives accidents on the trains, a disastrous explosion occurred at Harrisburg, Pa., taking 20 lives on this date.

As a result, regulations were approved and adopted in a few months by the American Railway Association's members. However, after a year, when the situation had not improved, it was decided that a central agency was needed to enforce compliance with the regulations.

Accordingly, in early 1907, an office called the Bureau for the Safe Transportation of Explosives and Other Dangerous Articles was opened in New York City with a testing and research laboratory directed by outstanding ordinance and chemical experts. A corps of inspectors set up headquarters at major railroad centers.

Later, when Congress empowered the Interstate Commerce Commission to formulate and enforce ""reasonable regulations to promote safety,"" it adopted the controls already established by the Bureau of Explosives. (64:42)

January 29, 1907

When 84 men were killed at the Stuart Mine, in Stuart, West Virginia, on this date, no one knew that it was only the beginning of our worst coal mine year to date. Before the year was out, the worst accident in our history had occurred; and within days of that one our second worst mine accident happened.

It was the toll of 1907, followed by another high toll in 1908, that brought about the eventual establishment of the U.S. Bureau of Mines. (60:27)

December 6, 1907

This is the date of the worst coal mine disaster in U.S. history. It happened at Monangah Numbers 6 and 8 Mines, Monongah, W. Va. Three hundred and sixty-two miners out of 367 men in the mine were killed.

A trip of loaded cars had reached the knuckle of No. 6 slope when part of the trip broke away and run to the bottom of the slope, piling up and blocking the entry. It is thought that the resultant dust cloud in the intake air current was ignited by an arc from electric wires torn down by the wreck or by open lights of men in the vicinity.

Separate investigations were made by parties of mine inspectors from West Virginia, Pennsylvania, and Ohio, representatives of the coal company, the Federal Geographical Survey, and by a commission of European mine investigators which was in the U.S. to study the problems of coal mine explosions.

The problem was world-wide. France had had its Courriere mine disaster (more than 1,000 killed) just the year before. Belgium, Germany, England, and other nations' records were not much better than ours, although they had initiated safety rules on a national scale and we had not. We had only separate state laws at the time and no federal body to even apply remedies (by the end of 1907, a total of 1,148 U.S. miners had died in explosions in that year alone).

The next year we sent a team of investigators to Europe to study their accident-prevention methods in mines. At the end of the study, the Geological Survey recommended to Congress that a national Bureau of Mines be established. This was done in 1910. (71:49)

March 4, 1908

All doors but the one at the front were kept locked in the school so the children could not easily sneak out. Even regular fire drills were carried out using the front entrance only. No one gave any thought to what might happen should fire block the one doorway.

And that's exactly what happened on this day in a Collingwood, Ohio, grammar school. When a defective flue in the school's boiler started a blaze in the basement, the very youngest children on the first floor were able to escape. Others on the first floor had to go back up the stairs when flames blocked their way out. They were met by a crowd of children from the second and third floors.

When the teachers tried the rear exits, they found the doors locked from the outside. The children rushed up to the third floor, but the fire company's ladders couldn't reach that far.

One hundred and seventy-five children died that day, most of them between six and seven years of age, none over 14.

This tragedy led to better rules for school construction—closed stairways, fire doors able to pen from the inside, and proper fire-drill training for teachers and pupils. It also prompted the State of Ohio to adopt safe construction and inspection codes for boilers, following the lead of Massachusetts which not long before had learned its lesson the hard way too. (62:45)

August 1, 1908

This is the date of the first federal Workmen's Compensation Act in the U.S. It covered only some federal workers; 18 years later all federal employees were covered.

Action of this nature by the government always prompts the states to follow suit. By 1921 some 42 States had adopted some form of compensation coverage laws; all had done so by 1948.

Thirty years before ""Teddy"" Roosevelt signed the Act into law, Switzerland had adopted a system of compensation for accidents in certain types of employment without requiring proof of fault. But Bismarck of Germany is credited as having initiated the modern concept of Workmen's Compensation. (67:48)

March 9, 1909

Because of the number of accidents occurring in the transportation of explosives, on this date the Interstate Commerce Commission (ICC) was given authority by Congress to formulate standards for safety for the movement of explosives throughout the country.

The ICC adopted the rules already set by the railroads' Bureau of Explosives established shortly after the 1905 explosion near Harrisburg, Pa., May 11, 1905.

This was the start of the safety activity of the ICC, an activity now handled by the Department of Transportation. (62:45)

July 1, 1910

From 1901 to 1910, the number of fatalities in mines doubled that of the previous decade. There were 22,702 deaths in coal mines alone in this 10-year span. Nineteen hundred seven was our blackest year with 3,197 deaths; 385 were killed in one accident in West Virginia—the worst mine disaster in our history; 230 were killed in another disaster in Pennsylvania, among a rash of at least eight other major accidents in Alabama, Colorado, Illinois, and Ohio. As 1,148 of these deaths were caused by explosions, Congress asked the U.S. Geological Survey in 1908 to investigate and make recommendations. It was their preliminary findings which paved the way for the establishment of the U.S. Bureau of Mines.

On July 1, 1910, the Bureau was created by Act of Congress. At that time, being merely a consultative body, the Bureau's work fell into five natural activities: (1) research into causes of accidents, which included reports and statistics; (2) testing laboratories and, under the supervision of George S. Rice, the first experimental mine in the world; (3) rescue and first-aid training; (4) the establishment of national rescue stations; and (5) bulletins and circulars issued each month to keep the mining and general public informed of their findings and progress. (66:45)

November 9, 1910

As though to point up once again the reason for establishment of the Bureau of Mines earlier this year, a sixth major coal mine disaster occurred on this date. In January, 75 had died in an explosion in Colorado; February, 34 in Kentucky; April, 40 in Alabama; the next month, another 84 in Alabama; 56 died in the October 8 Starkville, Colo., tragedy; and on this day, exactly one month later, the Victor American No. 3 Mine in Delagua, Colo., took the lives of 79 more miners!

The year 1910 was a bad one for accidents in mines: 2,840 fatalities! But it wasn't our worst. In 1907 we had more than 3,000. From 1901 to 1910 our fatalities had doubled over the preceding 10 years. That is when we decided that we must find the causes of the disasters and eliminate them.

We sent our finest mining engineers to Europe to study their methods and invited their experts to visit and consult with us. The Geological Survey was asked to study the situation and make recommendations.

The result was the establishment of the Bureau of Mines (see July 1, 1910) within the Department of the Interior. (70:50)

March 25, 1911

It seems we always have to have a tragedy before proper laws are passed!

In New York City, the Fire Chief and others had been calling for revision of building codes and factory laws, but no one heeded them . . . until this day.

The Triangle Shirt Waist Company was a typical sweatshop—the kind that labor leaders had been describing for years. Five hundred and seventy-five cutters and sewing machine operators were jammed in tight rows on just the 8th and 9th floors of the building alone. Around them were piles of materials, tissue paper, boxes, and other flammables. There was only one exit normally used by the Triangle seamstresses. A second exist on the other side of the building was kept locked.

Within minutes after the fire started, the main stairwells and the elevators were engulfed by flames. When the second exit was finally forced open, a pile-up of bodies brought on by panic blocked any escape. The girls were trapped.

The fire was extinguished comparatively quickly by the fire department, but not before 49 young women had burned, 36 fell or jumped down the elevator shafts, and 58 leaped to the street—143 killed in all.

The public demanded action. Three months later a Factory Investigation Commission was appointed, headed by Alfred E. Smith (later Governor of New York and a Presidential candidate) and Robert F. Wagner (later a U.S. Senator who sponsored many labor laws, including the Wagner Act).

The laws the Commission recommended called for elimination of all fire hazards, a limitation to the number of workers in a given work area, and rules against child labor, among other items. It meant the end of the sweatshop.

A Bureau of Fire Prevention was added to the New York City Fire Department to see that all buildings had proper fire-fighting and fire-prevention equipment, and other cities and states, knowing that such a tragedy could happen in their factories too, began to pass similar laws. (62:45)

May 3, 1911

On this date the Wisconsin Industrial Commission was created. It became the model for all the rest of the states—an administrative agency with the power to develop, issue, and enforce rules and regulations for occupational safety. The rules had the power of law.

This was the greatest breakthrough for occupational safety and health in the country. Other states had passed other statutes for this purpose earlier, but each time they were struck down as unconstitutional.

The Wisconsin concept was upheld and proved to be a fair and effective way to handle Workmen's Compensation in accident cases and to help prevent the accidents before they happened. (64:42)

April 14, 1912

There are few people who do not recognize this fateful date—the night the ""Titanic"" struck an iceberg and sank, taking 1,517 men, women, and children with her. Many passengers were from noted families of the continent and the U.S., but the greatest number lost were from the steerage class, the not-so-well-knowns. The ""Titanic"" was a British ship, but Americans always include it as an American tragedy too.

Some important safety lessons were learned from this disaster, lessons about ship construction, proper navigation, and life-saving equipment. At the subsequent International Safety at Sea Conference, most countries agreed to have ships carry enough lifeboats for all persons aboard. After World War I ended, an ice patrol was established to warn ships of drifting icebergs. Later, ship lanes were moved 70 miles south during the times of year this menace is greatest; and ship designs were changed.

This tragedy also made people realize that there really is no such thing as an ""unsinkable ship,"" something Sailors Union representative Andrew Furuseth had told Congress a decade before. (63:40)

March 4, 1913

On this date the Sulzer Act was signed by President William Howard Taft, creating the Department of Labor. Its Secretary became a cabinet member, thus putting the affairs of the working man for the first time on a par with Commerce, Agriculture, etc. However, until the 1930's the Labor Department had little to do with worker safety except in the area of child labor.

The Walsh-Healey Public Contracts Act of 1936 was the first to include health and safety for employees in its provisions.

In 1938 the Longshoremen's and Harbor Workers' Compensation Act was amended to authorize the Secretary of Labor to issue safety and health regulations and to make inspections to assure protection for these employees.

After safety and health clauses were included in the Federal Service Contracts Act, the only federal contracts not covered for safety and health were in the construction industry. This was remedied in 1969.

Then, at the end of 1970, the Occupational Safety and Health Act—the most comprehensive safety law in history—

was passed by Congress to include almost every industry and almost all workers in the country.

July 1, 1913

Would you believe a disease was once taxed out of existence! It's true. A law passed by Congress the year before became effective this day. It placed such a high tax on white phosphorous, its use became prohibitive in industry.

In 1911 the American Association for Labor Legislation had called for the banishment of white phosphorous from the match industry due to a recurrence of ""phossy jaw."" The disease caused periostitis and necrosis of the lower jaw. Young girls, working in the match factories, customarily pointed their brushes with their lips, thereby introducing the poison into their bodies. (66:45)

October 18, 1913

Major E. M. Maitland made the first successful parachute jump from a moving aircraft. He was on the airship ""Delta"" and jumped at 1,800 feet. This was an important development for aviation. The year had witnessed the loss of the crews of two German airships, some of whom may have been saved by parachutes.

It was Leslie L. Irvin, however, who developed the modern chute; that is, the kind that can be used with airplanes. Until April, 1919, all parachute jumps were begun with the chute fully flared. Because this was impossible with planes, a compressed pack that would unfold in a free fall from the plane became a necessity.

Shortly before his death on Oct. 10, 1972, Mr. Irvin was awarded citations from Britain and the U.S. for his contributions to aviation. (69:51)

November 12, 1913

After the sinking of the ""Titanic"" the year before, the U.S. called for an international conference to recommend measures all maritime nations could follow to protect lives at sea. The result was the International Maritime Conference which opened at London on this date. It was mainly concerned with requirements for life-boats and life rafts.

However, World War I stopped most nations from putting the conventions into effect; thus, the International Conference called in 1929 was more or less a resumption of the 1913 meeting. In spite of that long delay, the U.S. did not ratify these international conventions, but only changed its own rules gradually. The disaster of the ""Vestris"" finally brought about loadline limits after 1929, while the tragedy of the ""Morro Caste"" in 1934 forced the country to legislate effective fire safety rules too. (70:50)

February 6, 1915

At Carlisle Mine, Carlisle, West Virginia, gas accumulated overnight in faces of one section where a door had been left open. The fire bosses found gas in one room and closed the door upon leaving, but a miner with an open light entered after they left. The ensuing explosion killed 20 men and four others were injured, one of whom died later. Only three were killed by the violence, four by burns, and 14 by suffocation.

Shortly afterwards, the Bureau of Mines approved Thomas Edison's battery-powered electric cap lamp. The first use of the Edison lamp was at the Carlisle Mine in West Virginia.

Edison described his safety cap lamp as his most humanitarian invention because he knew it would help prevent the many deaths—more than 2,000 annually—in the early decade of this century from fires and explosions underground. (61:11)

March 2, 1915

A Bureau of Mines report read as follows: ""Layland No. 3 Mine, Layland, West Virginia: 115 killed.""

""The explosion occurred at 8:30 a.m., resulting in the death of 114 men inside the mine and one outside. Fifty-four men afterward escaped alive from the mine. Seven came out from two to five hours after the explosion; five more excaped unassisted at 8 a.m. on March 6, and 42 others were rescued an hour later. Of those killed, 44 died from suffocation.""

As a result of this tragedy, and the discipline and procedures of the men who came out alive, the Bureau issued a handbook the following year for instructing crews on best rescue and recovering operations. . . . (62:45)

March 22, 1916

On the same day fires in Nashville, Tennessee, and Augusta, Georgia, wiped out almost 700 buildings in each city. This was just one day after the Paris, Texas, fire. The three events helped people realize that better fire protection was necessary throughout the country. The question of war-related sabotage, however, was not ruled out as the possible cause for all these holocausts. (62:45)

June 12, 1916

On this date, the American Association of Industrial Physicians & Surgeons (now the American Occupational Medical Association) completed the business of organization, selected its first officers, heard papers on industrial medical problems, and thus started the work that for many years was unheralded and little appreciated.

Not until the introduction of exotic fuels and countless other new chemicals during the second World War did the role of the industrial physician achieve the recognition it deserved, not only from other practitioners but from scientific researchers, government, medical colleges, and the workers themselves. (65:44)

July 11, 1916

The first federal highway aid act was signed by President Woodrow Wilson. This law was the culmination of much effort on the part of auto clubs, good roads advocates, and many others to improve our roads.

It called for a cooperative federal-state program. Seventy-five million dollars was to be spent over a five-year period to improve rural roads over which mail was carried; to connect various states' roads, thus forming an interstate highway system; and to conduct more research into construction methods. Another provision of the act was that federal funds would be available to those states with a state highway department capable of assuming responsibility for construction and maintenance.

Although at this time only 33 states were able to meet the government's requirements, within one year after passage of the act, more highway and road legislation was passed by the 48 states and territories than in our entire previous history. Seventeen new state highway commissions were created and not a word of protest, such as that raised 100 years before during the building of the National Road, interfered with this program. (66:45)

July 31, 1916

When saboteurs decided to blow up the munitions stored at the piers on Black Tom's Island, N.J., it was lucky the subsequent blast occurred at 2 a.m. Few people were at work or on the streets at such an early hour.

Had it happened later, thousands would have been killed by the glass that blew out of tall buildings, homes, and offices in Manhattan, Brooklyn, Jersey City, and Hoboken, and by the explosion itself. Thirteen warehouses, almost 100 freight cars, at least six piers, and many barges were completely destroyed.

The shock of the explosion was heard at least 60 miles away. But only seven persons died.

However, this event brought passage by Congress of the Espionage Act which, among other provisions, gave the Coast Guard the authority to maintain the security of ports, harbors, and all their facilities. Although the Espionage Act of 1917 ended with the war, the protection provided by the Coast Guard continues as a regular duty to this day. (66:45)

March 19, 1918

A series of explosions destroyed each of the five duPont gunpowder mills one by one. Thirty-six workers were killed instantly and four others died later of their injuries. Irenee duPont set up a pension fund for the widows of these men, started a home for their orphans, and established paid medical care for the injured. This was probably the first voluntary Workmen's Compensation in our country, perhaps in the world. (62:45)

April 7, 1925

A rare coincidence that possibly only a seer can explain! Two of Union Oil Company's tank farms—more than 200 miles apart—at Brea and San Luis Obispo, Calif., were struck by lightning on the same day. Twenty million barrels of oil burned away, melting the huge storage tanks into crumpled ruins.

The result of this double disaster was the establishment of Union Oil's unique school of fire-fighting. It developed such experts in fire-fighting and fire-fighting equipment, municipal firemen from all over the country traveled to California for the special training. Other oil campanies began to teach the art to their workers; and, in fact, they not insist that all employees know something about combating fires. (63:40)

May 15, 1929

Until this year, X-ray film was made of highly flammable nitrocellulose. It took a tragedy to bring about laws requiring safe film and the training of hospital staffs in the evacuation of patients quickly during an emergency.

On this date, at the Cleveland Clinic—a very modern hospital for the time—a fire started in the X-ray room. Within seconds, the entire storage of films was aflame, and the fire and poisonous fumes raced through the corridors.

Despite the frantic efforts of doctors and nurses, 121 persons died as a result of the fire.

The regulations promulgated shortly thereafter required the use of safety film everywhere, including in motion picture theaters. A number of theater fires had pointed up the danger of nitrocellulose in places of public assembly too. (64:42)

May 31, 1929

The International Conference on Safety of Lives at Sea (SOLAS) which convened on this date was a direct result of the ""Vestris"" disaster which occurred just a few months before (see November 12, 1928).

Fire safety recommendations were drawn, but the rules that the ""Vestris"" influenced were requirements concerning wireless equipment and its use on board, and load lines. Britain had had load line regulations since 1890 when the Plimsoll Line was adopted; the U.S. had never adopted any at all. It took several years before the U.S. ratified the SOLAS conventions. (64:42)

March 10, 1933

One hundred and twenty persons died in the earthquake that hit Long Beach, Calif., at 5:54 p.m. on this day. However, nature provided some warnings before the event: Auroral lights were seen in the sky over the area; hens threw their eggs out of the nest because they could not incubate; horses bolted and ran up to the surrounding hills.

Something in either atmospheric pressures or electrical vibrations, or both, is felt by animals and other creatures from several weeks to several hours before an earthquake strikes. Sensitive types of persons can also often become aware of impending disaster. Someday it is hoped we will have instruments to calculate and predict these things.

The toll would have been much higher, possibly taking thousands of school children's lives, had this quake occurred a couple of hours earlier. Every school building in the city collapsed! As a result, the state legislature set requirements calling for designing all school buildings with earthquake-resistive features. These and other rules are still enforced for schools. Unfortunately, until new laws were recommended recently, many other California builders continued to ignore the lessons learned from this and other earthquakes that have followed since. (62:45)

July 3, 1933

On this date all branches of the U.S. Army Corps of Engineers received a notice informing them of their duty and responsibility in the promotion of safe engineering practices throughout the Department. They were told that they would henceforth advice, coordinate, and supervise all measures for safety and that a safety educational program would soon be initiated for all Corps projects.

This communique, signed by a Captain Lucius D. Clay (later acclaimed for his great reconstruction and administrative work in Germany), started the construction safety program for which the Corps has become deservedly well-known. (66:45)

September 8, 1934

Like an omen of evil, the last night out of the luxury liner ""Morro Castle,"" before her arrival back at New York,

began with the death of her captain either from a heart attack or acute indigestion.

The chief officer took over and the ship continued driving at a 22-knot pace through the rough seas whipped up by lively winds.

The ""Morro Castle"" was about 10 miles off the New Jersey coast in full view of the shore, not far away from her berth in New York harbor at about 2:30 a.m., when a fire was discovered in a closet of the writing room. No word of it was relayed to the bridge at first. Only when the fire appeared to be out of control was the acting captain informed. By that time a number of people had already jumped into the water to swim toward the beckoning shore lights.

No order was received by the radioman to signal for help, he reported later at the inquiry, and no order was received by the engine room to slacken speed.

Finally, when a second radio operator heard other vessels in the area inquiring about a ship afire at sea, he sent out a CQ (stand by) signal in order to keep the signal lanes open. Soon afterward, he sent an SOS.

Several ships moved in to aid in removing crew and passengers from the ship and from the water. A few strong swimmers reached the Asbury Park beach. Four hundred and eleven of the 548 persons aboard were saved; 137 died either in the fire or by drowning. . . .

In 1936 Congress created the Maritime Commission to control merchant marine shipping and passed other legislation to improve the safety standards of U.S. vessels. (68:46)

August 14, 1935

The Social Security Act came in the midst of the Great Depression in answer to the need for a form of insurance to provide for people when they either cannot work or when there is no work.

These two conditions were met by establishment of an old-age pension, and survivors, disability, and unemployment insurance. The first three are federally-financed and operated; the fourth is a federal-state system under which each state sets up its own law and administrative agency, with the federal government paying the operating costs.

The Social Security Act provides help to old people, children, the blind, and those who are permanently and totally disabled. It gives aid without sacrificing the dignity of the individual. (67:48)

June 30, 1936

The Walsh-Healy Public Contracts Act was signed on this date. This was the first federal law which required safety for employees in the operation of factories and some other industries holding public contracts. Under the Act, the Labor Department set the safety standards; most of the enforcement of those standards was conducted by the states. (65:44)

May 18, 1938

New York University established its Center for Safety Education. For many years this was the only university giving diplomas or degrees in safety and still is one of the few providing comprehensive safety engineering training. (64:42)

June 25, 1938

The Fair Labor Standards Act of this date set 16 years as the minimum age for employment of most young people, with 18 years as the minimum for employment of children in occupations declared hazardous by the Labor Department. However, 14 and 15-year-old minors were permitted to be employed outside school hours in a variety of non-manufacturing and nonmining occupations, such as office and sales work, for a limited number of hours and not before 7 a.m. or after 7 p.m.

The Act declared the employment of a child under 14 in any occupation as ""oppressive child labor,"" unless specifically exempt.

The occupations determined to be hazardous were listed and type of child labor exempt from the Act was also listed. The latter included agriculture, outside of school hours, in the school district where the child is living; actors or performers; employment of children by their parents in a nonhazardous occupation; newspaper boys; and home-workers. (65:44)

November 28, 1942

Twelve minutes is all it took to wipe out 492 lives and injure about 300 others in the Cocoanut Grove Nightclub in Boston. Fire caught flimsy decorations, curtains, and walls, and reduced them to ashes in seconds. At least half the victims died of carbon monoxide poisoning and other fumes produced by the decomposition of the materials used throughout the building.

In the investigation that followed this tragedy, it was found that building codes and fire and safety regulations (to which the Club had apparently adhered) were not adequate; there was something wrong about every exit; the

place was allowed to be grossly overcrowded; the electric wiring had not been done by a master electrician. In sum, the city had been lax and incompetent in its duty to safeguard public welfare.

After the tragedy, Massachusetts laws and the fire codes in practically every American city and state were revised according to the lessons from the Cocoanut Grove holocaust. Insurance companies, too, revised their standards and thereafter required regular inspections of all places of public gathering or assembly. (70:50)

July 6, 1944

What started as a happy outing for the children of Hartford, Conn., ended in tragedy. The Ringling Brothers Circus was in town. The big tent could hold 7,000 persons easily; and, to ensure that their pleasure would not be marred by inclement weather, the tent was waterproofed—with kerosene wax.

When flames appeared on the canvas, the audience panicked and jammed the exits. Soon the entire big top was ablaze. Then the center pole fell. Victims who had not been crushed trying to escape were burned or buried in the wreckage. There were 164 killed and hundreds injured, mostly children.

Until that time, there had been no fire regulations of any consequence governing outdoor public gatherings. After the tragedy, municipalities and states passed laws requiring fireproof finishes and proper exists for tent-type shows.

Because there is no central or organized voice to speak for the public, public safety always waits upon a disaster before preventive action is taken. (66:45)

June 22, 1945

The Occupational Health Institute was founded by the American Occupational Medical Association on this date. World War II, with its exotic new fuels, chemicals, and other toxic materials, had demonstrated the urgent need for such study and research by the medical profession. (65:44)

June 5, 1946

Experts said 1946 was the worst year for fires in 40 years. It included what, on this date, was one of the worst hotel fires in our history. Since then, unfortunately, its record has been surpassed.

The LaSalle Hotel in Chicago was 37 years old. And in June, one of the most pleasant months to be in Chicago, it was completely filled with more than 1,000 guests.

Shortly after midnight, a fire started in the basement and, by the time it was discovered, had already begun to shoot up the elevator shafts and walls on one side of the

hotel. On the other side, the guests left in an orderly manner and got out safely.

The toll of 60 dead and 200 hurt included some who tried to jump out of windows.

This fire convinced fire marshals, the National Board of Fire Underwriters, and other experts that hotels and all places of public gathering needed improvements in construction. They felt that buildings would be safer with completely enclosed stairways, with fire-doors, and with thicker walls. A number of cities changed their building codes accordingly. (65:44)

March 25, 1947

In 1946, after strikes closed many of the bituminous coal mines, mines were put under federal control. The Secretary of the Interior, through the Bureau of Mines, was authorized to operate the mines using existing management. The Secretary and the Union entered into an agreement for operation which included a number of safety rules. This was our first federal mine safety code, and it served as a supplement to state regulations. However, it did not remove the responsibility for inspection of mines provided by the Coal Mine Inspection Act of 1941. Except for this temporary operation of the mines, the only other power the Bureau had was the removal of men from a mine reported to be dangerous.

It was under these arrangements that the Centralia (Illinois) No. 5 Mine accident of this date occurred. One hundred and eleven men died.

The Bureau realized after this disaster that it could not allow gradual compliance with its Code and that certain practices which had not been considered an imminent danger were, in fact, just that. As a result, the Bureau went over all its recent inspection reports and required 518 mines to come into immediate compliance. Another 162 were listed for similar improvement under State jurisdiction.

In June, 1947, the mines were returned to private control and thus returned to the more lax state supervision. Stricter federal rules had to wait for another disaster. (62:45)

December 21, 1951

It was the explosion on this date at Orient No. 2 mine in West Frankfort, Ill., which killed 119 miners that prompted the passage of the Federal Coal Mine Safety Act of 1952 (see July 16, 1952).

President Truman had called for a tough enforcement law. He did not believe the 1952 law was tough enough, but signed it rather than delay any longer the corrective measures it did contain. On November 20, 1968, he was proven to be right. (71:49)

July 16, 1952

Public Law 49, passed in 1941, gave the Secretary of the Interior, acting through the Bureau of Mines, the power to make inspections and investigations of health and safety conditions in coal mines. No authority was given to enforce safety standards.

Then World War II began. The number of major accidents in coal mines began to rise. In 1946, when the federal government took over the coal mines as a result of strikes and in order to run them safety and productively, a Federal Mine Safety Code was established. It was during this period of government seizure that the Centralia No. 5 mine disaster in Illinois occurred (March 25, 1947). The Code was strengthened; and, after the mines returned to the operators' control, compliance with the Federal Mine Safety Code became a part of the working agreements between the union and the operators.

Yet, in spite of decided improvements in mine safety, there were six major explosions between January 1951, and February, 1952, including the Orient No. 2 (Illinois) disaster which killed 119 miners (December 21, 1951).

President Harry Truman called on Congress to pass a tough Coal Mine Safety Act giving enforcement powers to federal coal mine inspectors. The new law (which the President said was still too weak) was signed into law this day. (66:45)

November 19, 1952

The conventions of the 1948 SOLAS Conference (Safety of Lives at Sea) became effective this day when 15 of the 28 signatory nations indicated their countries had ratified them. The important milestone of this international meeting was the agreement on fire-safety rules brought about by the disasters by fire of the ""Georges Phillipbar"" (May 16, 1932), the ""L'Atlantique"" (January 14, 1934), the ""Morro Castle"" (September 8, 1934), and the ""Normandie"" (February 9, 1942). (70:50)

June 30, 1953

Congress enacted the Flammable Fabrics Act to outlaw the manufacture and the sale of any article of wearing apparel or fabric which is so highly flammable as to be dangerous when worn by individuals.

The statute was enacted in response to a series of tragic deaths that occurred in the years before this date from fires involving children's clothing. Certain sweaters earned the name of ""torch"" or ""exploding"" sweaters, their flammability was so great.

Later, following disastrous fires in convalescent homes, hospitals, and institutions for the aged, the Act was amended to include fabrics used in carpets, rugs, draperies, furniture, and blankets. (65:44)

February 17, 1957

When the Flammable Fabrics Act was enacted June 30, 1953, it applied only to articles of wearing apparel and fabrics used in clothing. It did not extent to other items such as curtains, draperies, carpets, rugs, blankets, or upholstery.

Thus, when 72 died on this date in a fire at the Warrenton, Missouri, Home for the Aged, there were no mandatory national standards on the flammability of the institution's furnishings.

It was not until December 14, 1967, some 10 years after the original Act's passage, that the law was broadened to include household fabrics too. But it took more nursing and elderly home tragedies, with more loss of life, to bring it about. (61:11)

August 23, 1958

The Longshoremen's and Harbor Workers' Compensation Act was amended on this date to require employers to furnish jobs and places of employment safe for employees. It also directed the Secretary of Labor to issue applicable safety and health regulations, inspect places of employment, hold hearings, issue orders with respect to violations, and secure injunctions when necessary to enforce the regulations. In addition, the Secretary was authorized to study and investigate causes of accidents, promote uniformity in safety standards, and provide for training programs to prevent unsafe working conditions.

At the hearing by Senate and House Labor Subcommittees in connection with passage of the Occupational Safety and Health Act of 1970, the vast improvement in longshoremen's and harbor workers' accident frequency rate often was quoted in arguments favoring the 1970 measure. A 13 percent drop in accident frequency was experienced in the 10 years this safety act was in force. (67:48)

September 23, 1959

The Radiation Standards Act of this date authorized the Atomic Energy Commission (AEC) to enter into agreements with states to help them formulate standards for protection against radiation hazards, with the purpose of allowing the states to conduct their own safety programs with respect to nuclear energy production.

The Act also created a Federal Radiation Council to advice the President on federal and state radiation matters.

The Secretary of Labor was added to the Council, which had originally been established by Executive Order. (68:46)

July 12, 1960

The Federal Hazardous Substances Labeling Act was signed into law this date. The principal thrust of the law was to require warning or precautionary labels on every package or container describing its contents.

In the 1970 report prepared by the National Commission on Product Safety, it was stated that, unlike some other law, which are prompted by a single incident or crisis, this one was prompted by evidence built up over a period of years that thousands of children were being poisoned, burned, overcome by fumes, and otherwise accidentally killed or injured annually through contact with inadequately labeled hazardous household chemical products. Many of these hazards were not covered by previous legislation.

Later, it was necessary to pass additional legislation requiring child-proof packaging. It had become evident that labels could not stop a preschool youngster from getting into unsafe substances. (66:45)

November 23, 1963

A fire at a nursing home for the aged at Norwalk, Ohio, claimed 63 lives. This, and the fatal convalescent home fire in Atlantic City, N.J., just five days before, caused Congress to investigate the fires and propose amendments to the original Flammable Fabrics Act to include within it materials used in blankets and other furnishings. This action was finally taken on December 14, 1967.

Unfortunately it took several years more for standards to be published. Meanwhile the toll from burns caused by flammable fabrics was estimated at 3,000 to 5,000 deaths annually and 150,000 to 250,000 nonfatal injuries. (70:50)

September 9, 1966

The National Traffic and Motor Vehicle Safety Act of 1966 was signed into law. In addition to an increasing annual toll from road accidents, impetus for passage of the laws was provided by Ralph Nader's book, Unsafe at Any Speed, which accused the auto industry of making unsafe cars.

What is now the National Highway Safety Administration within the Dept. of Transportation was created in 1966 as the National Traffic Safety Agency under the jurisdiction of the Secretary of Commerce. The Dept. of Transportation was established later, on October 15, 1966. (68:46)

September 16, 1966

On this date the Federal Metal and Nonmetallic Mine Safety Act became law. This is the first federal law concerning mineral mines other than coal. The purpose was to set safety standards, develop statistics, and work with the states to encourage greater safety and health for the workers in the metal and nonmetallic mines. While the hazard from explosion—as in coal mines—is not as great, fires can and do happen, falls can and do occur, and the health hazards are many. This is why Congress decided that leadership by the Bureau of Mines was necessary. (68:46)

October 15, 1966

On this date, a new cabinet office, the Dept. of Transportation (DOT) was created by Act of Congress. It brought under one head all the transportation duties that had been handled by other departments. It made DOT the only department whose major concerns (air, rail, road, and sea) were with safety.

The independent National Transportation Safety Board, created at the same time, would have the authority to study the causes of accidents, among a number of other safety duties.

The Highway Safety Act and the National Traffic and Motor Vehicle Act, which Congress passed a month before (September 9, 1966), established a national safety program based on motor vehicle standards to be coordinated on a federal-state basis.

Ralph Nader, author of Unsafe at Any Speed, helped spur the passage of these acts by calling attention to the long-neglected needs of the consumer. But the steadily increasing number of accidents, fatalities, and injuries also helped Congress make up its collective mind. (69:51)

November 3, 1966

The amendments to the Federal Hazardous Substances Act of this date are called the Child Protection Act of 1966. The purpose of the measure was to give the Secretary of Health, Education and Welfare the authority to ban hazardous household substances from the market. It included both unpackaged and packaged products and household articles treated with pesticides.

Three years later the Act was amended again to broaden its coverage (November 6, 1969). (70:50)

November 29, 1966

The Great Lakes freighter ""Daniel J. Morrell"" sank near Harbor Beach, Mich., in a Lake Huron storm, with the loss of all but one of the crew of 29, because ""of failure of the main hull amidships, which caused the vessel to break in two and both sections to sink.""

That was the finding of the National Transportation Safety Board, which also recommended either structural strengthening of existing tonnage or curtailment of operations of similar cargo vessels in comparable storm conditions on the Great Lakes.

In this day and age, and after so many sea disasters in the past, it seems strange that the Safety Board also had to recommend hull comparmentation in new ships, improved sea and weather reports for Lake vessel masters, emergency lighting in the forward crew quarters, a reliable position-reporting system, and improved emergency equipment. (70:50)

January 27, 1967

Virgil I. Grissom, Edgar H. White, and Roger B. Chaffee, the three-man crew of astronauts of the Apollo 1 spacecraft, were killed this day in a flash fire at the launching pad at Cape Kennedy, Florida.

This tragedy resulted in a number of safety changes in the entire space program—a different oxygen mixture in the craft, better fireproof suits, faster escape mechanisms, and more warning devices. (60:27)

March 18, 1967

The wreck of the giant oil tanker ""Torrey Canyon"" on the Seven Stone Rocks off England's Cornish coast ranks as the costliest single ship mishap in maritime history. She broke into three pieces when gale winds ran her aground.

The ship, built in 1959, was jumboized six years later. Her length became three times that of a football field.

The ""Torrey Canyon"" caused more than 100,000 tons of pollution on the English beaches, including the 2.5 million gallons of chemicals sprayed over the oil slick. Hundreds of thousands of birds died in the mess. When newspapers, ecologists, and conservationists protested the use of these giant tankers, most of the industrial nations of the world began to formulate strict rules for the carriage of oil and for penalties in the case of spills. The U.S. also decided to look into the strength and sea-worthiness of jumboized ships. (62:45)

November 20, 1967

Public Law 90-146 was a Joint Resolution passed by Congress on this day to create a National Commission on Product Safety to conduct ""a comprehensive study and investigation of the scope and adequacy of measures being employed to protect consumers against unreasonable risk of injuries which may be caused by hazardous household products.""

Six months later the Commission published a list of products it would investigate. The list included general household appliances; kitchen appliances; heating, cooking, and ventilating appliances; housewares; home entertainment appliances; home furnishings, fixtures and construction materials; home alarm, escape, and protection devices; home workshop apparatus, tools, and attachments; home and family maintenance products (cleaning agents, bleaches, solvents, etc.); farm household equipment; packaging and containers; sports and recreational equipment; toys; and yard and garden equipment.

Hearings were held throughout the country on each of these major categories of products; and two years later the Commission made its report to the President and to Congress.

The report spared no government agency and no private industry which its findings showed was contributing to consumer hazard; it brought evidence and statistics to bear witness to its findings. Finally, the Commission made specific recommendations on ways in which the situation should be handled.

The result: passage of the Toy Safety Act, the Poison Prevention Packaging Act, new regulations under the Flammable Fabrics Act, the addition of certain safety rules to HUD's various housing authorities, and a quickening of safety activities by manufacturer associations whose members were not helped by such adverse publicity. Later, a permanent Consumer Product Safety Commission was established.

This was a Commission report which was not filed away and forgotten like so many others. (70:50)

December 14, 1967

The Flammable Fabrics Act of 1953 covered only wearing apparel and, at that, only the quick-fire or highly flammable types of clothes. It did not extend to such items as baby blankets, bedding products, carpets, upholstery, and common household materials.

In Congressional hearings concerning the circumstances in fatalities from fires, it was learned that in the more than 2,100 clothing fire deaths each year, the greatest cause was not from the so-called uncommonly flammable type. A survey by the National Fire Protection Association showed that 78 percent of the people burned were wearing ordinary street clothing; the balance were in nightwear.

The amendments to the Act of this date extended the coverage to all textile products used in clothing and household fabrics. The Secretary of Commerce was to issue new flammability standards and other regulations including labeling; Agriculture was to continue its research and development of flame-retardant fabrics and chemicals;

HEW was to conduct a continuing study and investigation of the deaths, injuries, and economic losses resulting from such fires; the Federal Trade Commission was given the administrative and enforcement functions; and the Treasury Department was given jurisdiction over shipments of imported products from foreign countries. (71:49)

March 1, 1968

Congress found that a comprehensive fire research and safety program was needed to provide more effective measures of protection against the hazard of death, injury, and damage to property caused by fires.

The Fire Research and Safety Act of 1968, signed on this day by President Lyndon B. Johnson, amended the 1901 Act, which created the Bureau of Standards, to establish a national fire research and safety program including the gathering of comprehensive fire data; a fire research program; fire safety education and training programs; and finding new approaches and improvements in fire prevention and control.

More than 12,000 persons die each year in the U.S. as a result of fires, and property worth almost $3 billion is destroyed annually.

Unfortunately it took two years before funds were voted to get the research project underway. (62:45)

August 12, 1968

The Natural Gas Pipeline Safety Act was signed into law this day. It provided for the promulgation by the Secretary of Transportation of federal safety standards for the transportation of natural and other gases by pipeline and for pipeline facilities. It was enacted as a result of numerous pipeline breaks, gas leaks, and explosions which threatened whole communities. (67:48)

November 20, 1968

The death of 78 miners at Consolidated No. 9 Mine in Farmington, W. Va., in an explosion and fire made it the worst coal mine disaster in the country since the Orient No. 2 mine tragedy at West Frankfort, Ill., December 21, 1951, in which 119 men died.

The Illinois accident led directly the 1952 Coal Mine Safety Law, which gave Bureau of Mines inspectors the authority for the first time to inspect coal mines and to establish regulations. Enforcement, however, was still left up to the states.

The Farmington, W. Va., accident led to the passage of the strictest coal mine safety law to date, signed December 30, 1969, and effective in April, 1970. It

is an unusual law in that it includes certain safety regulations within it, something that is usually left up to the regulatory agency to promulgate. But it also gave the Secretary of Interior, through the Bureau of Mines, the authority to shut down mines, if necessary, and impose fines and penalties. (70:50)

August 9, 1969

On this date the Construction Safety Act was signed into law. It was the final Act providing protection for employees doing work under federal, federally-funded, or federally-assisted contracts and was the first national construction safety law in the U.S.

It called for the Secretary of Labor to promulgate rules with the assistance of an advisory committee comprised of members from the industry.

The regulations issued under the Act were later adopted under the Occupational Safety and Health Act of 1970 to cover all construction workers. (67:48)

November 6, 1969

Congress heard evidence to the fact that of the nearly 56 million children under 15 in the United States, more than 15,000 die each year from accidents—a rate of 28 per 100,000 population. In the toy-related injuries or deaths, they found that electrical, mechanical, and thermal hazards predominated in the statistics.

So Congress again amended the Federal Hazardous Substances Act of 1966 to ban any toy or other article intended for use by children which presented an electrical, mechanical, or thermal hazard. (70:50)

December 30, 1969

The Coal Mine Safety Act was signed into law this day. It amended the earlier federal coal mine safety laws in order—for the first time—to give the Secretary of the Interior, through the Bureau of Mines, the authority needed to write standards for both safety and health, train both employees and employers in safety, enforce the regulations, and exact penalties for violations.

In an excellent article by a New York Times reporter, Ben A. Franklin, the sordid history of coal mine accidents, injuries, and health problems was outlined. He said: ""In the 100 years that partial records of fatal mine accidents have been kept (the early records are incomplete), more than 120,000 men have died violently in coal mines, an average of 100 every month for a century. The total does not include those who died of what passes for 'natural causes' in work that is notoriously as hazardous to health as it is to life and limb. . . ."" (71:49)

January 9, 1970

In 1970's worst building fire, 32 elderly persons died when fire swept the Harmar House Nursing Home in Marietta, Ohio.

Harmar House was a modern building of fire-resistive construction. State and local officials said that the home had no building code violations. The fire caused little structural damage to the building. The 32 victims died of smoke inhalation produced mainly by the foam rubber backing of the nylon-pile carpeting as it burned in the rooms and down the 244-foot undivided corridor.

The home had no sprinklers, and the fire also demonstrated a lack of fire-evacuation procedures. There was at least a four-minute delay in calling the fire department. Firemen arrived within five minutes after that; they had the fire out in 12.

The Harmar House fire started intensive Congressional and federal agency investigations into fire safety and fabric flammability laws. (60:27)

April 22, 1970

This was the date suggested by Senator Gaylord Nelson of Wisconsin, an outstanding advocate of protection for the environment, for ""Earth Day.""

The purpose of ""Earth Day"" was to dramatize the pollution of our land, water, and air; the heedless killing of other living creatures; the hazards to our health from pesticides, poisons, additives, and preservatives; and the need for population control. In addition, it was to serve as a forum to encourage young people to study the problems and become active in the work of solving them.

While the focus of major attention centered on Washington, D.C., in order to press for the passage of necessary legislation, almost every college campus and many abused communities joined in the activities of the day all over the country.

The people expressed their deep concern this day, making evident to the lawmakers that they did, indeed, care about the environment. (63:40)

June 21, 1970

A major holocaust was somehow averted when a freight train carrying tanks of compressed propane gas derailed at Crescent City, Ill.

The gas exploded, igniting a fire that injured 70 persons, destroyed half the town's business district and about 20 homes, damaged other homes and buildings, and forced the evacuation of all 700 residents of the community.

This was the latest of a long string of rail accidents that occurred in 1969 and continued into 1970. Congress and the public called for stricter rail safety rules. Almost exactly one year after this accident, new regulations were promulgated. (65:44)

July 15, 1970

Just west of Allentown, Pa., a school bus skidded on the highway and plunged 50 feet down an embankment.

Seven of the young passengers died in the accident; 47 others were injured. The bus driver's wife collapsed and died on her way to see her husband at the hospital.

This accident, following 39 others in a period of 42 months, prompted an investigation into bus safety and our methods for achieving safety on motor carriers. The Department of Transportation tightened federal regulations covering vehicles and driver qualifications and many states began to revise their rules for such commerce. (66:45)

August 28, 1970

Texas became the first state to place specific limitations on the amount of heavy metals it would allow to be dumped into public waters. The reason for this action was the discovery in a number of places of dangerous amounts of mercury in fish.

Included in the Texas regulation were 13 metals: arsenic, bairum, boron, cadmium, copper, chromium, lead, managanese, mercury, nickel, selenium, sliver, and zinc.

Earlier this year, the Canadian government suspended all commercial fishing on the Canadian side of Lake Erie because of mercury, and several other governments—Iraq, West Pakistan, Guatemala, Japan, and Mexico—reported epidemics in the past 10 years of mercury poisoning attributed to the intake of mercury from foods.

On this same day, the State of Virginia extended its search for mercury pollution throughout the Commonwealth. (67:48)

December 20, 1970

Investigators believe the fire that demolished the Pioneer Hotel in Tucson, Ariz., and killed 28 persons, was set deliberately. But it was a structural design weakness that allowed the fire to sweep throughout the building instead of being confined to its point of origin. An open stairway acted as a chimney, drawing the draughts of hot air through it onto almost every floor.

Note: Because the losses from fire just to U.S. industry alone rose by 29 percent in 1970, the National Fire Protection Association (NFPA) the following July launched a nationwide

project to computerize the gathering and analysis of fire experience data. Fire marshals, federal agency representatives, and other experts planned the system. NFPA's ""Coding System for Fire Reporting"" became the basis for a master plan for operation of a nationwide fire information system using uniform reporting methods, with the Association serving as the repository and clearinghouse of data. (71:49)

December 29, 1970

The Occupational Safety and Health Act (OSHA) of 1970 was signed into law this day. Occupational safety was a major concern of Congress during the last half of the '60's. It passed the Metal and Nonmetallic Mine Act, the Radiation Safety Act, created the Department of Transportation to regulate transportation safety; amended the railroads' hours-of-work laws; passed a tough Coal Mine Safety Act and the Construction Safety Act; and finally drew almost all industry into the safety effort under OSHA.

The Act established penalties for violations of the standards that the Secretary of Labor was authorized to promulgate. It also established a National Institute for Occupational Safety and Health within the Department of Health, Education and Welfare in order to prevent the occupational diseases caused by industrial processes and products.

It is the most comprehensive piece of safety legislation ever passed by this nation. The purpose of the law is to prevent the more than 14,000 deaths, the over two million injuries, and an unknown number of industrially-caused diseases that occur in American industries each year. (71:49)

December 30, 1970

On this date, in order to prevent the approximately 75,000 accidental poisonings and some 300 deaths each year among children under the age of five, and the poisonings and deaths to others annually, the Poison Prevention Packaging Act was passed and signed into law. . . . (71:49)

April 28, 1971

The Occupational Safety and Health Act of 1970 became effective on this date (see December 29, 1970). (63:40)

June 24, 1971

A pocket of gas exploded in a water tunnel being driven 250 feet below Sylmar, Calif. Seventeen workers died of the blast, smoke, flames, or gases which followed.

This was the second explosion here in two days; the first had injured four men. One, who was treated and returned to work, died in the second explosion.

The Sylmar tunnel disaster, and another shortly thereafter at Port Huron, Mich., prompted federal Occupational Safety and Health Administration officials to study their tunnel safety requirements for possible tightening and strengthening.

Later, a jury convicted the construction company, charging it with gross negligence, misdemeanors, and industrial safety violations. (65:44)

December 11, 1971

Construction workers believed that an explosion of methane gas was touched off at the end of a tunnel at Port Huron, Mich., by some drilling being done to provide ventilation.

Workmen were pouring concrete for the tunnel lining when the explosion occurred. The blast blew sheets of corrugated steel out of the tunnel entrance, hurling some of the debris 200 feet into the air. A 15-ton piece of equipment was knocked back 40 feet.

To explain the tremendous forces involved in such an explosion, an expert witness testified at subsequent hearings on the explosion that a tunnel acts like the bore of a rifle; it aids in the build-up of heat, pressure, and force.

The Occupational Safety and Health Administration (OSHA) decided almost immediately to study its tunnel regulations in the light of the Port Huron, and the earlier Sylmar, Calif., tunnel disaster on June 24, 1971, to see if the regulations could be improved in order to possibly prevent similar accidents.

Twenty-one men were killed outright in the Port Huron tragedy; 22 escaped although a number of them were seriously injured. (71:49)

September 2, 1973

It was announced that the Consumer Safety Products Commission would study evidence on home fires believed to have been caused by defective TV sets. Three fires, all of which occurred within 18 months in New Jersey, had killed 14 persons. (68:46)

October 3, 1973

Five workmen died when the 2,000-foot radio broadcasting tower they were working on collapsed. This happened in Rowley, Iowa. Two months later, a 1,900-foot tower near Des Moines fell under wind and ice loads. Fortunately, no one was killed. Earlier, in June, two men died in a tower collapse in Florida, and seven men died in a similar collapse near St. Paul in 1971.

These events triggered action by the Occupational Safety and Health Administration of the Labor Department to write rules for the safety of workers on these transmission towers. (69:51)

August 9, 1974

An oil spill, second in size to that caused by the ""Torey Canyon,"" occurred this day when the supertanker ""Metula"" ran aground in the Straits of Magellan. Only the remoteness and desolation of the area where the accident occurred, and the U.S. Coast Guard's use of an experimental system to remove the remaining 140,000 tons of oil from the ""Metula,"" kept it from becoming a major disaster.

Tons of crude oil spilled into Chilean waters, washing onto 75 miles of that country's coastline. Penguins and other waterfowl were killed by the fouled waters, and shellfish production in the area was damaged.

The accident prompted Congress to finally pass legislation regarding safer, stronger construction of supertankers. . . . (67:48)

August 10, 1974

The first bill signed by President Gerald Ford was a safety bill. It authorized the Coast Guard to modify its boiler and pressure vessels standards. (67:48)

For a summary of the safety legislation passed, see Appendix T.

III. STUDIES RELATED TO THE IMPLICATIONS OF OSHA TO HIGHER EDUCATION

The Occupational Safety and Health Act of 1970 (the Williams-Steiger OSH Act) is in force and is beginning to exercise a profound influence over the daily functioning and long-range planning of employers throughout the United States—colleges and universities included. Several educational institutions have experienced compliance inspections. Others are taking major steps to insure that campus facilities and programs are in conformity with OSHA standards and recordkeeping requirements prior to the onset of

regular inspection. Although colleges and universities are not a prime "target area" of the OSHA program, the effect of federal regulation over occupational safety and health will be felt, to some degree, on every campus.

This is not a time to be dominated by panic or alarm. Rather, it is time for an educated look at facilities and programs and the beginning of plans which, in the long run, will bring colleges and universities into compliance with OSHA standards and recordkeeping requirements.

The National Association of College and University Business Officers recommended a three-pronged planning approach to OSHA compliance. These steps are (82):

1. Establish institutional coordination: Establish a formal working framework to coordinate OSHA-related matters within the institution. Designate a certain individual (or individuals) to become a resident expert(s) and to coordinate all aspects of compliance with all offices and departments of the institution.

2. Relate OSHA to the institution: Once a formal structure has been established and experts are thoroughly versed on OSHA standards and recordkeeping requirements, begin to relate OSHA regulations to specific institutional facilities and programs. With a well coordinated campus-wide campaign to eliminate occupational safety and health hazards from the institution, begin to isolate areas of danger and potential noncompliance. The assistance of an outside inspector

may be beneficial during this process of relating the OSHA program to the specific institutional environment. The end product of this exercise should be the formulation of a long-range plan, including financial implications, for eliminating safety and health hazards on campus.

3. Allocate financial resources for compliance: The financial implications of OSHA are great and must be met with a correspondingly greater commitment to eliminate hazards on the part of the institution. A gradual allocation of budgetary resources is necessary to finance the long-range institutional plan developed. Depending on the institution, resources probably will be required to meet OSHA regulations in each of the three following areas: (a) purchasing and reconstruction (a modification of planned construction) to redress hazardous situations in facilities and program; (b) administrative costs to provide for adequate recordkeeping and coordination of all OSHA-related activities; (c) identification of resources to meet potential fines levied by OSHA prior to the completion of the long-range plan.

Chamberlain, President of Colorado State University, pointed out that the decade of the seventies will see campus safety personnel and programs severely criticized by the campus faculty community. Campus administrations that respond to the new statutory safety needs by substantial reallocation of financial resources also will be criticized by the academic faculty.

This will occur, Chamberlain added, because the Congress and state legislators will continue to enact improved and appropriate safety legislation, will finance the state and national staff to supervise the laws, but will not appropriate funds to the campuses in sums even marginally adequate to carry out the required campus improvements. As a consequence, already tight college and university budgets will undergo shifts that will reduce the percentage going into general administration and physical plant. Academic faculty and students, he added, who at one time might have been in philosophic accord with the campus safety program, will turn against both the personnel of the safety program and the administration that supports it. Faculty will perceive that "their" salary and expense money is going for campus safety staff. Students will perceive their tuition is being diverted away from providing teachers, library books, and classroom supplies (17).

Chamberlain was of the opinion that campus safety programs in the 1950's and 60's were grossly inadequate even though money could have been available and reasonably easily allocated under the growth curve of the rapidly expanding higher education establishment. This wasn't done because there was not an adequate statutory and regulatory basis requiring substantial campus safety programs.

During the late 1960's and early 1970's there has been a great increase in the number of statutes extending safety and environmental laws to the campuses. For the first time, Chamberlain believed, there is an adequate legal basis for campus safety programs, requiring

financial resource allocation to achieve compliance of facilities and operational procedures with the new laws.

Chamberlain concluded that as the 1980 decade approaches, the costs, operational procedures, and facility compliance needs will have been assimilated into campus budgets to an extent that faculty and students will no longer perceive campus safety costs as a diversion of resources that "should have been allocated to the classroom teacher," and safe operational behavior will have become second nature to most campus personnel (17).

The Occupational Safety and Health Act has presented the campus safety officer with new problems, but it has offered him new potentials. He has the responsibility to interpret the "handwriting on the wall" that seems to announce that public schools will next feel the safety crunch and private schools shortly after. The impact of OSHA on the educational requirements and responsibilities of schools and colleges is becoming greater than on the employer-employee responsibilities. Employers and the business community will put pressure on the schools to make sure that people are trained properly.

One example of what can happen to a college or university with respect to OSHA inspection, citations and penalties is an incident at Massachusetts Institute of Technology. According to Kutchta, Assistant Safety Engineer, in April 1971, the Institute's legal counsel was asked to write an opinion regarding OSHA and its probable impact on MIT. This is what he wrote:

> So far as MIT is concerned, it would appear that the act will not have an impact of such a nature as to require immediate action. Clearly, MIT's operations do not involve the kinds of ""hazardous"" working conditions which are the short-term concerns of the act. It, therefore, is doubtful that many, if any, of the safety and health standards to be promulgated in the near future will have any particular application to MIT.

Kuchta continued:

> Unfortunately, in mid-October of 1972, a graduate student working alone in a physics research lab was electrocuted. The accident was reported within the allotted 48 hours. On October 19, 1972, two compliance officers arrived to go over the details of the accident. During this initial visit one of the questions was, ""Are any of MIT's employees exposed to this hazard?"" They left and we thought that this was the end of it. How wrong we were! Four days later, three OSHA compliance officers walked into the safety office and an inspection that lasted until November 14, 1972, was under way. (50:36-37)

In covering about 25 percent of the Institute, the inspectors, according to Mr. Kutchta, found one "serious" and 65 "other" violations of OSHA standards. There were a total of 1,651 instances of these violations cited. To date, the physical plant department has spent more than $150,000 beyond the amount normally allocated for safety. Other departments, it is estimated, have contributed another $75,000. This is the amount it has cost to remedy all of the violations specifically cited. Before MIT is brought up to OSHA standards, it will probably have cost $1 million over a two to three year period in funds that will have to be rebudgeted from other areas. After this cleanup period is over, the price of staying in compliance in equipment and procedures is estimated at $250,000 per year above the present commitment (50).

According to the NACUBO Special Report 71-1 (82) several colleges and universities have already reported experiences with OSHA compliance officers visiting their campuses. To date, all known visits of this nature have been the result of specific complaints filed with the Department of Labor. Although educational institutions are not high on the list of "target areas" for OSHA compliances, and are not yet subject to regular compliance inspections, the full impact of OSHA regulations and procedures has been felt in this limited number of instances.

> The question of whether or not schools are affected by OSH Act is no longer relevant. The question now is WHEN will they be affected? Close observers expect that by December 1975, most state plans will have been approved, with some plans meeting approval as soon as the fall of 1972. As state plans are approved, public institutions of formal education will probably be required to comply with a bewildering maze of safety standards, recordkeeping requirements and inspections. Although statistics on school employee injuries and illnesses are rare, cursory observation leads to the conclusion that most schools and colleges have a long way to go in occupational safety and health. There is no question that many school shops, warehouses, cafeterias, laboratories and other workplaces are presently in violation of OSH Act safety and health standards. (121)

School superintendents, college presidents, boards of education and trustees would be well advised to delegate responsibility for the total safety and laws control program to a competent professional staff person who would need to work closely with both the business management and instructional arms of school administration (121).

A comprehensive college or university safety program serves both to keep the student safe at college and prepare the graduate for his leadership role in life. The transition from student to family life and

professional or business employment is a rapid one. Safety knowledge and attitudes acquired in college will in large part determine the future safety of the graduate as a producer, citizen, and family member. His safety knowledge and attitudes will also be transmitted to his family and to his professional, business, and social acquaintances. As a college graduate, he commands respect. The attitudes and practices he displays will be followed by others. Our college graduates are our leaders of tomorrow. They can also be our best salesmen for safety (134).

IV. STUDIES RELATED TO THE DEVELOPMENT OF THE OCCUPATIONAL SAFETY AND HEALTH ACT

Much information about the relationship between the work environment and occupational casualties has been known for decades while continuing research uncovers more and more of this relationship. It was brought out in the Senate Committee hearings that asbestosis, a disabling disease of the lung that results from excessive exposure to asbestos, has been well known for about 40 years, but persists as though it were unknown. Coal mine workers, cotton textile employees, persons in the chemical pesticide and fungicide industries—the list is almost endless—have a high incidence of disease persuasively documented by scientific research to be work-related. The president of the American Public Health Association, in a statement before the Senate Committee, said that there is enough knowledge about controlling the work environment to prevent silicosis, lead intoxication, mercury

poisoning, and noise-induced hearing loss diseases which have been reported for years in occupational health literature. But no significant action was taken by any government, state or federal, to translate the intelligence at hand into effective legislation. The American worker continued to suffer crippling accidents and death at an accelerating rate estimated by former Secretary of Labor Shultz to be 20 percent more in 1970 than in 1958 (22:500).

The enactment of safety and health laws historically has been left to several states, and their legislative response to the problem indeed has been diverse. Only a few states had safety and health laws that could be called modern. Many states had so few laws on their books or legislated only with respect to particular industries, or failed to appropriate the money needed to enforce such laws as they had, that it could not be said that a viable network of state laws to protect the American worker had ever existed.

The increasing complexity of modern industry with its sophisticated processes and its use of new materials—it has been estimated that a new and potentially toxic chemical is introduced into industry every 20 minutes—pointed to the need for research on a vastly enlarged scale. There is also need for the reporting of statistics on occupational safety and health on a nationwide scale to a central agency, and for legislation to protect the American worker wherever he might be employed. These needs could be met only by governmental action at the federal level (22:312).

Legislative History of the Act

The Act evolved amid a stormy atmosphere, both in committees and on the floors of both Houses of Congress, that time after time threatened its enactment. Division along political party lines was sharply drawn. Committee meetings were boycotted in protest of the ways the bills were shaping up. Division outside the halls of Congress was also clear. Industry and management were firmly behind bills espousing the administration's view. Labor, with equal energy, supported bills introduced into both Houses by the majority Democrats.

Although there were numerous differences between the bills introduced by the Administration and the majority, for the most part, the differences were of a kind that would lend themselves to resolution at the conference level. A basic difference or two did exist, however, that divided the legislators. One difference was the extent to which power was to be concentrated in the Secretary of Labor. The Administration was for the dilution of this power, vesting the authority to promulgate standards in an entity separate from the person authorized to enforce the standards. It proposed that a five-man board, appointed by the President with the advice and consent of the Senate, issue the standards to be enforced by the Secretary. This separation of powers was more palatable to business, which, at best, was apprehensive over the proposed legislation.

Labor, on the other hand, strongly supported the concept of concentration of power in the Secretary; with the Secretary to promulgate and to enforce standards. This attitude of labor was

surprising to a number of legislators because of labor's disenchantment with the way in which the Department of Labor had enforced earlier safety and health legislation, such as the Walsh-Healey Public Contract Act. Nonetheless, total power in the Secretary was the way labor wanted the legislation structured. The majority never yielded on this point.

A second difference between the two legislative viewpoints pertained to the power of the Secretary in situations of imminent danger. The Majority Bills gave the Secretary the right to shut down a plant for up to seventy-two hours without a court order, if a danger were imminent. The Administration saw this as being too drastic and held out, successful in the end, for a provision which would require the Secretary to go to the courts for an injunctive order before a plant could be shut down in whole or in part (22:313).

The final Bill

> . . . was largely the liberal labor-sponsored legislation. Two conservative features of the Administration Bill were retained: (1) A separate judiciary function was established. This is the Occupational Safety and Health Review Commission. The Labor Bill would have provided the Department of Labor with overall judiciary power, and (2) A U.S. District Court injunction must be obtained before a plant can be shut down because of ""imminent danger."" The Labor proposal would have given this authority to an inspector on his own cognizance. (22:314)

In the House of Representatives. The first bill introduced was H.R. 3809. Congressman O'Hara introduced the measure in January 1969, joined by seventeen cosponsors.

Occupational safety and health was a part of the Administration's program of legislation on the home front. A bill backed by the Administration, H.R. 13373, was started on its way through the legislative process in the autumn of 1969.

Congressman Daniels, late in 1969 and through the early months of 1970, working from H.R. 3809, substantially revised the earlier bill and presented to the House Subcommittee the majority bill, H.R. 16785. This bill was opposed to the Administration's position in the areas mentioned above and divided the members of the Subcommittee strictly on party lines. The Democratic members refused to compromise positions opposed by the Administration. H.R. 16785 was reported out of Subcommittee in April 1970, at a time when all Republican members were absent, having boycotted the meeting in a gesture of protest.

The Administration proposed a compromise in a revised bill offered by Congressman Steiger. This was not acceptable to the Democratic majority on the Subcommittee and the measure was defeated. A further effort at compromise was made by the Administration in a bill which has the approval of the DOL, but it never got off the ground.

By June 1970, H.R. 16785 had been reported out of the Subcommittee and had been approved by the full Committee. Before it could reach the House floor, it was held up by the Rules Committee until the last week of November. The Administration, which had not given up the battle, countered with H.R. 19200, sponsored by Congressmen Steiger and Sikes, a Bill endorsed by DOL. The Bill was proposed on the floor of the House as a substitute for the committee's bill.

In an effort to save the committee's bill, Congressman Daniel offered a number of amendments to attract Republican support. These amendments, designed to meet some of the objections to the committee's bill voiced by the Republicans, still retained standards-setting and standards-enforcing powers in the Secretary. The Republicans were not yet ready to surrender. The Daniel's amendments were rejected and within forty-eight hours the House accepted the Steiger-Sikes Bill, H.R. 19200, as an amendment to the committee's bill (22:313).

In the Senate. In May 1969, Senator Williams introduced the Majority's measure, S. 2193. A few months later the Administration's bill, S. 2788, was introduced. As in the House, lines were drawn in accordance with party loyalties.

The Senate Subcommittee sought to avoid some of the problems which had beset the House Subcommittee and amendments offered by the Republican members were in many cases adopted. These amendments, however, did not go far enough to satisfy the Administration. In September, with some further amendments, the Democrats were able to muster enough support for S. 2193 to report it out to the full Committee.

Two days after S. 2193 had been reported out to the full Committee, Senator Dominick introduced S. 4404, a counterpart of H.R. 19200, which he proposed to offer on the floor in lieu of the committee's bill. On November 16, S. 4404 was tabled by a close vote and a series of amendments to S. 2193 were proposed by Senators Javits and Dominick.

These amendments, which still fell short of what the Administration wanted, were accepted, and S. 2193, as amended, won Senate approval.

The Joint Committee of the two Houses met in five sessions to work out the differences between the two bills. The Administration gave up the fight on the issue of the power of the Secretary to promulgate and enforce standards. The Majority accepted the Administration's approach to imminent danger and took from the Secretary the power to shut down a plant without a court order. Other differences were then soon resolved. The conference report was approved by both Houses after brief debate. On December 29, President Nixon signed into law the Occupational Safety and Health Act of 1970 (22:314).

Objectives of the Act

Congress found that work-related personal injuries and illnesses imposed a substantial burden upon and hindered interstate commerce by causing losses in production and wages, medical expense and disability payments. Congress declared it to be its purpose and the policy of the nation, to assure, so far as possible, safe and healthful working conditions to every employee in America and to preserve this country's human resources. Congress would achieve its purpose in the following ways:

1. by encouraging employers and employees in their efforts to reduce the number of occupational safety and health hazards at their places of employment, and to stimulate employers and employees to institute new and to perfect existing programs for providing safe and healthful working conditions.

2. by providing that employers and employees have separate but dependent responsibilities and rights with respect to achieving safe and healthful working conditions;
3. by authorizing the Secretary of Labor to set mandatory occupational safety and health standards applicable to businesses affecting interstate commerce, and by creating an Occupational Safety and Health Review Commission for carrying out adjudicatory functions under the Act;
4. by building upon advances already made through employer and employee initiative for providing safe and healthful working conditions;
5. by providing for research in the field of occupational safety and health, including the psychological factors involved, and by developing innovative methods, techniques, and approaches for dealing with occupational safety and health problems;
6. by exploring ways to discover latent diseases, establishing causal connections between diseases and work in environmental conditions, and conducting other research relating to health problems, in recognition of the fact that occupational health standards present problems often different from those involved in occupational safety;
7. by providing medical criteria which will assure insofar as practicable that no employee will suffer diminished health, functional capacity, or life expectancy as a result of his work experience;
8. by providing for training programs to increase the number and competence of personnel engaged in the field of occupational safety and health;
9. by providing for the development and promulgation of occupational safety and health standards;
10. by providing an effective enforcement program which shall include a prohibition against giving advance notice of any inspection and sanctions for any individual violating this prohibition;
11. by encouraging the States to assume the fullest responsibility for the administration and enforcement of their occupational safety and health laws by providing grants to the States to assist in identifying their needs and responsibilities in the area of occupational safety and health, to develop plans in accordance with the provisions of this Act, to improve the administration and enforcement of State occupational safety and health laws, and to conduct experimental and demonstration projects in connection therewith;
12. by providing for appropriate reporting procedures with respect to occupational safety and health which procedures will help achieve the objectives of this Act and accurately describe the nature of the occupational safety and health problem;

13. by encouraging joint labor-management efforts to reduce injuries and disease arising out of employment. (22:315-316)

V. SUMMARY

Two pertinent points have been derived from this review of the literature. They are as follows:

1. During the Industrial Revolution an awakening of the public conscience to the need for protecting human life occurred. This interest toward safety has continued to develop over the years at a slow and irregular pace. Not as much progress has been made because of the seemingly indifference or insensitivity on the part of the public. Even today (1978), it still may take a tragedy before effective laws are passed and enforced.

2. A turning point occurred in 1970 with the passage of the Occupational Safety and Health Act (the Williams-Steiger OSH Act). Congress declared it to be the purpose and policy of the Act, to assure so far as possible safe and healthful working conditions for every employee in American and to preserve this country's human resources.

This Act has exercised a profound influence over the daily functioning and long-range planning of employers throughout the United States, colleges and universities included. Because of this influence, the investigator believed that it was time for an educated look at the facilities and programs and the beginning

of plans which, in the long run, would bring colleges and universities into compliance with OSHA standards and recordkeeping requirements.

CHAPTER III

METHOD AND PROCEDURES

I. INTRODUCTION

In the development of a "safety curriculum" serious consideration should be given to the fact that some portion of the program should be devoted to professional courses and some to nonprofessional courses. However, these proportions become a matter of disagreement. There are also different opinions as to the proper classification of certain subjects.

At the present time employers complain that some college graduates with a degree in safety education have not received adequate training in the practicalities of the jobs they are hired to do. Some students are beginning to raise their voices complaining that they lack practical knowledge in some of the areas directly associated with safety and some of the experiences expected of a safety officer or a safety director.

What is needed is a curriculum properly balanced between a highly specialized undergraduate curriculum and a curriculum to meet the demands of students and prospective employers. In other words a safety curriculum with approximately 50 percent of professional courses and the other 50 percent of nonprofessional work. By nonprofessional is meant nonsafety courses. It will include the courses offered by a liberal arts college that are traditionally classed as cultural

subjects. Breadth rather than specialization in these areas is necessary if the objectives of the curriculum builder are to be realized.

II. METHOD

The study conducted was exploratory in nature. It took the form of a descriptive survey. According to Good, "descriptive survey investigations collect evidence about an existing situation or current condition and are frequently helpful in or contribute to other types of investigations" (33:192). This study should contribute to other investigations which have the primary purpose problem-solving, decision-making, development of a procedure or method. The development of a four-year safety curriculum is part of the present study.

Analysis and classification are an integral part of a descriptive study. "It is the purpose of analysis to summarize the completed observations in such a manner that they yield answers to research questions" (106:386). Interpretation, according to Selltiz (106), connects or associates the answers with other knowledge in an effort to find broader meanings. In the investigation under consideration specific questions were framed in the instruments utilized to facilitate the analysis of the data.

III. POPULATION

According to the National Safety Council (20) in the 1976-77 school year 150 colleges and universities were offering a major,

minor or certification and advanced degrees in safety education. The listing, according to the editors, is by no means exhaustive, but it does represent most of the institutions with extensive programs in safety education.

The survey conducted by the National Safety Council (20) also listed 269 institutions that reported safety courses for either credit or noncredit, yet do not offer a degree in safety.

A Directory of Educational Institutions owned by the S.D.A Church was reviewed (24). The 1977 Yearbook published by the General Conference of S.D.A. was reviewed in order to learn the number and location of the hospitals and sanitariums, the publishing houses, and other industries and businesses owned and/or administered by the S.D.A. Church (138).

IV. SELECTION OF SAMPLE

Of the 150 colleges and universities with a degree program in safety, 52 were undergraduate programs, 34 were undergraduate and graduate programs, and 64 minor or certification programs. From these findings, it was decided that eight schools would be selected as the sample for the study. The selection of the schools were based on two requirements: (1) geographical location and (2) program structure. The geographical location indicated that the colleges and universities were situated in the geographical area of the S.D.A. schools. The program structure requirement called for the school selected to offer an undergraduate and/or a graduate degree in safety.

The following schools were chosen:

1. Auburn University, Auburn, Alabama
2. University of Southern California, Los Angeles, California
3. Housatonic Community College, Bridgeport, Connecticut
4. Indiana State University, Terre Haute, Indiana
5. Catonsville Community College, Catonsville, Maryland
6. Central Missouri State University, Warrensburg, Missouri
7. The University of Tennessee, Knoxville, Tennessee
8. Texas A & M University, Kingsville, Texas.

From the review of the S.D.A. Directory of Educational Institutions and the S.D.A. 1976 Yearbook, four of eleven colleges and universities and 11 of the 47 hospitals and sanitariums located in the United States were selected for the study. The selection was made according to the geographical region where these institutions were situated. These regions were: eastern, southern, central, and western. In the case of the hospitals and sanitariums an additional requirement was for the institution to have 100 beds or more. In addition to the schools and hospitals, three publishing houses and one food factory were selected for the study.

The following institutions were selected:

Schools:

1. Columbia Union College, Maryland
2. Southern Missionary College, Tennessee
3. Andrews University, Michigan
4. Pacific Union College, California

Medical Institutions:

1. Eastern Region:
   a. New England Memorial Hospital, Massachusetts
   b. Washington Sanitarium and Hospital, Maryland
2. Southern Region:
   a. Florida Hospital, Florida
   b. Madison Sanitarium and Hospital, Tennessee
3. Central Region:
   a. Kettering Medical Center, Ohio
   b. Porter Memorial Hospital, Colorado
4. Western Region:
   a. Portland Sanitarium and Hospital, Oregon
   b. Tempe Community Hospital, Arizona
   c. Paradise Valley Sanitarium and Hospital, San Diego, CA
   d. Glendale Adventist Hospital, Glendale, CA
   e. Saint Helena Sanitarium and Hospital, Saint Helena, CA

Publishing Houses:

1. Review and Herald Publishing Association, Washington, D.C.
2. Southern Publishing Association, Nashville, Tennessee
3. Pacific Press Publishing Association, Mountain View, CA

Food Factory:

1. Loma Linda Foods, Riverside California

(See Appendix A for the geographical location in a map.)

V. DATA COLLECTION AND ANALYSIS

Source of Data

The data were obtained from the Chairman of the department or the Director of the Program, the Business Managers or Administrators, the Director of Admissions, and Freshman students. Supplementary written materials also served as sources of data.

Instrument

Two questionnaires were developed and pretested. The members of the Doctoral Committee and students, including freshmen, were asked to read the questionnaire to be used among freshmen students and to make corrections or changes as they considered it necessary. The questionnaire was retyped and this time the members of the Doctoral Committee were asked to review it. Few additional changes were made and the questionnaire was retyped and xeroxed. The instrument was administered to two classes of students within the Health and Safety Division and they were asked to make comments and/or changes if they considered it necessary. No changes were suggested. (See Appendix B.)

The members of the Doctoral Committee were asked to read the questionnaire to be used among Administrators and to make changes or corrections if necessary. The questionnaire was retyped and administered to a group of Administrators in the Knoxville area. Graduate students were also asked to participate. Several changes were suggested and the questionnaire was retyped. The members of

the Doctoral Committee were asked to review the questionnaire. No additional changes were suggested. (See Appendix C.)

Analysis

Data analysis was based on the questions framed in the questionnaires.

VI. PROCEDURES

1. A letter was sent to the Educational Secretary of the General Conference of S.D.A. requesting authorization to conduct the study among the S.D.A. institutions. (See Appendix D.) The same letter requested a written statement of support for the study. (See Appendix E.)

2. A letter was mailed to the Director of Admissions of the four S.D.A. schools selected for the study. A list of all the freshmen students registered during the Fall Semester/Quarter of the 1977-78 School Year was requested. A copy of the 1977-78 bulletin was requested. A copy of the "statement of support" written by the Educational Secretary of the General Conference of S.D.A. was also included. (See Appendix F.)

3. A problem which presented itself early in this study was the large number of students that would be surveyed if all the eleven S.D.A. colleges and universities were to be utilized. These institutions are located as follows: two in the east, three in the south, three in the central and midwestern section, and three in the west. It was decided that in order to have all areas represented, one

college or university was to be selected from each of the four geographical areas. A sampling of the students from these four colleges and universities was made and this group was used in the survey. A letter was sent to the students in the selected sample together with the questionnaire. (See Appendix G.)

4. A questionnaire, a letter, and the "statement of support" was mailed to the administrators of the hospitals and sanitariums, publishing houses, and food factory. (See Appendix H.)

5. A letter was mailed to the Safety Educators listed below. In this letter they were asked to give their opinion on two items. A copy of the letter used appears in Appendix I.

a. Frank E. Bird, Jr., C.S.P.
Executive Director
International Loss Control Institute
Loganville, Georgia 30249

b. Dr. Everett Marcum, Chairman
Safety Study
West Virginia University
Morgantown, West Virginia 26505

c. Dr. J. O. Fish, Director
Environmental Health and Safety
University of Washington
Seattle, Washington 98105

d. Dr. Robert L. Marshall, Dean
School of Public Services and
Director, Missouri Safety Center
Central Missouri State University
Warrensburg, Missouri 64093

e. Jack N. Green, Sr., Staff Representative
Campus Safety Association
National Safety Council
Chicago, Illinois 60611

f. Dr. Benjamin F. Scherer, Chairman and
Professor of Health and Safety
California State University, L.A.
Los Angeles, California 90032

g. William E. Tarrants, Ph.D., P.E., C.S.P., President
American Society of Safety Engineers
National Highway Traffic Safety Administration
Washington, D.C. 20590

h. Dr. William H. Creswell, Jr., Chairman
Health and Safety Education
University of Illinois
Champaign, Illinois 61820

i. Dr. Frazier Damron, President
American School and Community Safety Association
University of Wisconsin
Madison, Wisconsin 53715

j. International Safety Academy
R. J. Hook, B.S., CHCM (Masters)
Loss Control Consultant
10575 Katy Freeway
Houston, Texas 77024

6. A letter was sent to the Safety Educators directing the four outstanding curricular programs in safety. These four Safety Educators were identified by the eight Safety Educators and/or Safety Professionals surveyed during the study. See copy of the letter in Appendix J.

The four Safety Educators were:

a. Dr. Robert L. Marshall, Dean
School of Public Services and
Director, Missouri Safety Center
Central Missouri State University
Warrensburg, Missouri 64093

b. Dr. Maurice E. Dennis, Director
Safety Engineering Program
Texas A & M University
College Station, Texas 77843

c. Dr. Richard Spear, Chairman
Health and Safety Department
Indiana State University
Terre Haute, Indiana 42809

d. Dr. Robert Lauda, Chairman
Safety Sciences Department
Indiana University of Pennsylvania
Indiana, Pennsylvania

7. Information obtained in this study was classified into categories and presented in tables, graphs, and charts.

8. The interpretation of the findings was presented in terms of the questions phrased in the questionnaires.

VII. DEVELOPMENT OF A CURRICULUM

Based upon the information obtained through the surveys and a review, a curriculum was developed and recommended to the Board of Higher Education of the S.D.A. Church.

The curriculum is given in Chapter VI.

CHAPTER IV

PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

The data were analyzed through use of the answers given to the questions framed in the questionnaires. The data gathered from the reviewing of the college or university bulletins and/or catalogs were analyzed through comparison. For example, similarities in safety course offerings are presented in one section. In each section there is a paragraph summary about the topic presented in that section.

I. SIMILARITIES AND DIFFERENCES IN SAFETY COURSES OFFERED BY THE S.D.A. SCHOOLS

S.D.A. Schools

Andrews University. In 1975 the College of Technology was organized and plans were made to increase the number of safety courses as new facilities were being developed and new qualified personnel were being employed. During the 1974-75 school year, four safety courses were being offered by Andrews. During the 1977-78 school year the offering of safety courses increased from four to 13. A B.S. degree in Industrial Technology is now being offered.

Atlantic Union College. During the 1974-75 school year, one safety course was offered by Atlantic Union. Two safety courses have been added according to the 1977-78 Bulletin.

Columbia Union College. The review of the 1977-78 Bulletin of Columbia Union showed that only two courses in safety are being offered as compared with three courses offered during the 1974-75 school year. Columbia Union was the only school that decreased the number of safety courses offered. The other ten S.D.A. schools are offering during the 1977-78 school year the same number or more safety courses than those offered during the 1974-75 school year.

Kettering Medical Center. Kettering has listed one safety course in the 1977-78 Bulletin. Though this is a new course, they continue to offer only one. First Aid and Emergency Care listed in the 1974-75 Bulletin is no longer being offered.

Loma Linda University. Loma Linda has a School of Public Health. Several courses are being offered by the School that can be classified as safety courses, but these were not included in our study because no other S.D.A. School has a program in public health. The review of the 1977-78 Bulletin showed an increase of two in the safety courses being offered as compared with the 1974-75 Bulletin.

Oakwood College. According to the 1977-78 Bulletin, Oakwood added one safety course to the two courses that were being offered in the 1974-75 school year.

Pacific Union College. Next to Andrews University, Pacific Union is the S.D.A. School offering the larger number of safety courses. The review of the 1977-78 Bulletin showed that seven safety courses were being offered by P.U.C. compared with five in 1974-75.

Southern Missionary College. S.M.C. listed in the 1977-78 Bulletin the same three safety courses offered in the 1974-75 school year.

Southwestern Union College. The 1977-78 Bulletin showed that Southwestern was offering the same two safety courses that were being offered in the 1974-75 school year.

Union College. The review of the 1977-78 Bulletin indicated that while one safety course of the three offered during the 1974-75 school year was dropped, a new safety course has been added.

Walla Walla College. Walla Walla has a total of seven safety courses listed in the 1977-78 Bulletin. During the 1974-75 school year four safety courses were being offered.

Table I indicates the safety courses offered by the S.D.A. Schools during 1974-75; Table II indicates those offered during 1977-78.

II. ANALYSIS OF THE FINDINGS FROM THE SURVEY OF THE SAFETY PROGRAMS BEING OFFERED BY EIGHT COLLEGES AND UNIVERSITIES IN THE U.S.

A survey was made of the safety programs being offered by eight colleges and universities in the United States with the hope that such a survey will bring forth ideas and/or suggestions which could be useful in the preparation of the four-year safety curriculum. The eight colleges and universities were located in the geographical area where the S.D.A. colleges and universities are located.

See Appendix K for a summary of safety courses offered by the eight colleges and universities.

TABLE I

SAFETY COURSES OFFERED BY THE S.D.A. SCHOOLS DURING 1974-75

Subject	Colleges and Universities+											Frequency
	1	2	3	4	5	6	7	8	9	10	11	
Advanced Driver Education	x											1
Basic Driver Education	x						x				x	3
First Aid and Emergency Care			x	x			x			x	x	5
Industrial Safety							x	x				2
Prev. and Care of Athletic Injuries	x	x	x		x	x	x		x	x		8
Safety Education					x			x				2
School Safety											x	1
Water Safety	x	—	x	—	—	x	—	x	x	x	x	7
Total	4	1	3	1	2	2	4	3	2	3	4	29

+ 1 = Andrews, 2 = Atlantic Union, 3 = Columbia Union, 4 = Kettering, 5 = Loma Linda, 6 = Oakwood, 7 = Pacific Union, 8 = Southern Missionary, 9 = Southwestern, 10 = Union, 11 = Walla Walla.

x Indicates that safety course appears in the school bulletin.

TABLE II

SAFETY COURSES OFFERED BY THE S.D.A. SCHOOLS DURING 1977-78

	Colleges and Universities+											
	1	2	3	4	5	6	7	8	9	10	11	Frequency
Advanced Driver Education	x						x					2
Basic Driver Education	x						x					2
Construction Safety*		x										1
First Aid and Emergency Care	x		x		x	x	x				x	6
Fundamentals of Traffic Safety*	x											1
Hospital Safety and Codes*				x							x	2
Industrial Safety	x						x	x			x	4
Occupational Education*	x											1
Personality Factors in Driving and Traffic Safety*	x											1
Prev. and Care of Athletic Injuries	x	x	x		x	x	x		x	x	x	9
Safety Education	x				x		x	x				4
School Safety											x	1
Shop Planning and Safety*	x											1
Traffic Laws*	x											1
Water Safety	x	x	x		x	x	x	x	x	x	x	10
Wilderness Survival*	x	—	—	—	—	—	x	—	—	x	x	4
Total	13	3	3	1	4	3	8	3	2	3	7	50

+ 1 = Andrews, 2 = Atlantic Union, 3 = Columbia Union, 4 = Kettering, 5 = Loma Linda, 6 = Oakwood, 7 = Pacific Union, 8 = Southern Missionary, 9 = Southwestern, 10 = Union, 11 = Walla Walla.

x Indicates that safety course appears in the school bulletin.

*Safety course added since the 1974-75 school year.

Colleges and Universities

Auburn University. Thirty-one quarter hours in safety are required for an undergraduate degree in safety. Twenty quarter hours in safety are required for a master's degree in safety. (Table III)

University of Southern California. U.S.C. requires 120 semester hours for a B.S. degree in safety and 30 semester hours for a M.S. degree in safety. A total of 23 safety courses were listed in the undergraduate program and 12 safety courses in the graduate program. U.S.C. also offers 6 intensive short courses in the Certificate program. (Table IV)

Housatonic Community College. Housatonic offers an Associate Degree, a Minor, and a Major in Occupational Safety and Health. Thirty semester hours in the concentration area are required for the B.S. degree and 18 semester hours for the minor. (Table V)

Indiana State University. Indiana State offers a Minor and Major at the undergraduate and the graduate levels. Nine semester hours are required for the Graduate Minor, and 24 semester hours for the Undergraduate Minor. For the B.S. degree 58 semester hours in safety are required and 32 for the M.S. (Table VI)

Catonsville Community College. Catonsville offers an undergraduate degree in Occupational Safety and Health Technology. Thirty-four semester hours are required for this concentration. (Table VII)

TABLE III

SAFETY COURSES OFFERED BY AUBURN UNIVERSITY

Subject	Quarter Hours	Under-grad.	Undergrad. and Grad.	Grad.
Design for Hazard Reduction	4	x		
Design of Occupational Safety and Health Admin. Systems	3		x	
Ergonomics III	3	x		
Ergonomics IV	3		x	
Industrial Eng. Project	1-5			x
Introduction to Acoustics and Noise Control	3	x		
Occup. Accident Prevention	3	x		
Occup. Accident Prevention, Adv.	3			x
Occup. Hygiene Eng. I	3	x		
Occup. Hygiene Eng. II	3	x		
Occup. Safety Eng. Fundamentals	3	x		
Occup. Sfty. and Hlth. Engineering	3	x		
Occup. Safety and Health Lab.	3	x		
Oper. and Facilities Design I	3	x		
Oper. and Facilities Design II	3	x		
Topics in Human Eng., Adv.	3			x
Topics in Occupational Safety and Health, Adv.	3			x
Systems Analysis for Occup. Sfty.	3	x		

TABLE IV

SAFETY COURSES OFFERED BY UNIVERSITY OF SOUTHERN CALIFORNIA

Subject	Sem. Hours	Under-grad.	Undergrad. and Grad.	Grad.
Aerospace Safety	4	x		
Aircraft Accid. Investigation	-			x
Analysis and Measurem. Accid. Prev.	3	x		
Aviation Accid. Investigation	-			x
Application of Indust. Hygiene	4	x		
Community Safety	3	x		
Elements of Indust. Hygiene	4	x		
Exper. Design and Sfty. Research	3		x	
Field Study	2-4	x		
Field Study (Internship)	2-4	x		
Fire Prev. and Protection	4	x		
Fund. of Safety Techniques	2-4	x		
Fund. of System Safety	3		x	
Helicopter Accid. Invest.	-			x
Human Factors	4	x		
Human Factors in Accid. Causation	3		x	
Human Factors in Accid. Prevention	2-4	x		
Industrial Psychology	4	x		
Industrial Sfty. (Internship)	2-4	x		
Internship	2-4	x		
Introd. to Safety and Health	4	x		
Investigation of Accidents	3		x	
Legal Aspects of Safety	3		x	
Mgmt. of Accid. Prev. Programs	3		x	
Motor Veh. Accid. Investigation	-			x
Multidisciplinary Hwy. Coll. Inv.	-			x
Philosophical Basis for Accid. Prev.	3		x	
Prob. in Environmental Health	4	x		
Quantitative Methods of Sfty. Anal.	3		x	
Regulatory Aspects of Safety	3	x		
Sfty. Applic. of Ind. Hygiene	4	x		
Safety Communication	4	x		
Safety Educ. and Training	4	x		
Sfty. of Chemicals and Propellants	3		x	
Safety Programs Administration	4	x		
School Safety	3	x		
Structural Sfty. and Failure Anal.	3		x	
System Safety, Fund.	3			x
System Safety	4	x		
Tech. Aspects of Flight Veh. Sfty.	3		x	
Tech. Aspects of Mtr. Veh. Sfty.	3		x	
Transportation Safety	4	x		

TABLE V

SAFETY COURSES OFFERED BY HOUSATONIC COMMUNITY COLLEGE

Subject	Sem. Hours	Undergraduate
Federal and State Codes/Stand.	3	x
Fire Protection	3	x
Human Factors in Safety	3	x
Industrial Hygiene	3	x
Introd. to Occup. Safety and Health	3	x
Motor Fleet Safety	3	x
Physical Hazards I	3	x
Physical Hazards II	3	x
Safety Programs Management	3	x
Techniques of Industrial Hygiene	3	x

TABLE VI

SAFETY COURSES OFFERED BY INDIANA STATE UNIVERSITY

Subject	Sem. Hours	Under-grad.	Undergrad. and Grad.	Grad.
Accid. and Disaster Control	2	x		
Admin. of Safety Programs	3		x	
Communic. and Utiliz. of Multiple Care Driving Complex	3			x
Corporate Safety	3	x		
Driver Education	3		x	
Driver Ed. for the Handicapped	2		x	
Emerg. Sfty. Serv. and Security	3	x		
Environmental Safety	3	x		
Field Work Safety Management	6	x		
Fire Prot. and Hazardous Mat. Sfty.	3	x		
Gen. Sfty. and Safety Education	3			x
Industrial Accid. Prevention	3	x		
Introduction to General Safety	3	x		
Lab. Program in Driver Education	3			x
Lab. Prog. in Dr./Traf. Sfty. Educ.	3	x		
Motorcycle Traffic Work	1		x	
Occupational Safety	3	x		
Safety Methods	3	x		
Safety Planning Seminar	3	x		
Safety Supervision	2		x	
Seminar in Dr./Traf. Sfty. Educ.	3			x
Survey of Sfty. Res. and Eval. Tech.	3		x	
Theory and Prac. Driving Sim.	3			x
Traffic Safety	3			x
Traffic and Transportation Safety	3	x		

TABLE VII

SAFETY COURSES OFFERED BY CATONSVILLE COMMUNITY COLLEGE

Subject	Sem. Hours	Undergraduate
Accident Prevention and Loss Control	3	x
Advanced Industrial Hygiene	3	x
Construction Safety and Health	3	x
First Aid and Safety	2	x
First Aid Instruction	2	x
Human Factors in Safety	3	x
Industrial Fire Hazards	3	x
Introduction to Industrial Hygiene	3	x
Occupational Safety and Health I	3	x
Occupational Safety and Health II	3	x
Recog. and Control of Phys. and Health Hazards	3	x
Safety and Health Standards	3	x
Safety Education	3	x

Central Missouri State University. Central Missouri State appears to have the largest program in safety. Under the School of Public Services, three departments operate. These are: (1) Department of Industrial Safety and Hygiene, (2) Department of Safety, and (3) Department of Criminal Justice. In addition, Central Missouri State University operates the Missouri Safety Center. The following Safety Degrees are offered: Associate of Arts, Bachelor of Arts, Bachelor of Science, Bachelor of Science in Education, Master of Science, Master of Science in Education, and Education Specialist. An undergraduate minor is also offered requiring 20 semester hours in safety courses. For the undergraduate major 30 semester hours are required. Thirty-two semester hours in safety courses are required for the master's and 62 semester hours for the Specialist degree. Courses listed under "Security and Police Administration" were not included in Table VIII.

The University of Tennessee. The University of Tennessee offers an undergraduate minor in Safety Education and it requires 30 quarter hours. The graduate program in Safety Education includes a Master of Science degree which requires 45 quarter hours, and a Doctor of Education in Health Education with emphasis in Safety. The doctoral program requires a minimum of 120 quarter hours beyond the bachelor's degree. In addition a Safety Specialist degree is also offered. A minimum of 45 quarter hours beyond the master's degree is required. (Table IX)

TABLE VIII

SAFETY COURSES OFFERED BY CENTRAL MISSOURI STATE UNIVERSITY

Subject	Sem. Hours	Under-grad.	Undergrad. and Grad.	Grad.
Adult Programs in Safety Education	2			x
Aviation Management	3		x	
Aviation Safety				
Civil Defense and Emerg. Procedures	2		x	
Construction Safety	3		x	
Curric. Dev. in Traffic Sfty. Educ.	3		x	
Directed Studies in Sfty. Programs	1-6		x	
Document and Personal Security	3			x
Driving and Traffic Safety Educ. I	3	x		
Driving and Traffic Safety Educ. II	3	x		
Driving Simulation and Mult. Car Driving Range	3	x		
Farm Safety	3		x	
Field Experience in Safety	3			x
Fire Prevention and Protection	3	x		
Fire Science, Introduction	3			x
First Aid and Emergency Care, Adv.	2-3			x
First Aid and Personal Safety, Stand.	2-3	x		
Fixed Extinguishing and Alarm Syst.	3		x	
Industrial Hygiene, Principles	3			x
Industrial Safety Engineering	3			x
Ind. Ventil. for Environmental Health and Safety	3			x
Intermodal Aerospace—Water Transp.	3			x
Introduction to Industrial Hygiene	3	x		
Introduction to Safety Education	3	x		
Introduction to Safety Engineering	3	x		
Legal Aspects of Safety Programs	3		x	
Mgmt. of Sfty. Transp. Systems	3			x
Motorcycle Safety Transp. Systems	2		x	
Motor Vehicle Law	3		x	
Occup. Sfty. and Hlth. Legislation	3			x
Org., Admin. and Superv. Sfty. Prog.	3			x
Principles of Accident Prevention	3		x	
Psychology in Sfty. and Accid. Prev.	2		x	
Reading in Safety	1-5			x
Safety and Health Laboratory	2		x	
Safety, Philosophy of	3		x	
Seminar in Safety	2			x
Special Projects in Safety	1-3		x	
Special Security Problems	3		x	
Superv. of School Transportation	2			x
Total Loss Control	3			x
Traffic Admin. and Control	3	x		
Traffic Engineering I	2		x	
Traffic Engineering II	2		x	
Traffic Safety—Curr. Problems	2			x
Traffic Sfty. Educ.—Curr. Devel.	3		x	
Transportation Law and Regulations	3			x
Transp. Safety, Innovations in	2			x
Water Systems Analysis	3			x
Workman's Compensation Legislation	2			x

TABLE IX

SAFETY COURSES OFFERED BY THE UNIVERSITY OF TENNESSEE

Subject	Quarter Hours	Under-grad.	Undergrad. and Grad.	Grad.
Behav. Problems Safety Education and Accident Prevention	3			x
Civil and Defense Education	3			x
Consumer Health and Safety Education	3		x	
Current Issues in Safety Education	1-3			x
Driving/Traffic Safety Education	5		x	
Driving and Traffic Sfty. Educ., Adv.	5		x	
Earthquake Resistant Structure I	4		x	
Earthquake Resistant Structure II	4		x	
Environmental Control Systems I	4	x		
Environmental Control Systems II	4		x	
Fire Protection in Structures	4		x	
First Aid and Emergency Care	4		x	
Highway Engineering I	3		x	
Highway Engineering II	3		x	
Industrial Safety	3		x	
Industrial Toxicology	3			x
Instructor's Adv. First Aid and E.C.	3		x	
Internship and Research in in Safety Education	3-9			x
Occupational Safety and Health	5			x
Org. Admin. and Superv. of Sfty. Prog.	3			x
Principles of General Safety	3		x	
Problems and Res. in Accid. Prev.	3			x
Problems in Safety	1-3		x	
Sanitation	3		x	
School Shop Safety	3		x	
Solid Waste Management	3		x	
Sports Safety	5		x	
Theory of Risk Management	3		x	
Traffic Engineering	3		x	
Traffic Management	3		x	
Workshop in Safety	3-6		x	

Texas A & M University. Texas A & M offers an undergraduate minor in safety requiring 18 semester hours in the area of concentration. Two degrees in safety are offered at the graduate level, a M.Ed. and a Ed.D. in Safety Education and in Traffic Safety. For the Master Program 18 semester hours in safety are required, while 32 semester hours in safety are required for the doctoral program. (Table X)

III. ANALYSIS OF THE FINDINGS FROM THE SURVEY OF THE COLLEGE FRESHMEN FROM FOUR S.D.A. COLLEGES AND UNIVERSITIES

The data presented and analyzed in this section were collected after surveying a sample of freshman students attending four of the eleven S.D.A. colleges and universities in the United States. The schools selected were located as follows: one in the east, one in the south, one in the central section, and one in the west. (For a copy of the questionnaire used, see Appendix B.)

As shown in Table XI, questionnaires were mailed to 497 freshmen and 323 were returned or 65.0 percent (64.98 percent). Pacific Union College showed the highest percentage of return with 68.7 percent, followed by Andrews University with 66.4 percent, Southern Missionary College with 60.6 percent and Columbia Union College with 58.0 percent.

The freshman students were asked the following question: While attending high school or academy, did you take any safety courses? Table XII presents a computation of the answers received.

Fifty-seven percent of the freshman students surveyed indicated that while attending high school or academy they took a safety course.

TABLE X

SAFETY COURSES OFFERED BY TEXAS A & M UNIVERSITY

Subject	Sem. Hours	Under-grad.	Grad.
Admin. of Safety Education Programs	3		x
Alcohol and Traffic Safety	3		x
Behavioral Factors in Traffic Safety	3		x
Community Public Safety and Legal Services	3	x	
Driver Education	3	x	
Evaluation and Control of the Occup. Env.	4		x
Fire Protection and Prevention	2		x
Human Factors Engineering, Introduction to	3	x	
Industrial Hygiene	3	x	
Industrial Hygiene	2		x
Industrial Safety, Introduction to	2	x	
Industrial Safety	3	x	
Industrial Safety II	3	x	
Industrial Safety Engineering	3		x
Inst. and Techniques in Sfty. Educ. Eval.	3		x
Inst. Mtds. and Mtrl. in Safety Education	3	x	
Issues and Trends in Safety Education	3		x
Machine Guarding	2		x
Problems in Industrial Safety	2		x
Product Safety Engineering	3		x
Professional Development in Safety Educ.	3		x
Radiation Protection Engineering	3	x	
Radiation Protection, Principles of	3	x	
Radiological Safety	2	x	
Safety Education	2	x	
Safety Education, Nature and Scope	3	x	
Safety Engineering and Facilities Design	3		x
Safety Eng. in Design of Transp. Systems	3		x
Safety Management	3	x	
Safety in Material Handling	2		x
School and College Accident Prevention	3		x
System Safety Engineering	3		x
Teaching Driving and Traffic Safety Educ.	3	x	
Teaching Motorcycle Safety Education	3	x	
Traffic Safety Communication	3		x
Traffic Safety Educ., Innovations	3		x
Urban Traffic Facilities	3	x	

TABLE XI

S.D.A. SCHOOLS SELECTED FOR THE SURVEYING OF FRESHMEN

School	Freshman Students	Questionnaires Mailed	Questionnaires Returned	Percentage of Return
Andrews University (Central)	303	122	81	66.4
Columbia Union College (East)	184	50	29	58.0
Pacific Union College (West)	818	198	136	68.7
Southern Missionary College (South)	328	127	77	60.6
Totals	1633	497	323	65.0

TABLE XII

NUMBER OF FRESHMEN WHO TOOK A SAFETY COURSE IN HIGH SCHOOL OR ACADEMY

School	Yes	No	N/A
Andrews University	46	33	1
Columbia Union College	18	8	3
Pacific Union College	79	41	16
Southern Missionary College	40	34	3
Totals	183	116	23

Thirty-six percent did not take any safety courses and 7 percent gave no reply. (Figure 1)

Question two from the questionnaire mailed to the freshman students reads as follows: "With which do you associate SAFETY?"

Twelve safety areas were given to the students and they were asked to indicate in order of preference by ranking in order of importance. A summary of responses, classified by area, is presented in Table XIII. A complete tabulation of all responses is presented in Appendix L.

When asked, with which do you associate Safety?, the freshmen selected First Aid more often than any of the 12 safety areas given. The average rank score for First Aid was 2.41. Home, the second safety area selected, received a score of 4.58. Areas like Industry and Construction, known for their exposure to accidents, were ranked seventh and eighth respectively.

In question three the students were given a list of twelve courses. They were asked to indicate in order of preference which course or courses they will consider taking as an elective.

First Aid and Emergency Care received the highest average rank score with 1.98. The second ranked area, Environmental Health, had an average rank score of 5.18. (Table XIV)

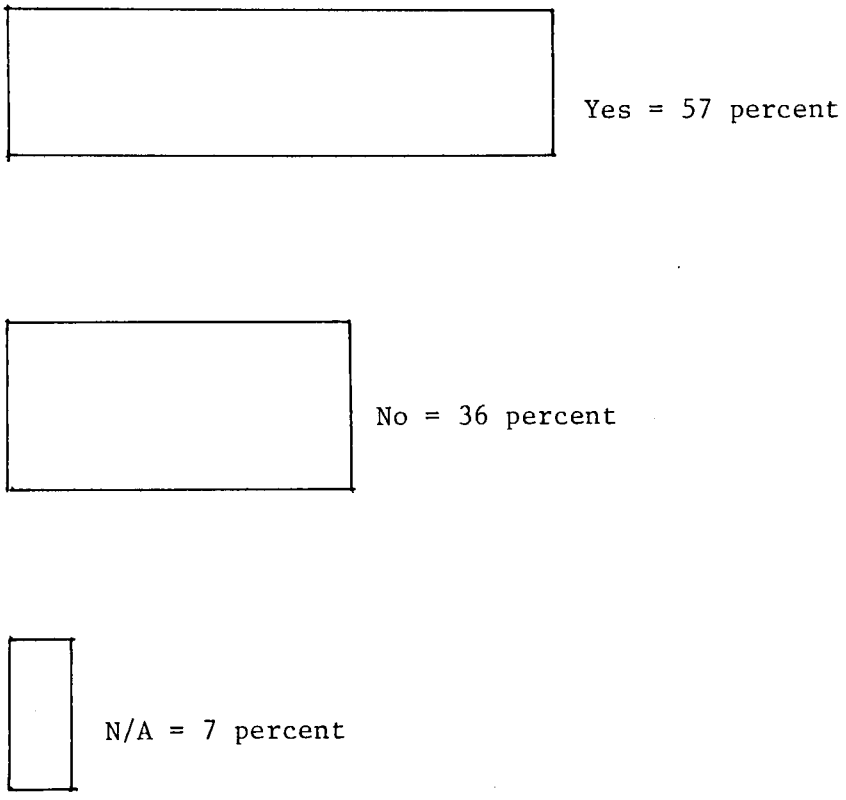


Figure 1. All four S.D.A. schools: Safety courses taken while attending high school or academy.

TABLE XIII

RANKING OF THE AREAS WITH WHICH THE FRESHMEN ASSOCIATE SAFETY

	Safety Area	Average Rank Score	Rank Order
A.	Driver Education	4.47	3
B.	First Aid	2.41	1
C.	Industry	6.70	7
D.	Construction	6.91	8
E.	School	5.65	6
F.	Fire	4.58	4
G.	Home	4.44	2
H.	Sports	7.96	10
I.	Civil Defense	7.45	9
J.	Hospital	5.53	5
K.	Aviation	8.76	11
L.	Farm	9.51	12

TABLE XIV

RANKING OF THE SAFETY COURSES THE FRESHMEN WOULD CONSIDER TAKING AS AN ELECTIVE

	Safety Course	Average Rank Score	Rank Order
A.	Safety in Health Care Institutions	6.41	8
B.	Safety Management and Loss Control	8.94	11
C.	Driver Education	5.77	6
D.	Occupational Safety	6.82	9
E.	Industrial Hygiene	9.59	12
F.	Disaster Preparedness	5.38	3
G.	First Aid and Emergency Care	1.98	1
H.	Safety in Sports	7.25	10
I.	Environmental Health	5.18	2
J.	Fire Prevention	5.41	4
K.	Safety Education	5.46	5
L.	Community Safety	6.31	7

In question four the students were asked to rank in order of preference six areas of safety they would consider taking as a minor.

A complete tabulation of all responses is presented in Appendix N. A summary of the results is presented in Table XV.

When asked, which of the six Safety areas suggested would you consider taking as a minor?, there was no clearcut choice among the areas selected by the freshmen. Community Health and Safety had the highest average rank score (2.24). Next Safety Education was chosen, followed by Occupational Health and Safety, Safety Administration, Traffic Safety, and Industrial Hygiene.

TABLE XV

RANKING OF THE SAFETY AREAS THE FRESHMEN WOULD CONSIDER TAKING AS A MINOR

Safety Area	Average Rank Score	Rank Order
A. Safety Education	2.75	2
B. Occupational Safety and Health	3.08	3
C. Safety Administration	3.63	4
D. Community Health and Safety	2.24	1
E. Industrial Hygiene	4.63	6
F. Traffic Safety	3.73	5

In question five of the questionnaire, the freshman students were asked: If offered, would you consider Safety as your major area? Table XVI and Figure 2 present the results.

According to Table XVI and Figure 2, 17.7 percent (57 freshmen) indicated that they would consider Safety as a major area of study, 81.9 percent (262) answered no, and 0.4 percent (3) did not answer.

TABLE XVI

STUDENTS' PREFERENCE REGARDING SAFETY AS A MAJOR AREA OF STUDY

School	Yes	No	N/A
Andrews University	17	62	1
Columbia Union College	6	22	1
Pacific Union College	22	113	1
Southern Missionary College	12	65	-
Totals	57	262	3

Each student was asked in question six to identify their major area of preference in safety if a B.S. degree were to be offered. Four safety areas were suggested and the student was asked to rank these four areas in order of importance to him/her.

The freshman students were asked to indicate which of four Safety areas suggested they would consider as the major area of preference. Table XVII shows that Safety Education received the highest average rank score (1.65), followed closely by Occupational Health and Safety with a rank score of 2.07. Safety Administration was selected third

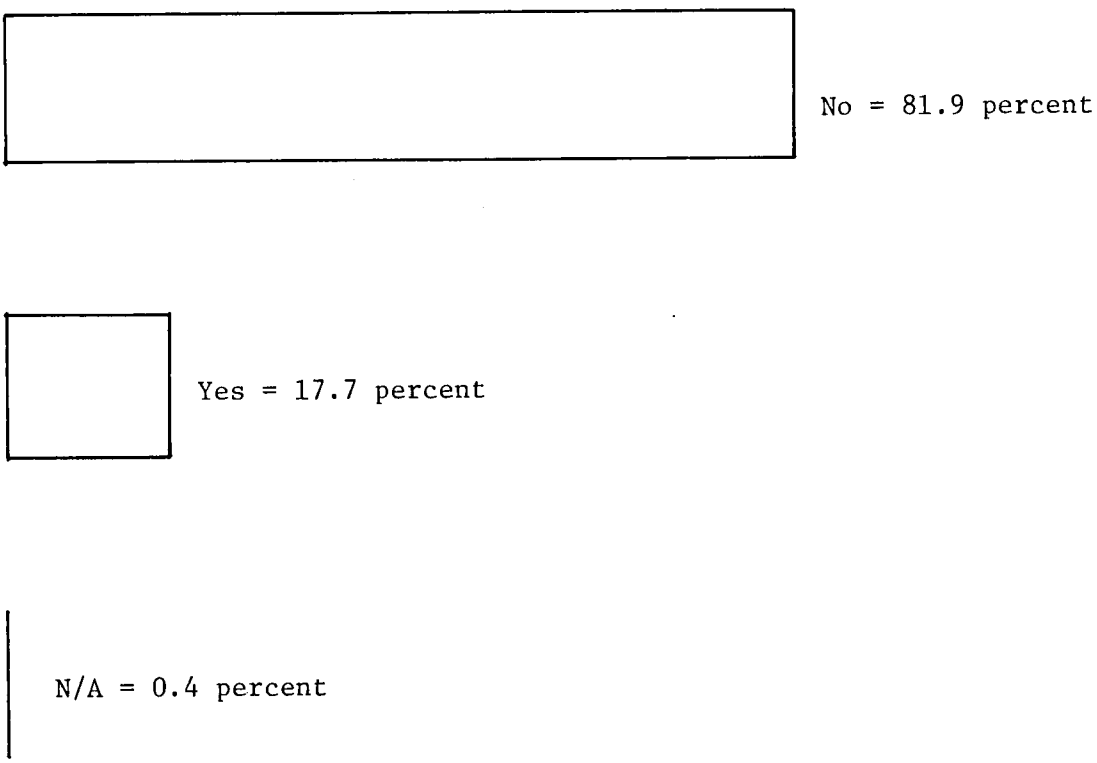


Figure 2. All four S.D.A. schools: Would Safety be considered as the major area?

and Industrial Safety was the fourth area chosen. A complete tabulation of all responses is presented in Appendix O.

TABLE XVII

RANKING OF THE SAFETY AREAS THE FRESHMEN WOULD CONSIDER TAKING AS A MAJOR

Safety Area	Average Rank Score	Rank Order
A. Safety Education	1.65	1
B. Occupational Health and Safety	2.07	2
C. Industrial Safety	3.25	4
D. Safety Administration	2.95	3

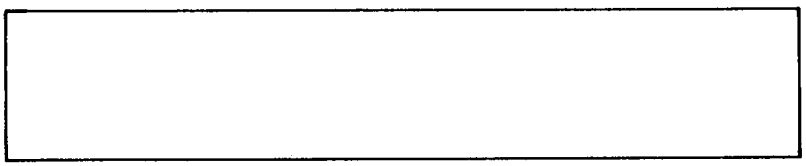
In question seven the students were asked: "Do you think a safety course should be required of every student?"

Table XVIII and Figure 3 present the results.

TABLE XVIII

COMPUTATION OF "YES" AND "NO" RESPONSES TO THE REQUIREMENT OF A SAFETY COURSE TO BE TAKEN BY EVERY STUDENT

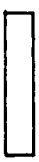
School	Yes	No	N/A
Andrews University	66	14	-
Columbia Union College	24	3	2
Pacific Union College	112	20	4
Southern Missionary College	67	9	1
Totals	269	46	7



Yes = 83.6 percent



No = 14.3 percent



N/A = 2.1 percent

Figure 3. All four S.D.A. schools: Should a safety course be required for every student?

According to Table XVIII and Figure 3, 269 freshmen or 83.6 percent of the respondents answered affirmatively. By a margin of over four to one the students surveyed favored the proposition that a safety course be required of every student.

Six safety courses were listed in question eight, and the freshmen students were asked to give their opinion regarding which of the six safety courses listed should be required. The students were asked to select only one. Those who answered no to question seven were asked to omit their answer to question eight.

The results are presented in Table XIX and Figure 4.

Table XIX and Figure 4 show that the students from each of the four schools selected First Aid as the course which should be required. A combined total from the four schools indicated that 66.4 percent of the respondents have chosen First Aid. None of the other areas received any significant support.

The final question that the freshman students were asked to answer dealt with the area of employment. The students were asked to express their opinion regarding the type of occupation they would like to select if they were to receive a B.S. degree in Safety.

Six areas were listed in question nine and the students were asked to indicate their preference by ranking these six areas in order of importance.

Table XX presents a summary of all four schools. There was no clearcut choice among the six occupations listed. Information by school is given in Appendix P.

TABLE XIX

RESPONSE OF THE FRESHMEN TO THE QUESTION "WHICH SAFETY COURSE SHOULD BE REQUIRED?"

School	N/A	Introd. to Safety	Occup. Safety	First Aid	Basic Safety Mgmt.	Safety in Sports	Traffic Safety
Andrews University	16	11	0	50	2	0	1
Columbia Union College	5	4	1	17	1	0	1
Pacific Union College	24	8	4	93	2	1	4
Southern Missionary College	11	5	1	52	3	1	4
Totals	56	28	6	212	8	2	10

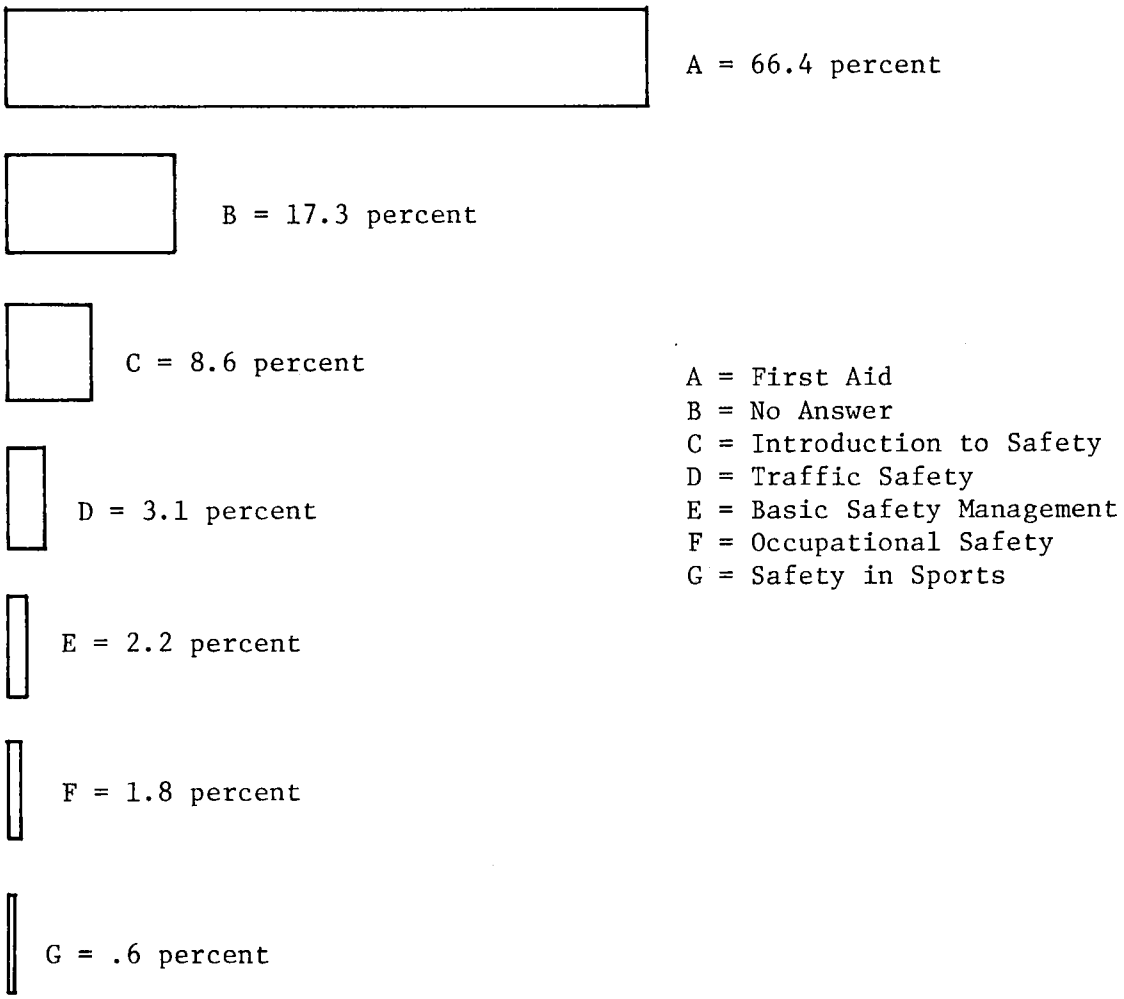


Figure 4. All four S.D.A. schools: Which safety course should be required?

TABLE XX

RANKING OF THE OCCUPATIONS THE FRESHMEN WOULD SELECT IF A B.S. DEGREE IN SAFETY WAS TO BE RECEIVED

Safety Area	Average Rank Score	Rank Order
A. Compliance Officer (State of Federal)	3.98	5
B. Safety Inspector (Insurance Company)	3.77	4
C. Safety Director (Industrial)	4.02	6
D. Safety Director (Hospital or University)	2.14	1
E. Safety Instructor (Junior College)	2.79	2
F. Driver/Traffic Safety Instructor	3.31	3

The order of preference was as follows: (1) Safety Director (Hospital or University), (2) Safety Instructor (Junior College), (3) Driver/Traffic Safety Instructor, (4) Safety Inspector (Insurance Company), (5) Compliance Officer (State or Federal), and (6) Safety Director (Industrial).

IV. ANALYSIS OF THE FINDINGS FROM THE SURVEY OF THE ADMINISTRATORS OF SEVENTEEN S.D.A. INSTITUTIONS

The data presented and analyzed in this section were collected from fifteen S.D.A. institutions (hospitals, publishing houses and a food factory). The institutions selected were located as follows:

Hospitals:

1. Eastern Region: New England Memorial Hospital and Washington Sanitarium and Hospital.

2. Southern Region: Florida Hospital and Madison Sanitarium and Hospital.

3. Central Region: Kettering Medical Center and Porter Memorial Hospital.

4. Western Region: Tempe Community Hospital, Paradise Valley Sanitarium and Hospital, Glandale Adventist Hospital, Saint Helena Sanitarium and Hospital, and Portland Sanitarium and Hospital.

Publishing Houses:

1. Eastern Region: Review and Herald Publishing Association.

2. Southern Region: Southern Publishing Association.

3. Western Region: Pacific Press Publishing Association.

Food Factory:

Loma Linda Foods was selected for this study. This is the largest Denominational owned food factory in the United States. It is located in the Western Region.

For a copy of the questionnaire used and letters of support, see Appendixes C, E, and H.

The Administrators were asked on question one of the questionnaire: The position of Safety Director, Coordinator, or Compliance Officer is: (a) Held by a full-time employee in that function; (b) the responsibility of someone on Staff assigned safety as a part-time function; (c) to be filled as soon as a qualified person is available; (d) do not plan to have one.

According to Figure 5, 33.3 percent of the institutions surveyed employed a full-time person as Safety Director, Coordinator, or

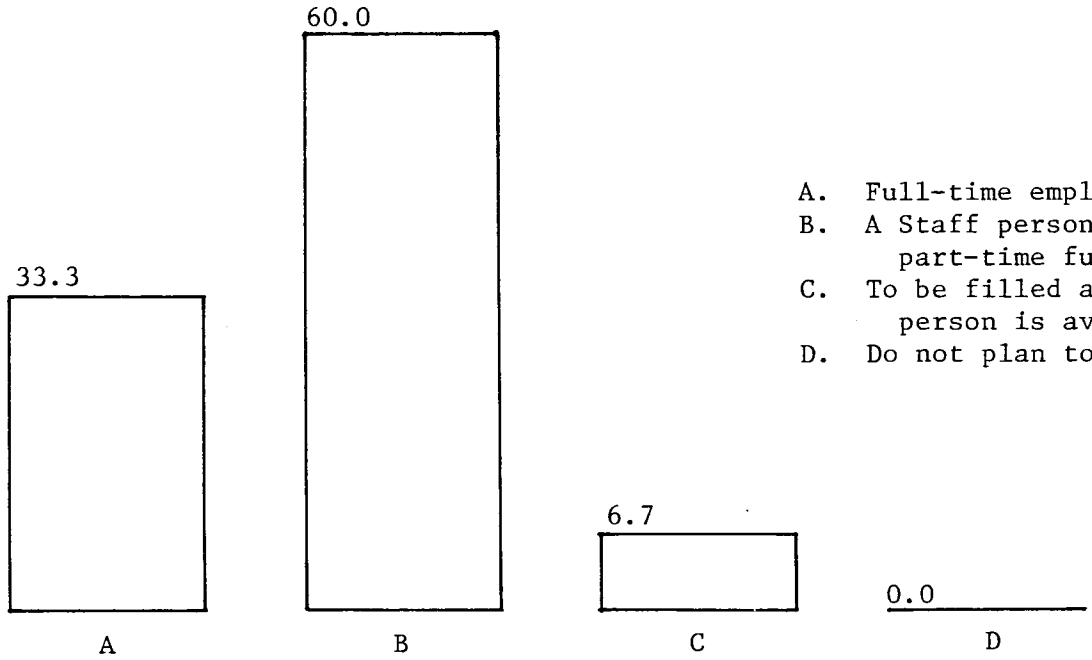


Figure 5. The position of Safety Director, Coordinator, or Compliance Officer.

Compliance Officer. Sixty percent of the respondents employed a Staff person who has safety as a part-time function. The other Administrators, 6.7 percent, indicated that the position will be filled as soon as a qualified person is available.

Questions two and three of the questionnaire dealt with a Safety Policy and a Safety Manual. The Administrators were asked to indicate if these documents have been written or were in the process of being written. Figures 6 and 7 present the results.

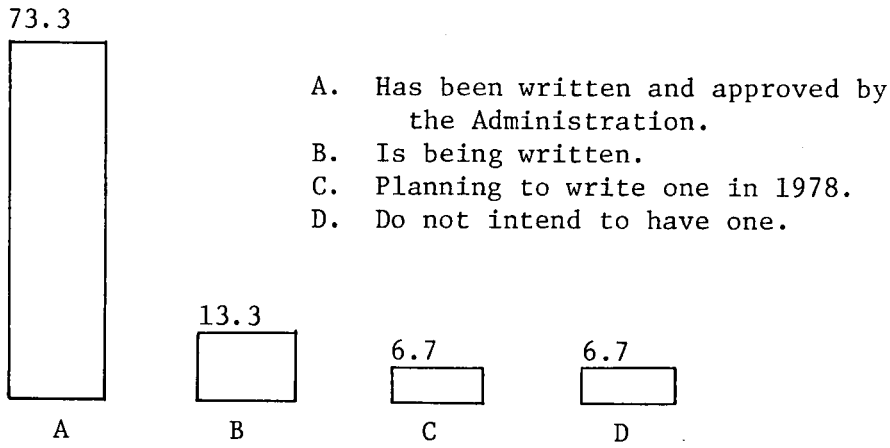


Figure 6. A Safety Policy has been written or not.

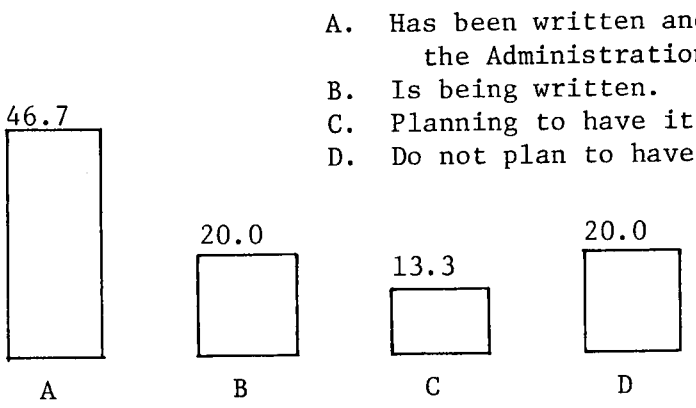


Figure 7. A Safety Manual has been written or not.

According to Figures 6 and 7, 73.3 percent of the institutions surveyed have written a Safety Policy and has been approved by the Administration; 46.7 percent of the institutions have written a Safety Manual and has been approved by the Administration.

Twenty percent of the Administrators indicated that they were planning to have a Safety Policy written in 1978. A third (33.3 percent) of the institutions are planning to have a Safety Manual written by December 1978.

Question four asked if a Safety Committee has been appointed and how often they met. Figure 8 presents the results.

Figure 8 shows that 93.3 percent of the institutions surveyed have appointed a Safety Committee, 86.6 percent hold meetings every month and 6.7 percent hold meetings bimonthly. It was indicated by 6.7 percent of the Administrators that no Safety Committee has been appointed as yet.

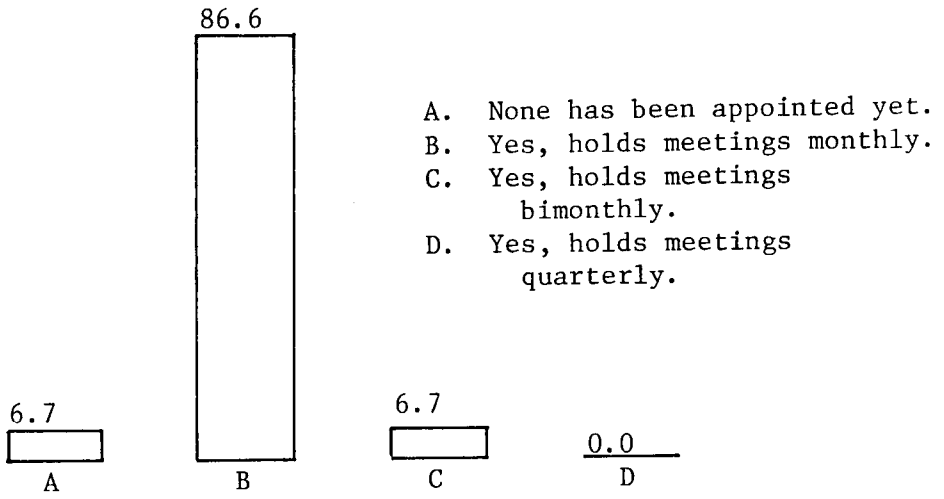


Figure 8. Appointment of a Safety Committee.

In question five the Administrators surveyed were asked to describe the status of their Safety Programs. The results are presented in Figure 9.

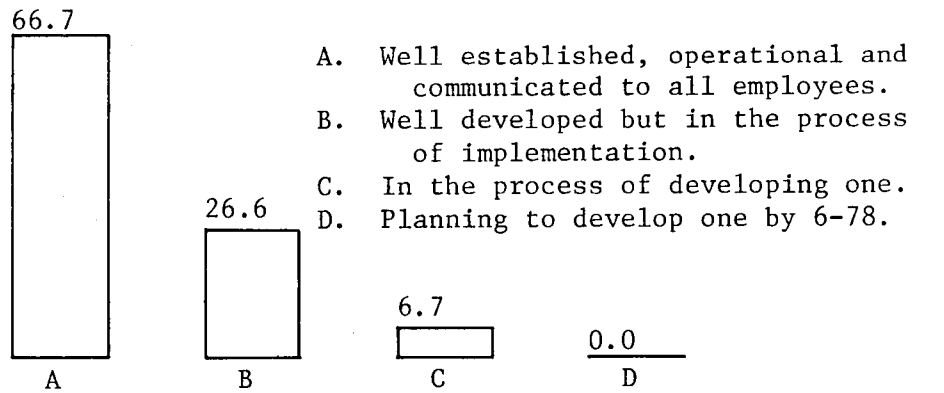


Figure 9. Status of their Safety Programs as viewed by the Administrators.

It was the opinion of 66.7 percent of the Administrators that their Safety Program was well established, operational and communicated to all employees. It was indicated by 26.6 percent that their Safety Program was well developed but in the process of implementation. The other 6.7 percent indicated that their Safety Program is in the process of development.

In order to further evaluate the possible safety needs that these institutions might have, the Administrators were asked to give a "yes" or a "no" answer to a series of six questions.

The questions asked to the Administrators and their replies were:

1. "Is Occupational Safety a part of the orientation program for new employees?" "Yes" was answered by 80.0 percent.
2. "Is employee safety included in the retraining program of present employees?" "Yes" was answered by 73.3 percent.
3. "Has an emergency disaster and evacuation plan been implemented for fire, tornados, etc.?" "Yes" was answered by 73.3 percent.
4. Is an investigation conducted after each 'lost time' accident?" "Yes" was answered by 93.3 percent of the Administrators.
5. "Have funds been allocated in the budget for a Safety Program?" "Yes" was answered by 66.7 percent.
6. "Has the institution received any specific request from the authorities (OSHA, The Joint Commission on Accreditation, etc.) concerning the need for improving the safety program?" Only 20.0 percent of the institutions have received specific requests.

Figures 10 through 15 present the results.

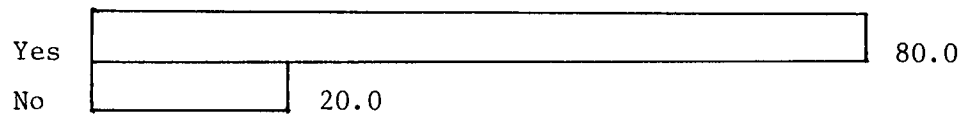


Figure 10. Occupational Safety is a part of the orientation program for new employees.

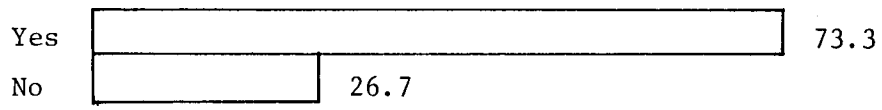


Figure 11. Employee safety is included in the retraining program of present employees.

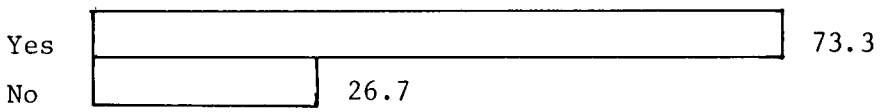


Figure 12. An emergency disaster and evacuation plan has been implemented.

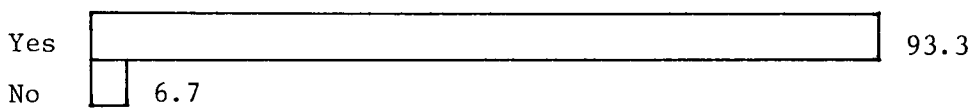


Figure 13. An investigation is conducted after each "lost time" accident.

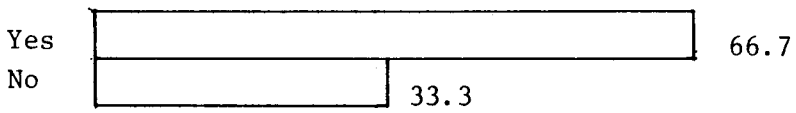


Figure 14. Funds have been allocated in the budget for the Safety Program.

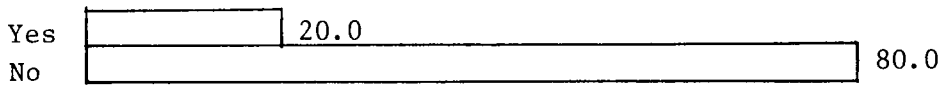


Figure 15. The institution has received a specific request(s) from the authorities concerning the need for improving the safety program.

The training of employees in First Aid principles and the conducting of regularly scheduled Fire Drills are two important aspects of a well developed safety program. The Administrators were asked to express their opinion on these two areas. The results are shown in Figures 16 and 17.

Over thirteen percent (13.3) of the respondents indicated that more than 50 percent of the Staff are Certified First Aiders; 26.7 percent of the Administrators indicated that more than 25 percent of the Staff were Certified First Aiders; 33.3 percent of the respondents indicated that less than 25 percent of the Staff were Certified First Aiders.

Figure 17 shows that 60.0 percent of the institutions conduct monthly fire drills; 20.0 percent conduct the fire drills quarterly; 13.3 percent conduct fire drills annually; and 6.7 percent did not reply.

In order to make a more accurate assessment of the scope of the safety programs in the institution surveyed, the Administrators were asked to indicate which of the twelve areas listed were included in their safety programs. Figure 18 shows the results.

All the institutions surveyed indicated that Workmen's Compensation is included in their safety program; 93.0 percent of the institutions

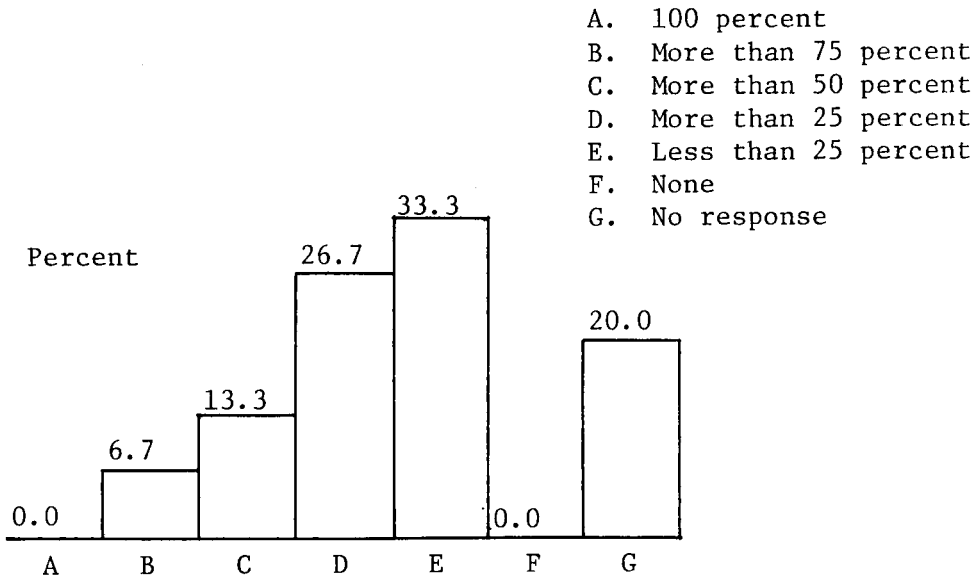


Figure 16. What percentage of the Staff are Certified First Aiders?

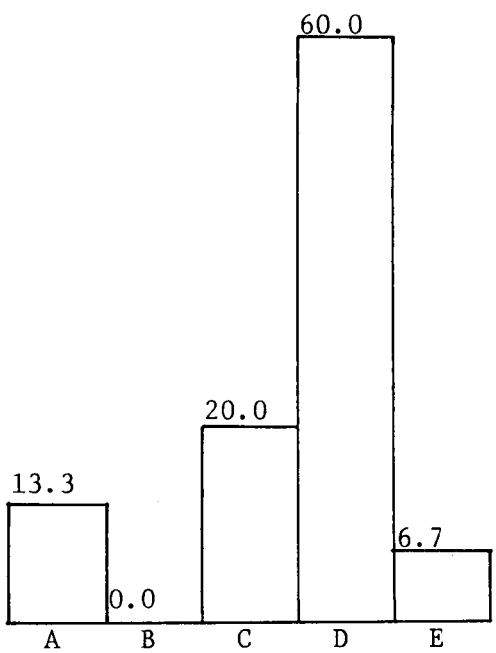


Figure 17. How often are fire drills conducted?

A. Safety Inspections
B. Safety Audits
C. Radiation Safety
D. Biohazards
E. Solid Waste Disposal
F. Pest Control
G. First Aid and Emerg. Care
H. Occupational Safety
I. Environmental Health
J. Disaster Preparedness
K. Fire Safety
L. Workmen's Comp.

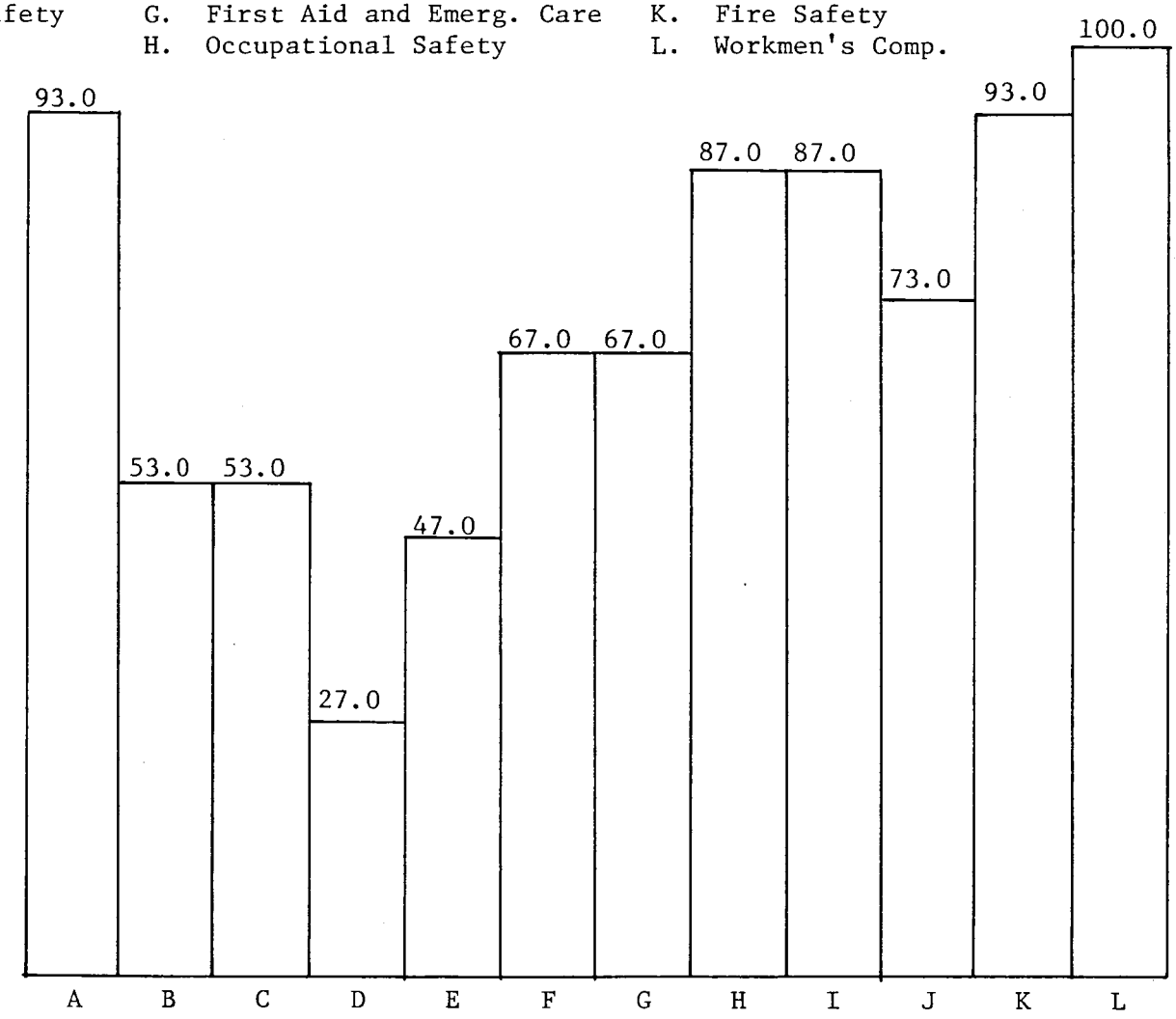


Figure 18. Areas included in the Safety Programs.

include Occupational Safety and Environmental Health; Disaster Preparedness is included in the safety program of 73.0 percent of the institutions; 67.0 percent of the institutions include Pest Control and First Aid and Emergency Care in their safety program; Safety Audits and Radiation Safety is included by 53.0 percent of the respondents; 47.0 percent of the institutions surveyed include Solid Waste Disposal in their safety program; and 27.0 percent include Biohazards.

The Administrators were asked to express their opinion in relation to the possible area of major emphasis that they would favor if a B.S. degree in Safety were to be offered. The Administrators were also asked to indicate their preference among eighteen safety courses listed and that could be recommended as part of a B.S. degree in Safety. The recommendation of each Administrator was requested in the selection of a minor area in Safety. Eight possible areas were suggested. The results are shown on Tables XXI through XXIII. See Appendixes Q through S for complete tabulation of all responses.

TABLE XXI

RANKING OF THE SAFETY AREAS THE ADMINISTRATORS WOULD FAVOR FOR A B.S. DEGREE

Safety Area	Average Rank Score	Rank Order
A. Safety Education	2.38	2
B. Occupational Health and Safety	2.30	1
C. Safety Administration	3.25	3
D. Environmental Health and Safety	3.38	4
E. Traffic Safety	5.27	6
F. Industrial Safety	3.57	5

TABLE XXII

RESPONSE OF THE ADMINISTRATORS TO THE QUESTION "WHICH OF THE FOLLOWING COURSES WOULD YOU RECOMMEND AS PART OF A B.S. IN SAFETY?"*

	Safety Area	Average Rank Score	Rank Order
A.	Basic Safety Management	2.90	1
B.	Principles of Safety Administration	3.70	3
C.	First Aid and Emergency Care	8.11	13
D.	Safety Education	6.50	7
E.	Health Care and Safety	7.88	11
F.	School Safety	14.66	16
G.	Safety in Sports	14.83	17
H.	Environmental Health	7.00	9
I.	Industrial Hygiene	12.33	15
J.	Safety in Health Care Institutions	3.90	4
K.	Occupational Safety	7.00	8
L.	Civil Defense and Disaster Preparedness	5.88	5
M.	Driver Education	17.33	18
N.	Fire Prevention	3.30	2
O.	Occupational Health	6.27	6
P.	Industrial Safety	7.90	12
Q.	Risk Management	7.18	10
R.	Total Loss Control	9.00	14

*Ranking was done in order of importance.

TABLE XXIII

RANKING OF THE SAFETY AREAS THE ADMINISTRATORS WOULD RECOMMEND AS A MINOR

	Safety Area	Average Rank Score	Rank Order
A.	Business Administration	3.90	4
B.	Health Education	3.27	1
C.	Industrial Education	3.63	2
D.	Psychology	4.11	7
E.	Personnel Management	3.63	3
F.	Public Relations	4.00	5
G.	Environmental Health	4.00	6
H.	Counseling	6.20	8

The courses recommended by the Administrators as part of a B.S. in Safety were ranked in the following order: (1) Basic Safety Management, (2) Fire Prevention, (3) Principles of Safety Administration, (4) Safety in Health Care Institutions, (5) Civil and Disaster Preparedness, (6) Occupational Health, (7) Safety Education, (8) Occupational Safety, (9) Environmental Health, (10), Risk Management, (11) Health Care and Safety, (12) Industrial Safety, (13) First Aid and Emergency Care, (14) Total Loss Control, (15) Industrial Hygiene, (16) School Safety, (17) Safety in Sports, and (18) Driver Education.

The Administrators recommended the minor area in the following order: (1) Health Education, (2) Industrial Education, (3) Personnel Management, (4) Business Administration, (5) Public Relations, (6) Environmental Health, (7) Psychology, and (8) Counseling. There was no clearcut choice among the first seven of the eight areas suggested.

Finally the Administrators were asked to indicate if they would employ a qualified graduate with a degree in Safety to be Coordinator of the Safety Program in their institution. Figure 19 shows the results.

Almost 50.0 percent (46.7 percent) of the respondents indicated that they would employ a qualified graduate with a degree in Safety to direct their Safety Program. The remainder of the respondents, 33.3 percent, said that they would not employ a graduate with a degree in Safety, while 20.0 percent did not reply.

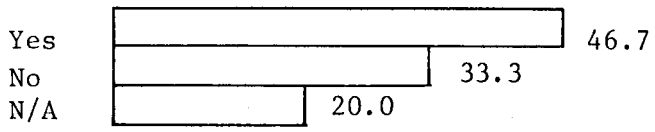


Figure 19. A qualified graduate with a Degree in Safety would be employed as Coordinator of the Safety Program.

V. ANALYSIS OF THE FINDINGS FROM THE SURVEY OF TEN SAFETY EDUCATORS

The data presented and analyzed in Section V were collected after contacting ten well-known educators in the field of Safety Education. Eight of the ten educators contacted replied. The researcher was interested in obtaining information concerning the job opportunities for qualified graduates with a degree in one of six safety areas suggested. The Safety Educators were also invited to suggest any other area that they considered to have significance as far as employment opportunities were concerned.

The Safety Educators were asked also to identify the two or three most outstanding four-year curricular programs in Safety in the United States.

Tables XXIV and XXV present the results.

Three areas of work opportunities were identified as Excellent—(1) Industrial Safety, (2) Occupational Safety and Health, and (3) Environmental Health and Safety; while two areas—Safety Education and Safety Administration were identified as Fair.

TABLE XXIV

OPINION OF THE SAFETY EDUCATORS ON JOB OPPORTUNITIES FOR QUALIFIED GRADUATES WITH A DEGREE IN ONE OF FIVE AREAS OF SAFETY SUGGESTED

Areas	Excellent	Good	Fair	Poor
A. Industrial Safety	6	1	0	0
B. Safety Education	1	1	4	1
C. Occupational Safety and Health	5	2	0	0
D. Environmental Health and Safety	5	2	0	0
E. Safety Administration	1	1	3	2
F. Other:				
Industrial Hygiene	1			
Safety and Health Management	1			
Fire Prevention			1	
Driver and Traffic Safety Education				1

TABLE XXV

OUTSTANDING FOUR-YEAR CURRICULAR PROGRAMS IN SAFETY IDENTIFIED BY THE SAFETY EDUCATORS

Curricular Program	Contact Person
1. Central Missouri State University School of Public Services Safety Department Warrensburg, Missouri 64093	Dr. Robert Marshall, Dean School of Public Services and Director, Missouri Safety Center
2. Texas A & M University Safety Education Program College Station, Texas 77843	Dr. Maurice E. Dennis, Director Safety Education Program
3. Indiana State University Health and Safety Department Terre Haute, Indiana 42809	Dr. Richard Spear, Chairman Health and Safety Department
4. Indiana University of Pennsylvania Safety Sciences Department Indiana, Pennsylvania	Dr. Robert Lauda, Chairman Safety Sciences Department

In addition to the four curricular programs listed in Table XXV, the following Safety Programs were also recommended by the Safety Educators interviewed: (1) University of Illinois, (2) University of Michigan, (3) University of Southern California, (4) Southern Illinois University; and (5) Michigan State University.

VI. ANALYSIS OF THE FINDINGS FROM THE SURVEY OF THE SAFETY EDUCATORS DIRECTING THE SAFETY PROGRAMS RECOMMENDED AS MOST OUTSTANDING

The Safety Educators directing four outstanding Curricular Programs in Safety were asked to suggest in which area the recommended four-year Safety Curriculum was to be developed. Three replies were received.

The three Safety Areas suggested by eight Safety Educators previously contacted as areas of EXCELLENT job opportunities were suggested to the directors of four outstanding Curricular Programs in Safety. They were asked to rank these three areas in their order of preference. The area ranked the highest would be selected for the development of the proposed four-year Safety Curriculum.

The recommendation of the three Safety Educators was as follows: (1) Occupational Safety and Health, (2) Environmental Health and Safety, and (3) Industrial Safety. (Table XXVI)

TABLE XXVI

AREAS TO BE CONSIDERED IN THE DEVELOPMENT OF THE PROPOSED FOUR-YEAR SAFETY CURRICULUM

Safety Area	Average Rank Score	Rank Order
A. Environmental Health and Safety	2.00	2
B. Industrial Safety	2.33	3
C. Occupational Safety and Health	1.33	1

CHAPTER V

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

I. SUMMARY

Chapter V of this study is divided into four sections. The first section presents a summary of the entire study. From the results of the several surveys conducted, the findings are presented in the second section of this chapter. The third section contains the conclusions. This chapter ends with the recommendations, the fourth section.

Purpose of the Study

The purpose of this study was to develop a four-year safety curriculum that could be adopted and recommended by the Board of Higher Education of the Seventh-Day Adventist Church.

Need for the Study

No previous study has been conducted to find the number of safety courses being offered by the S.D.A. colleges and universities and to determine the need for one or more of the S.D.A. colleges and universities to offer a four-year safety curriculum.

Statement of the Problem

A better understanding of the purpose of this study can be obtained by reviewing the various problems and questions which were solved and answered.

This study established:

1. What safety courses were being offered by the S.D.A. colleges and universities.

2. What degree of interest a four-year safety curriculum would generate among freshman students attending S.D.A. colleges and universities.

3. What number of safety courses were being offered by eight colleges and universities offering undergraduate and/or graduate work in safety.

4. What opinions the Administrators of the several S.D.A. institutions surveyed gave regarding the development of a four-year safety curriculum.

5. What opinions the Administrators of the several S.D.A. institutions surveyed gave regarding job opportunities for qualified graduates with a degree in one of the several safety areas.

6. What opinions the Safety Educators surveyed gave regarding job opportunities for qualified graduates with a degree in one of six areas in safety listed and any other areas suggested by the Safety Educators.

7. What opinions the Safety Educators surveyed gave regarding the two or three most outstanding four-year curricular programs in Safety in the United States.

8. What recommendations the Safety Educators directing the four most outstanding Safety Programs in the United States gave concerning the safety area in which the proposed four-year safety curriculum should be developed.

Procedure Followed in the Study

The study conducted was exploratory in nature. It took the form of a descriptive survey. The development of a four-year safety curriculum was part of the present study.

The National Safety Council identified 150 colleges and universities offering major, minor or certification and advanced degrees in safety education. In addition 269 institutions were identified as offering courses for either credit or noncredit, yet do not offer a degree in safety. From the 150 schools a sample of eight schools was selected.

From the review of the S.D.A. Directory of Educational Institution and the S.D.A. 1976 Yearbook, four of the 11 colleges and universities, 13 of the 47 hospitals and sanitariums, three publishing houses, and one food factory were selected for the study.

The data were obtained from the Chairman of the Department or the Director of the Program, the Business Managers or Administrators, the Director of Admissions, and Freshman students. Written materials also served as sources of data.

Two questionnaires were developed and pretested. One questionnaire was used among the freshman students and a second questionnaire was used among the administrators.

Data analysis was based on the questions framed in the questionnaires and was qualitative in nature.

II. FINDINGS

From the results of the study conducted, the following findings were made:

From the Review of Related Literature

1. Safety was practiced by primitive men and the Jews had enacted safety and health laws many centuries ago.

2. The inhumane conditions of employment in the early stages of the Industrial Revolution produced an awakening of the public conscience to the need for protecting human life.

3. The Common Law gave injured workers little chance at compensation.

4. The early 19th century saw the start of legislation for the protection of workers in all industrialized countries.

5. In the United States the first industrial legislation was passed in Massachusetts in 1867 providing for factory inspectors.

6. In the United States many private companies established their own safety programs over sixty years ago. The Lukens Steel Company, America's oldest independent steel company, established a formalized safety program.

7. The first college courses in safety education were established in 1929.

8. Driver education was introduced in a few schools in the early 1930's.

9. A new revolutionary safety philosophy was presented by H. W. Heinrich in 1931. This safety philosophy states that unsafe acts of people are the cause of a high percentage of accidents and that people cause far more accidents than do unsafe conditions.

10. The number of colleges offering courses in various phases of safety has grown from 50 in 1940 to 419 in 1976.

11. Historical events have influenced the passing of safety laws.

12. The National Association of College and University Business Officers recommended a three-pronged planning approach to OSHA compliance. These steps are: (a) Establish Institutional Coordination (establish a formal working framework to coordinate OSHA-related matters within the institution); (b) Relate OSHA to the Institution; and (c) Allocate Financial Resources for Compliance.

13. A comprehensive college or university safety program serves both to keep the student safe at college and prepare the graduate for his leadership role in life.

14. The increasing complexity of modern industry with its sophisticated processes and its use of new materials, demanded governmental action at the federal level.

15. Congress declared the OSH Act to be the purpose and the policy of the nation, to assure, so far as possible, safe and healthful working conditions for every employee in America and to preserve this country's human resources.

From the Survey of the S.D.A. Colleges and Universities Bulletins and/or Catalogs

From the review of the bulletins and/or catalogs, 1974-75 school year, it was learned that the 11 S.D.A. colleges and universities were offering a total of 29 safety courses or an average of 2.6 courses per school.

Prevention and Care of Athletic Injuries was being offered by eight of the 11 schools; Water Safety was being offered by seven of the 11 schools; First Aid and Emergency Care by five of the 11 schools.

Industrial Safety and Safety Education were being offered by two of the 11 educational institutions, while Basic Driver Education was offered by three of the schools. Only one of the eleven schools offered Advanced Driver Education and School Safety.

Three of the eleven S.D.A. colleges and universities were offering four safety courses; three other schools were offering three safety courses each; three were offering two safety courses each, and two of the eleven S.D.A. colleges and universities were offering one safety course each.

With the exception of Andrews University which increased its offering in safety courses from four in the 1974-75 school year to 13 in the 1977-78 school year, the review of the bulletins showed no significant increase in the offering of safety courses by the other ten S.D.A. colleges and universities. All the safety courses being offered at the present time by Andrews University are listed in the Bulletin for the Department of Technology, which was organized in 1975.

Excluding Andrews University, in 1974-75 the other 10 colleges and universities were offering 25 safety courses or 2.5 per school. During the 1977-78 school year, 37 safety courses or 3.7 courses per school were listed in their bulletins and/or catalogs. The average increase of 1.2 safety courses per school in the last three years appears to have no major significance.

According to the 1977-78 bulletins, Water Safety is being offered by 10 of the 11 schools; Prevention and Care of Athletic Injuries is

being offered by nine of the 11 schools; First Aid and Emergency Care is being offered by six of the 11 S.D.A. colleges and universities.

The following safety courses have been added by one or more of the 11 schools: Construction Safety, Driving and Traffic Safety, Fundamentals of Traffic Safety, Hospital Safety and Codes, Occupational Education, Personality Factors in Driver and Traffic Education, Shop Planning and Safety, Traffic Law, and Wilderness Survival.

From the Survey of the Safety Programs Being Offered in Eight Colleges and Universities in the U.S.

1. Housatonic Community College in Bridgeport, Connecticut and Catonsville Community College, Catonsville, Maryland, two of the eight colleges and universities selected for the surveying of their safety programs, are offering an undergraduate degree in Occupational Safety and Health.

2. Auburn University, Alabama, offers an undergraduate and a graduate degree in Occupational Safety and Health.

3. The University of Southern California, under the Institute of Safety and Systems Management, offers the Baccalaureate and Master's Degrees in Safety since 1972 and 1968 respectively. A third degree, the Master of Public Administration in Traffic Safety Management, has been offered since 1977.

4. Indiana State University offers an undergraduate degree in Safety Management and M.S. in Occupational Safety and Health.

5. Central Missouri State University expanded its safety curriculum in 1967 and eventually established a School of Public

Services, offering a wide variety of degree programs in safety and related fields. A Department of Industrial Safety and Hygiene was added in 1975.

In slightly more than a decade—from 1967 to 1978—the CMSU School of Public Services has produced 2,264 graduates. Of these graduates, 261 have been in industrial safety and hygiene. Other degrees granted include B.S., Industrial Safety (922); B.S., Fire Science (36); B.S., Sanitary Science (1); M.S., Industrial Hygiene (37); M.S., Industrial Safety (157); M.S., Industrial Security (6); and Education Specialist (10). Last year nearly 1,000 undergraduate and 900 graduate students were enrolled in the various programs of the School.

6. The University of Tennessee offers an undergraduate minor in Safety Education. The graduate program in Safety Education includes a Master of Science degree and a Doctor of Education degree in Health Education with emphasis in Safety. In addition, a Safety Specialist degree is also offered. The University of Tennessee offers, in addition, undergraduate and graduate degrees in related fields.

7. At Texas A & M University, the Industrial Hygiene and Safety Engineering Division of the Department of Industrial Engineering has grown from a two-man program in 1970 to five full-time faculty in 1978.

A relatively new development is the B.S. degree in Safety Engineering. The program was initiated in the Fall semester, 1977. Graduate programs include the M.S. in Industrial Hygiene, M.S. in Industrial Safety and Ph.D. in Industrial Engineering (with major study in industrial hygiene and safety engineering).

From the Survey of the College Freshmen from Four S.D.A. Colleges and Universities

1. A response of 65.0 percent was obtained from the mailed questionnaires.

2. Over 50 percent of those responding (57.0 percent) had taken safety courses while attending high school or academy.

3. The respondents associate Safety with: (a) First Aid, (b) Home; (c) Driver Education; (d) Fire; (e) Hospital; (f) School, (g) Industry; (h) Construction; (i) Civil Defense; (j) Sports; (k) Aviation, and (1) Farm.

4. The majority of those responding indicated that they would consider taking First Aid and Emergency Care as an elective. Other courses were chosen in the following order: Environmental Health, Disaster Preparedness, Fire Prevention, Safety Education, Driver Education, Community Safety, Safety in Health Care Institutions, Occupational Safety, Safety in Sports, Safety Management and Loss Control, and Industrial Hygiene.

5. The respondents selected Community Health and Safety as the preferred area for a minor. Other safety areas were chosen in the following order: Safety Education, Occupational Health and Safety, Safety Administration, Traffic Safety, and Industrial Hygiene.

6. Over 17 percent (17.7 percent) of those responding indicated they would consider Safety as their major area, 81.3 percent answered negatively, while 1 percent gave no answer.

7. Safety Education was selected as the major area the respondents would like to see offered. The other three safety areas

in the order chosen were: Occupational Health and Safety, Safety Administration, and Industrial Safety.

8. Over 80 percent of the respondents (83.6 percent) indicated that they thought a safety course should be required of every student, 14.3 percent were against a proposed elective requirement in safety, and 2.1 percent gave no reply.

9. The great majority of those responding (66.4 percent) selected First Aid and Emergency Care as the safety course that should be required as an elective. The other courses selected appear in order of preference: Introduction to Safety, Traffic Safety, Basic Safety Management, Occupational Safety, and Safety in Sports.

10. The respondents indicated their preference of the type of occupation they would like to select if they were to receive a B.S. degree in Safety. Six areas were suggested and they are listed according to the average rank score in the following order: (a) Safety Director (Hospital or University), 2.14; (b) Safety Instructor (Junior College), 2.79; (c) Driver/Traffic Safety Instruction, 3.31; (d) Safety Inspector (Insurance Company), 3.77; (e) Compliance Officer (State or Federal), 3.98; and (f) Safety Director (Industrial), 4.02. There were no clearcut differences among the six areas suggested.

From the Survey of the Administrators of Seventeen S.D.A. Institutions

1. Sixty percent of the Administrators surveyed indicated that the position of Safety Director was held by a Staff person who has

safety as a part-time function. One-third indicated that the position was held by a full-time employee in that function. The remaining 6.7 percent would fill the position as soon as a qualified person is available.

2. Over 73 percent of the respondents (73.3) indicated that a Safety Policy had been written and approved by the Administration, while less than 50 percent (46.7) indicated that a Safety Manual has been written and approved by the Administration.

3. A Safety Committee has been appointed by 86.6 percent of the institutions surveyed, holding meetings monthly.

4. The Administrators surveyed described their Safety Programs as follows: (a) well established, operational and communicated to all employees, 66.7 percent; (b) well developed but in the process of implementation, 26.6 percent and (c) in the process of developing one, 6.7 percent.

5. Eighty percent indicated that Occupational Safety was a part of the orientation program for new employees, while 73.3 percent indicated that Employee Safety is included in the retraining program of present employees.

6. In reply to the question, "Has an emergency disaster and evacuation plan been implemented?," 73.3 percent replies yes. Over 90 percent, (93.3) of the Administrators surveyed indicated that an investigation is conducted after each "lost time accident."

7. Twenty percent of the institutions surveyed have received specific requests from the authorities concerning the need for improving the safety program.

8. Funds have been allocated in the budget for the Safety Program by 66.7 percent of the S.D.A. institutions surveyed.

9. Sixty percent of the Administrators indicated that approximately 25.0 percent of the Staff are Certified First Aiders.

10. Fire drills are conducted monthly by 60.0 percent of the institutions surveyed. Twenty percent conduct the drills quarterly.

11. The Administrators surveyed indicated that the following areas are included in their Safety Program: (a) Workman's Compensation, 100.0 percent; (b) Safety Inspection and Fire Safety, 93.0 percent; (c) Occupational Safety and Environmental Health, 87.0 percent; (d) Disaster Preparedness, 73.0 percent; (e) Pest Control and First Aid and Emergency Care, 67.0 percent; (f) Safety Audits and Radiation Safety, 53.0 percent; (g) Solid Waste Disposal, 47.0 percent, and (h) Biohazards, 27.0 percent.

12. The Administrators indicated their order of preference in six areas suggested for a bachelor's degree. The selection, according to the average rank score, was as follows: (a) Occupational Health and Safety, 2.30; (b) Safety Education, 2.38; (c) Safety Administration, 3.25 (d) Environmental Health and Safety, 3.38; (e) Industrial Safety, 3.57; and (f) Traffic Safety, 5.27.

13. The Administrators indicated their order of preference in 18 safety courses suggested for the B.S. Degree in Safety. The selection, according to the average rank score, was as follows: (a) Basic Safety Management, 2.90; (b) Fire Prevention, 3.30; (c) Principles of Safety Administration, 3.70; (d) Safety in Health Care

Institutions, 3.90; (e) Civil Defense and Disaster Preparedness, 5.88; (f) Occupational Health, 6.27; (g) Safety Education, 6.50; (h) Occupational Safety, 7.00; (i) Environmental Health, 7.10; (j) Risk Management, 7.18; (k) Health Care and Safety, 7.88; (l) Industrial Safety, 7.90; (m) First Aid and Emergency Care, 8.11; (n) Total Loss Control, 9.00; (o) Industrial Hygiene, 12.33; (p) School Safety, 14.66; (q) Safety in Sports, 14.83; (r) Driver Education, 17.33.

14. The Administrators indicated their order of preference in eight areas suggested for a minor concentration. The selection, according to the average rank score, was as follows: (a) Health Education, 3.27; (b) Industrial Education, 3.63; (c) Personnel Management, 3.63; (d) Business Administration, 3.90; (e) Public Relations, 4.00; (f) Environmental Health, 4.00; (g) Psychology, 4.11, and (h) Counseling, 6.20.

15. In reply to the question, "Would you employ as Coordinator of the Safety Program a qualified graduate with a degree in Safety?," 46.7 percent responded affirmatively, 33.3 percent responded negatively, and 20.0 percent gave no answer.

From the Survey of Eight Safety Educators

1. The Safety Educators were asked to identify the two or three most outstanding four-year curricular programs in Safety in the United States. The four programs identified were as follows: (a) Central Missouri State University, School of Public Services, Safety Department; (b) Texas A & M University, Safety Education

Program; (c) Indiana State University, Health and Safety Department, and (d) Indiana University of Pennsylvania, Safety Sciences Department.

2. The Safety Educators identified three areas of job opportunities for qualified graduates with a degree in safety as excellent. They were: Industrial Safety, Occupational Safety and Health, and Environmental Health and Safety.

In addition, they listed Safety Education and Safety Administration as areas fair for job opportunities. They listed four others as possible areas for employment. These were: Industrial Hygiene, Safety and Health Management, Fire Prevention, and Driver and Traffic Safety Education.

From the Survey of the Safety Educators Directing the Safety Programs Recommended as Outstanding

1. The Safety Educators directing four outstanding Curricular Programs in Safety were asked to suggest in which area the recommended four-year Safety Curriculum was to be developed. Three responded. The three areas identified as excellent for job opportunities were suggested to the Safety Educators and the selection was as follows: (a) Occupational Safety and Health, (b) Environmental Health and Safety, and (c) Industrial Safety.

III. CONCLUSIONS

Findings of the study were the basis for the following conclusions:

1. The increase in the number of colleges and universities offering courses in various phases of safety from 50 in 1940 to 419

in 1976 indicated an awareness of the increased demand for graduates trained in this field and the desire of the institutions of learning to alleviate this demand by supplying more graduates.

2. The S.D.A. colleges and universities, with one exception, have not kept up with the national trend. Their increase in the number of safety courses being offered was about 50 percent compared with about 400 percent by other schools.

3. Andrews University has increased the offering of safety courses in the last three years from four to 13 courses or 300 percent. Andrews University appears to have moved along with the national trend.

4. Fifty percent of the Safety Programs reviewed offer an undergraduate and/or a graduate degree in Occupational Safety and Health. Twenty-five percent offer an undergraduate and/or graduate degree in Safety Management. Twenty-five percent offer an undergraduate degree and/or graduate degree in Industrial Hygiene, Industrial Safety, and/or Industrial Engineering. One school offers an undergraduate minor and a graduate degree in Safety Education.

5. A response of 65.0 percent (64.98) of the students sampled answered the questionnaire. This could be an indication of interest in the study conducted.

6. It appears that the knowledge about safety among the freshman students attending the S.D.A. colleges and universities is limited. In reply to the question, "With which do you associate Safety?," the freshmen selected First Aid. The students selected First Aid as the elective they would consider taking. First Aid was also selected by

the freshmen as the safety course that should be required as an elective.

7. The 17.7 percent of freshman students indicating that they will consider Safety as their major area could be interpreted as an indication of interest in this field.

8. The selection by the respondents of Occupational Safety and Health as the major area that they would like to see offered, the selection of Community Health and Safety as the preferred area for a minor, and the selection of Safety Director (Hospital or University) as their preference on the type of occupation they would like to have if they were to receive a B.S. degree in Safety, appears to indicate an interest in Safety when combined with Health.

9. Twenty percent of the institutions have received specific request from the authorities concerning the need for improving the safety program. This, together with the 46.7 percent who responded that a qualified graduate with a degree in Safety would be employed as Coordinator of their Safety Program, might be an indication of a need.

10. Both the Administrators and the students selected Occupational Safety and Health and Safety Education as the number one and two areas they would favor for a bachelor's degree. This appears to be highly significant.

11. Occupational Safety and Health was recommended by the Safety Educators as the area in which the proposed four-year Safety Curriculum should be developed.

IV. RECOMMENDATIONS

Based upon the findings of this study and the conclusions drawn, the following recommendations were made:

1. That a four-year Safety Curriculum with a major in Occupational Safety and Health and a minor in Health Education be proposed to the Board of Higher Education of the S.D.A. Church.

2. That Andrews University be considered as the S.D.A. educational institution where the proposed Safety Curriculum be offered.

3. That continuing study of the proposed four-year Safety Curriculum in Occupational Safety and Health and similar programs in other colleges and universities be conducted.

4. That future studies be conducted under the direction of the Board of Higher Education of the S.D.A. Church to determine the possibility of having several of the S.D.A. colleges and universities to include in their course offerings an Associate Degree and an undergraduate minor in one or more of the following areas: Safety Education, Occupational Safety and Health, Environmental Health and Safety, and Industrial Safety or Industrial Engineering, and that the schools be encouraged to recommend safety courses as elective.

5. That an action by the Board of Higher Education be taken, recommending to the Department of Education of the General Conference of Seventh-Day Adventists that a course in Safety Education and/or Principles of Safety be offered at the Academy level.

Chapter VI presents the recommended four-year Safety Curriculum in Occupational Safety and Health.

CHAPTER VI

THE PROPOSED FOUR-YEAR SAFETY CURRICULUM IN OCCUPATIONAL SAFETY AND HEALTH

Based on the results of the study conducted, the need for a four-year Safety Curriculum to be offered by one or more of the S.D.A. colleges and universities is apparent. Following is the recommended four-year Safety Curriculum with a major in Occupational Safety and Health and a minor in Health Education.

I. GENERAL EDUCATION REQUIREMENTS

English Language and Communication

Twelve hours. These courses are intended to develop a proper command of the spoken and written English language.

English Composition	6-9
Communication	3

Behavioral and Social Sciences

Twelve hours. The requirements in Behavioral and Social Sciences are intended to give the student an understanding of the present events through the study of history and civilization.

Must select one course from the areas in the following list: Anthropology, History and Political Science, Psychology, Geography, Sociology, and Economics.

Religion

Eighteen hours. The religion requirements are intended to acquaint the student with the nature and destiny of man and his relationship with God and the meaning and use of life.

Christian Beliefs	4
Applied Theology	14

Natural Sciences and Mathematics

Twenty hours. An understanding of the scientific method and the universe in which the student lives is vitally important to the well-educated person.

Mathematical Sciences	8
Two of the three areas of Biology, Physics, and Chemistry	12

Fine Arts

Four hours. To provide for a better understanding and appreciation of the creative arts. Must select one of the following:

Music Appreciation, Language of Arts, or Introduction to Western Arts	4

Vocational

Three hours. To introduce the student to an area of work which may develop appreciation for labor, require physical manipulation, give manual training, and provide a beginning-level skill. Must select one course from the area in the following list:

Industrial Arts, Agriculture, Art,

or Home Economics 3

Physical Education

Three hours. To help each student develop physical efficiency through participation in supervised activity, to develop wholesome recreational habits by helping the student acquire interest, knowledge and skills in several recreational activities.

Concepts of Fitness 2

Any physical education activity course(s) 1

Humanities

Twelve hours. An integrated study of philosophy, literature, music, and the visual arts. The following areas are suggested:

Philosophy 4

Foreign Cultures 4

Literature 4

Summary for the Requirements on General Education for the B.S. in Occupational Safety and Health

English Language and Communication 12

Behavioral and Social Sciences 12

Religion 18

Natural Sciences and Mathematics 20

Fine Arts 4

Vocational 3

Physical Education	3
Humanities	12
Total	84

II. SPECIFIC EDUCATIONAL REQUIREMENTS FOR THE B.S. DEGREE WITH AN OCCUPATIONAL SAFETY AND HEALTH MAJOR AND HEALTH EDUCATION MINOR

Occupational Safety and Health

Seventy hours. The major under this program requires 70 hours, 30 hours including the Internship must be in upper division courses.

The following courses are recommended:

1.	Introduction to Occupational Safety and Health I	4
2.	Introduction to Occupational Safety and Health II	4
3.	Principles of General Safety	3
4.	Introduction to Industrial Hygiene	4
5.	Safety Education	4
6.	Industrial Safety	4
7.	Fire Protection	4
8.	Safety and Health Standards	4
9.	Construction Safety and Health	3
10.	Federal and State Codes and Standards	4
11.	Accident Prevention and Loss Control	4
12.	Risk Management	4
13.	Control of Occupational Health Hazards	4
14.	Safety in Health Care Institutions	4
15.	Nature and Effects of Occupational Health Hazards	4

16.	Internship	12
	Total	70

Health Education

Thirty-six hours. The minor under this program requires 36 hours, nine of which must be in the upper division.

The following courses are recommended:

1.	Foundation of Health Science	3
2.	First Aid and Emergency Care	4
3.	Substance Abuse Education	4
4.	Communicable and Degenerative Disease Prevention	3
5.	Community Health	4
6.	Consumer Health and Safety Education	4
7.	School Safety Education	3
8.	Community Health Programs	4
9.	Ministry of Healing	3
10.	School Health Program	4
	Total	36

A proposed four-year curriculum sequence is shown in Table XXVII.

III. RECOMMENDATIONS FOR THE FUTURE

Further research will be needed and is, therefore, recommended. This ongoing study should include research in the field of Safety Education, research of the bulletins of colleges and universities, and

TABLE XXVII

PROPOSED FOUR-YEAR OCCUPATIONAL SAFETY AND HEALTH CURRICULUM AND A MINOR IN HEALTH EDUCATION

	Course	Quarter or Semester Fall	Winter	Spring
	First Year			
ENGL	English I, II	4	4	-
COMM	Communication	-	-	4
SAF	Introduction to Occupational Safety and Health, I, II	4	4	-
SAF	Principles of General Safety	-	-	3
CHEM	Chemistry I, II	4	4	-
MATH	Mathematics	-	-	4
HL	Foundation of Health Science	3	-	-
REL	Christian Beliefs	-	4	-
REL	Workshop in Prayer	-	-	2
BEHSC	General Psychology	-	-	4
PEAC	Physical Activity	1/2	1/2	-
	Total	15-1/2	16-1/2	17
	Second Year			
BIO	Biology	4	-	-
MATH	Probability and Statistics	-	-	4
SAF	Safety Education	4	-	-
SAF	Introduction to Industrial Hygiene	-	4	-
SAF	Industrial Safety	-	-	4
HL	First Aid and Emergency Care	-	4	-
HL	Substance Abuse Education	-	-	4
REL	Understanding the Old Testament	3	-	-
REL	Understanding the New Testament	-	4	-
BEHSC	Industrial Sociology	-	-	4
HUM	History	4	-	-
ART	Introduction to Western Arts	-	4	-
	Total	15	16	16
	Third Year			
HL	Communicable and Degenerative Disease Prevention	3	-	-
HL	Community Health	-	4	-
SAF	Fire Protection	4	-	-
SAF	Safety and Health Standards	-	4	-
SAF	Construction Safety and Health	-	-	3
SAF	Federal and State Codes and Standards	-	4	-
BEHSC	Principles of Economics	-	-	4
REL	Pauline Epistles	-	-	3
REL	Topics in Religion	-	2	-
VOC	Industrial Arts	-	-	3
HL	Consumer Health and Safety Education	4	-	-
HL	School Safety Education	-	3	-
HUM	Ethics	4	-	-
PEAC	Wilderness Survival	-	-	2
	Total	15	17	15
	Fourth Year			
SAF	Accident Prevention and Loss Control	4	-	-
SAF	Risk Management	4	-	-
SAF	Control of Occupational Health Hazards	4	-	-
HL	Community Health Programs	4	-	-
HL	School Health Programs	-	4	-
SAF	Safety in Health Care Institutions	-	4	-
SAF	Internship I	-	6	-
HUM	Philosophy	-	-	4
HL	Ministry of Healing	-	-	3
SAF	Nature and Effects of Occupational Health Hazards	-	-	4
SAF	Internship II	-	-	6
	Total	16	14	17

research of the programs being offered in the fields of Safety Management, Industrial Safety, and Environmental Health and Safety.

It would be helpful to study "current" literature in these fields to keep up with the changes and improvements that are occurring. This is greatly recommended.

Finally, the proposed four-year curriculum should continually be evaluated and reevaluated to see if it is fulfilling the needs of the populace served by the Board of Higher Education of the S.D.A. Church.

CHAPTER VII

EPILOGUE

In 1940 the number of colleges offering courses in various phases of safety were 50. In the 1968 issue of the booklet, "College and University Safety Courses," published by the Higher Education Section, National Safety Council, 291 colleges and universities were listed as offering programs in safety. In the 1977-78 issue of this same publication, 404 universities reported offering safety education credit courses to some extent. This booklet also showed 24 institutions offering a Bachelor Degree in Safety, 40 a Master's Degree in Safety and Driver Education and 10 institutions a Doctoral Degree.

The American Society of Safety Engineers' most current list shows 30 institutions which offer a graduate degree, 31 which offer a baccalaureate, and 42 an associate (undergraduate) degree in occupational safety and health.

From these figures, it might be concluded that tremendous progress had been made in the training of safety professionals. This increase has become more dramatic in the last ten years. Yet, the S.D.A. Higher Education System, with its 18,771 enrollees for the Fall registration, 1977-78 in the 11 colleges and universities, has not kept up to date with the national trend and therefore has not been able to meet the increased demand from business and industries for qualified graduates in the area of safety. The School of Public Services, Missouri Safety

Center, Central Missouri State University, had more than 4,000 job openings for its 1976-77 graduates.

During the last decade several regulatory agencies have committed large sums of money and manpower toward assuring the safety of the public. Such federal and state attempts to regulate safety have heightened the social awareness of many people that safety is not easily achieved by simple rules and quick administrative responses.

According to Dr. Chaffin in an article published in Professional Safety, April 1978, page 32, safety education in this country has been for the most part an experimental process, with formal training in the field often restricted to short courses on specific topics. The limitations to such approaches have been realized lately by at least two agencies. During 1977, continues Dr. Chaffin, both the National Institute for Occupational Safety and Health and the Occupational Safety and Health Administration have greatly increased their funding for more formal degree-oriented learning in the field. Between these two agencies alone over $10 million have been made available to universities and colleges to develop curricula which specialize in developing the broad skills necessary to practice at both the technical and professional levels in the occupational safety and health fields. It was not clear how much of these funds would be devoted to safety education, per se, but it should be greater than in the past.

In terms of the type of curricula needed for professional safety training, no single model now exists. Baccalaureate and Master's Degrees

are offered most often through either a School of Education or Engineering. If the former, then courses tend to deal with administrative solutions to safety problems. If offered in an Engineering Curriculum, the courses stress engineering controls. Clearly, both strategies are often needed, and hence the recommended curriculum tended to be interdisciplinary.

This study was undertaken to learn of the need for a four-year safety program to be offered by one or more of the S.D.A. colleges and universities, to develop a Safety Curriculum in the area of safety with the higher demand and to recommend such a curriculum for its adoption to the Board of Higher Education of the S.D.A. Church.

This curriculum, if incorporated into the curricula offerings of one or more of the S.D.A. colleges and universities, could become a contributory force in helping to supply the demand for safety professionals.

The Adventist Review, formerly Review and Herald, General Church Paper of the Seventh-Day Adventists, published an editorial on March 28, 1968, under the title, "Accident Prevention—A Christian Duty." In this editorial the question was asked, "when someone dies as the result of an accident, has the sixth commandment been broken?" The article pointed out that "as Adventists we would do well to think about the causes of home accidents, to talk to our children about avoiding them, and to assume a greater responsibility in protecting our families from unnecessary injury and death."

The editorial from the Adventist Review explained that carelessness is not a Christian virtue and that the Bible promise of heavenly protection may make us more secure, but we ought not to become careless. No conscientious Christian, it continued, would willfully take the life of another person, but he might through carelessness set a death trap, ending a life that might have been fruitful.

The editorial concluded

> The Christian philosophy of safety should not be based on the presumption that God will protect us and our loved ones regardless of our acts and attitudes. . . . Wisdom dictates that we eschew unsafe acts and unsafe practices, and that we keep alert to potential hazards. Using all reasonable care in protecting ourselves and others from accidents is certainly a part of our Christian duty as commandment keepers.

Such an awareness about accident prevention, accidents, unsafe acts and unsafe practices by the leadership of the S.D.A. Church as early as March 1968 made the researcher wonder why no definite steps have been taken to make available to our youth courses and/or programs in the area of safety.

The research study just completed pointed out some facts that ought to be considered in this chapter.

1. The student participation in the study, 65.0 percent returned a response from the mailed questionnaires, shows a degree of interest in the area covered by the study.

2. The 83.6 percent of the respondent students indicated that they thought a safety course should be required of every student. This shows a clearcut awareness of the need to expose the student to the area of Safety and to allow him/her to acquire knowledge in this field.

3. The study pointed out that many of the students attending the S.D.A. colleges and universities have a limited understanding of what Safety is. The respondents associated Safety with First Aid, they indicated their willingness to take First Aid as an elective, and they recommended that First Aid be the safety course to be required of every student. Apparently the students attending the S.D.A. colleges and universities are aware of the importance of Safety, but at the same time show limited understanding of the subject.

Two notes written by students and returned with the questionnaires brought to focus the apparent need of freshmen to increase their knowledge and understanding of safety. The two notes read:

> I hope my answers will be of help. Unfortunately I couldn't answer the questionnaire any better because I wasn't familiar with some of the items.

> I was involved in an accident that put me in the hospital, in traction, for 18 days. Even though I have experienced much pain, now I realize the importance of safety. Your questionnaire brought to me an awareness of how important it is to live without accidents . . .

4. Close to 50 percent of the S.D.A. Administrators surveyed (46.7 percent) indicated that they would employ as Coordinator of the Safety Program a qualified graduate with a degree in Safety. This might reflect a need to be fulfilled.

5. The study pointed out that some of the S.D.A. Administrators contacted might not be fully aware of the possible need that freshman students attending the S.D.A. schools have to develop a better understanding about safety and to increase their knowledge in this area. Before the list of freshmen requested was to be released, the following requests were made:

> I am quite certain we can comply with your request for an address roster of our freshmen; however, before doing so we would like to review a copy of your questionnaire.
>
> As soon as I have received your questionnaire, I will present your request to the Administrative Committee . . .
>
> We would be very happy to help you but we think it would be much easier if you would let us know the number or percentage you would like and we would do the random sampling. If this is all right with you we will do this as soon as we hear from you. . . .

An educational institution that originally was to be included in the study was left out because of the delay in obtaining the information requested. Two letters were written in a two month period. Neither letter was acknowledged. Finally, three months after the first letter was written, the list of freshman students arrived in the mail. By then it was too late to include the students in the study.

In one of the S.D.A. schools two new safety courses were included among the offerings for the 1976-77 school year. These courses were: (1) Safety Management under the Business Administration Department, and (2) Safety Education under the Health and Physical Education Department. Following the request of the academic Dean from that school, both courses were taken out of the schedule.

With an awareness in the leadership of the S.D.A. Church for Safety, with the S.D.A. Administrators indicating their willingness to employ as Coordinator of the Safety Program a qualified graduate with a degree in Safety, and with college students in the S.D.A. schools showing interest in Safety and a Safety Curriculum, but also showing limited understanding and knowledge in the area of Safety, the proposed

four-year Safety Curriculum with a major in Occupational Safety and Health and a minor in Health Education, could become, when adopted and recommended by the Board of Higher Education of the S.D.A. Church, a viable instrument in helping to fulfill the interest and need shown by the students and the Administrators as well as to satisfy the concern shown by the leadership.

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APPENDIXES

APPENDIX A

MAP SHOWING THE LOCATION OF THE INSTITUTIONS SELECTED FOR THE STUDY

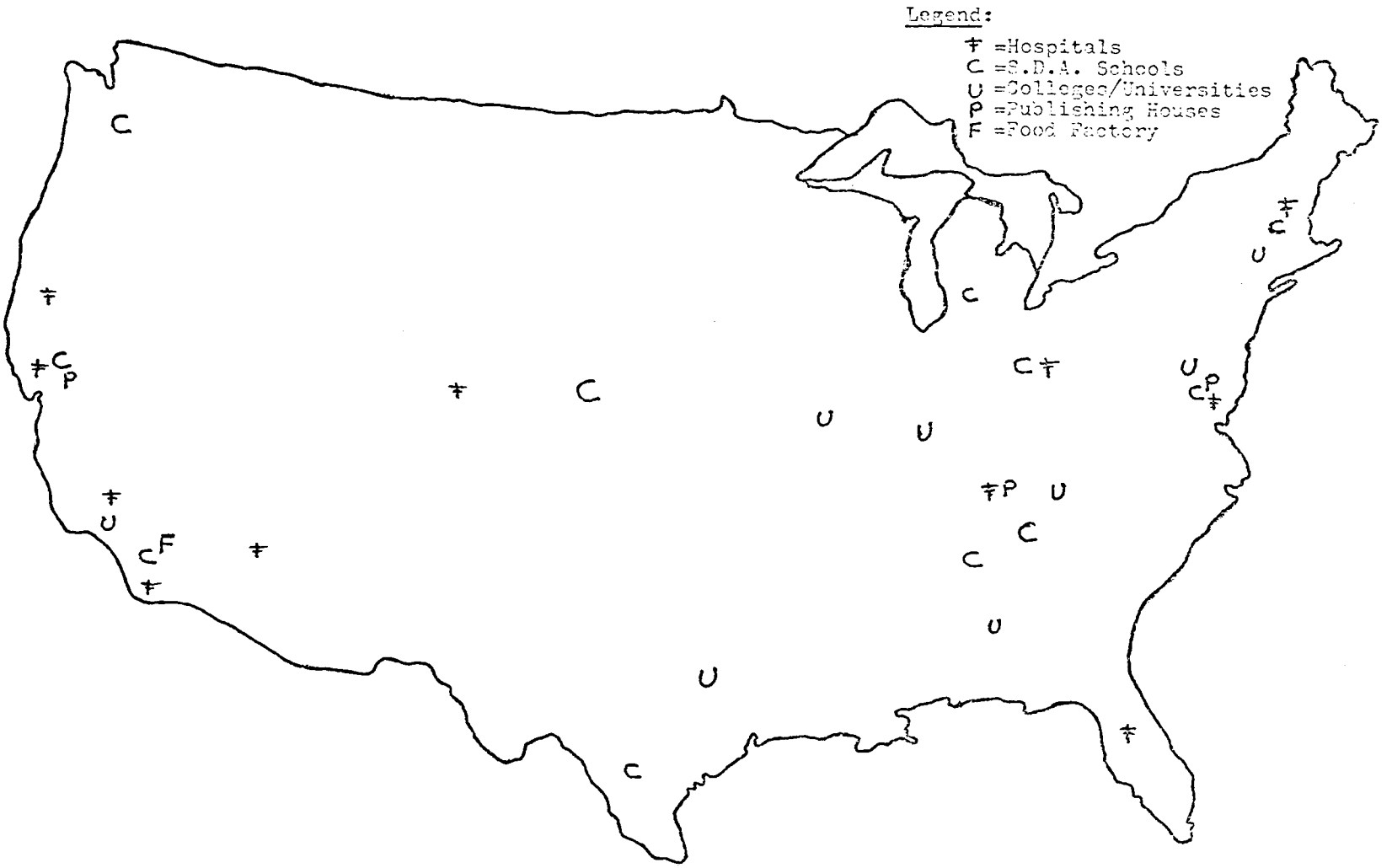

Figure 20. Map showing the location of the S.D.A. institutions and the location of the other colleges and universities selected for the study.

APPENDIX B

QUESTIONNAIRE MAILED TO THE FRESHMAN STUDENTS

QUESTIONNAIRE

The information in this questionnaire will be treated as confidential and will be used for statistical purpose only.

The questions in this survey are of two basic types: some may be answered by marking an "X" in the parenthesis and others will require writing a number in the parenthesis -(1)-

1. While attending High-School ( ) or Academy ( ), did you take any safety courses? Yes ( ) No ( )

2. Do you associate SAFETY with? -Indicate your order of preference by ranking in order of importance, 1, 2, 3, etc.-

a. Driver Education	( )	e. Constructions	( )	i. Homes	( )
b. Industrial Education	( )	f. Schools	( )	j. Civil Defense	( )
c. First-Aid	( )	g. Fire	( )	k. Aviation	( )
d. Industries	( )	h. Sports	( )	j. Hospitals	( )

3. Which of the following courses would you consider taking as an elective? -Indicate your order of preference by ranking in order of importance, 1, 2, 3, etc.-

a. Basic Safety Management	( )	f. Safety in Sports	( )
b. Safety in Health Care Institutions	( )	g. Environmental Health	( )
c. Driver Education	( )	h. Advanced First Aid	( )
d. Occupational Safety	( )	i. Fire Prevention	( )
e. Disaster Preparedness	( )	j. Safety Education	( )

4. If offered, which of the following minors would you consider taking? -Indicate your order of preference by ranking in order of importance, 1, 2, 3, etc.-

a. Safety Education	( )	d. Traffic Safety	( )
b. Occupational Safety and Health	( )	e. Fire Safety	( )
c. Safety Management	( )	f. Industrial Safety	( )

5. If offered, would you consider Safety as your major area? Yes ( ) No ( ). If your answer is NO, omit question #6.

6. Indicate the major area of preference that you would like to see offered by ranking 1, 2, 3, and 4, in order of importance to you.

a. Safety Management	( )	c. Safety Education	( )
b. Occupational Safety and Health	( )	d. Industrial Safety	( )

7. Do you think a "safety course" should be required to every student? Yes ( ) No ( ). -If your answer to this question is NO, omit question #8-

8. Which of the following courses do you think should be required? -Select ONLY ONE-

a. Introduction to Safety	( )	c. Advanced First Aid	( )	e. Safety in Sports	( )
b. Occupational Safety	( )	d. Safety Management	( )	f. Traffic Safety	( )

9. If you receive a B.S. degree in Safety, which of the following occupations would you select? -Indicate your preference by ranking in order of importance, 1, 2, 3, etc.-

a. Safety Inspector (State or Fed.)	( )	d. Safety Director (School or Hospital)	( )
b. Safety Inspector (Insurance Co.)	( )	e. Safety Instructor (Jr. College)	( )
c. Safety Coordinator (Industrial)	( )	f. Driver/Traffic Safety Instructor	( )

-PLEASE RETURN THIS QUESTIONNAIRE IN THE PAID ENVELOPE ENCLOSED-

APPENDIX C

QUESTIONNAIRE MAILED TO THE ADMINISTRATORS

QUESTIONNAIRE

The information in this questionnaire will be treated as confidential and will be used for statistical purpose only.

The questions in this survey are of two basic types: some may be answered by marking an "X" in the parenthesis -(X)-, others will require writing a number in the parenthesis -(1), or (2), or (3), etc.- Please, be sure to follow these instructions.

1. The position of Safety Director, Coordinator, or Compliance Officer is:

   a. Held by a full-time employee in that function ( )
   b. The responsibility of someone on Staff assigned safety as a part-time function ( )
   c. To be filled as soon as a qualified person is available ( )
   d. Do not plan to have one ( )

2. A Safety Policy:

   a. Has been written and approved by the Administration ( )
   b. Is being written at the present time ( )
   c. Planning to write one during 1978 ( )
   d. Do not intend to write one ( )

3. A Safety Manual:

   a. Has been written and approved by the Administration ( )
   b. Is being written at the present time ( )
   c. Should be written by December, 1978 ( )
   d. Do not plan to write one ( )

4. The Safety Committee has been appointed:

   a. None has been appointed yet ( ) c. Yes, holds meetings bimonthly ( )
   b. Yes, holds meetings monthly ( ) d. Yes, holds meetings quarterly ( )

5. Which of the following will best describe your safety program?

   a. Well established, operational and communicated to all employees ( )
   b. Well developed but in the process of implementation ( )
   c. In the process of developing one ( )
   d. Planning to develop one by June, 1978 ( )

6. Is "occupational safety" a part of the orientation program for new employees? Yes ( ) No ( )

7. Is employee safety included in the retraining program of present employees? Yes ( ) No ( )

8. What percentage of the Staff are "Certified Red Cross First Aiders"?

   a. 100% ( ) c. More than 50% ( ) e. Less than 25% ( )
   b. More than 75% ( ) d. More than 25% ( ) f. None ( )

9. Has an emergency disaster and evacuation plan been implemented for fire, tornados, etc. Yes ( ) No ( ) Being Developed ( ).

10. How often are "fire drills" conducted:

    a. Annually ( ) b. Semiannually ( ) c. Quarterly ( ) d. Monthly ( )

11. The fire extinguishers are inspected:

    a. Annually ( ) b. Semiannually ( ) c. Quarterly ( ) d. Monthly ( )

12. Is an investigation conducted after each "lost time" accident? Yes ( ) No ( ).

13. Have funds been allocated in the budget for a Safety Program? Yes ( ) No ( ).

14. Which of the following areas are included in your safety program? Mark all applicable boxes.

a. Safety Inspections	( )	g. First Aid and Emergency Care	( )
b. Safety Audits	( )	h. Occupational Safety	( )
c. Radiation Safety	( )	i. Environmental Health	( )
d. Biohazards	( )	j. Disaster Preparedness	( )
e. Solid Waste Disposal	( )	k. Fire Safety	( )
f. Pest Control	( )	l. Workmen's Compensation	( )

15. Has the institution received any specific requests from the authorities (OSHA, The Joint Commission on Accreditation, etc.) concerning the need for improving the safety program? Yes ( ) No ( ).

16. If B.S. degree in the field of Safety were to be offered by one of the S.D.A. colleges in the U.S., which area of safety would you favor as a major emphasis in the curriculum? -Indicate your preference by ranking in order of importance, (1), (2), (3), etc.

a. Safety Education	( )	d. Environmental Health and Safety	( )
b. Occupational Health and Safety	( )	e. Traffic Safety	( )
c. Safety Administration	( )	f. Industrial Safety	( )

17. Which of the following courses would you recommend as a part of a four-year Safety Curriculum? -Indicate your preference by ranking in order of importance-

a. Basic Safety Management	( )	j. Safety in Health Care Institutions	( )
b. Princ. of Safety Administration	( )	k. Occupational Safety	( )
c. First Aid and Emergency Care	( )	l. Civil & Disaster Preparedness	( )
d. Safety Education	( )	m. Driver Education	( )
e. Health Care and Safety	( )	n. Fire Prevention	( )
f. School Safety	( )	o. Occupational Health	( )
g. Safety in Sports	( )	p. Industrial Safety	( )
h. Environmental Health	( )	q. Risk Management	( )
i. Industrial Hygiene	( )	r. Total Loss Control	( )

18. Which minor area would you recommend in conjunction with a B.S. in Safety? -Indicate your preference by ranking in order of importance (1), (2), (3), etc.-

a. Business Administration	( )	e. Personnel Management	( )
b. Health Education	( )	f. Public Relations	( )
c. Industrial Education	( )	g. Environmental Health	( )
d. Psychology	( )	h. Counseling	( )

19. Would you employ a qualified graduate with a degree in Safety to be the Director or Coordinator of the Safety Program in your institution? Yes ( ) No ( ).

-PLEASE RETURN THIS QUESTIONNAIRE IN THE PAID ENVELOPE ENCLOSED-

APPENDIX D

LETTER REQUESTING AUTHORIZATION TO CONDUCT THE SURVEY

October 20, 1977

General Conference of S.D.A.
C. B. Hirsch, Ph.D.
Takoma Park, Washington, D.C.

Dear Doctor Hirsch:

I am enrolled in the Doctoral Program in Health Education (with emphasis in Safety), at the University of Tennessee, School of Health, Physical Education, and Recreation. I was admitted to candidacy in October, 1975.

I am an alumnus of C.U.C. In 1961, the year I graduated, you were the President of the College. I have eighteen years of Denominational service. My last Denominational employment with with L.L.U. from 1968-1976.

The title of my Doctoral Dissertation is, "A Proposed Four-Year Safety Curriculum for the Seventh-Day Adventist Colleges in the United States." Chapter III of my Dissertation Proposal, "Methods and Procedures," calls for:

C. Survey of the freshman students attending some of the S.D.A. colleges and universities.
D. Survey of Administrators and Safety Directors of some of the S.D.A. institutions.

Two years ago I visited with Dr. Walter J. Brown, at that time Acting Director, Department of Education, and we talked for a while regarding my doctoral program, my dissertation proposal, and the survey that I was planning to conduct. Dr. Brown agreed at that time to write a letter authorizing the study. I was supposed to let him know when I needed the letter.

I have been informed that the responsibilities in the Department of Education have been readjusted and that you are now responsible for the North America Division. This is the reason why this letter is being addressed to you.

The purpose of this letter is to request from your office a letter authorizing the conduction of a survey among a random sampling of the freshman students attending Andrews University, Columbia Union College, Pacific Union College, Southern Missionary College, and Walla Walla College, and also among the Administrators and Safety Directors of some of the S.D.A. Hospitals, Publishing Houses, and Food Factories.

The success of this study will greatly depend upon your assistance.

Sincerely,

Samuel Espinosa, MA., MS.
Doctoral Teaching Assistant
The University of Tennessee
Division of Health and Safety
1914 Andy Holt Ave., Room 371
Knoxville, TN 37916

APPENDIX E

LETTER AUTHORIZING THE SURVEY

General Conference of Seventh-Day Adventists
6840 Eastern Avenue, NW.
Washington, D.C. 20012

November 3, 1977

Presidents of Colleges and Universities
Administrators of Hospitals
General Managers of Publishing Houses
President of Loma Linda Food Company
NORTH AMERICAN DIVISION

Dear Friends:

Mr. Samuel Espinosa, a doctoral teaching assistant at the University of Tennessee, has asked the General Conference Department of Education to endorse a survey in connection with his doctoral dissertation, "A Proposed Four-Year Safety Curriculum for the Seventh-Day Adventist Colleges in the United States." Mr. Espinosa is a graduate of Columbia Union College, is known by Dr. Hirsch, and has discussed his dissertation proposal with Dr. Walton J. Brown. It appears that valuable insights on safety could accrue from his study.

We recommend that Mr. Espinosa be permitted to survey select freshmen in the colleges and administrators and safety directors of other institutions. Courtesies shown to Mr. Espinosa will be appreciated.

Kindest Christian greetings.

Cordially,

Garland J. Millet
Associate Director

GJM:erw

APPENDIX F

LETTER REQUESTING THE LIST OF FRESHMAN STUDENTS

November 11, 1977

Dear Registrar:

I am enrolled in the Doctoral Program in Health Education (with emphasis in Safety), at the University of Tennessee, School of Health, Physical Education, and Recreation. I was admitted to candidacy in October, 1975. I attended S.M.C. from 1955 to 1957. I am an alumnus of C.U.C. and L.L.U.

The title of my Doctoral Dissertation is, "A Proposed Four-Year Safety Curriculum for the Seventh-Day Adventists Colleges in the United States." Chapter III of my Dissertation Proposal, "Methods and Procedures," calls for:

C. Survey of the freshman students attending some of the S.D.A. colleges and universities.

From this survey I do hope to develop a better understanding of the possible need for a Safety Curriculum to be offered by one or more S.D.A. Colleges and to recommend such a curriculum to the S.D.A. Board of Higher Education.

I am requesting from your office a list of the 1977-78 college freshmen and their local addresses. A random sampling from your list will be made and a questionnaire will be mailed to the students selected. The questionnaires returned will be tabulated anonymously and the data will be kept in strict confidence. The success of the study will greatly depend upon your cooperation.

Enclosed there is a copy of a letter from Garland J. Millet, Associate Director, Department of Education, General Conference of S.D.A., authorizing this research study.

Thank you for your assistance and prompt reply.

Cordially,

Samuel Espinosa, M.A., M.S.
Doctoral Teaching Assistant
The University of Tennessee
1914 Andy Holt Ave., Room 371
Knoxville, TN 37916

Enc.

APPENDIX G

LETTER MAILED TO THE STUDENTS WITH THE QUESTIONNAIRE

January 3, 1977

Dear Student:

I am attending the University of Tennessee in Knoxville. I am planning to complete a Doctoral Program in Health Education with emphasis in Safety by the Spring Quarter. The title of my Doctoral Dissertation is "A Proposed Four-Year Safety Curriculum for the S.D.A. Colleges in the United States." I am a former student of S.M.C. and an alumnus of C.U.C. and L.L.U. I take this opportunity to wish you a happy and blessed 1978 as well as success in your college program.

I am conducting a research study on the possible interest that college freshmen might have in an Occupational Safety Program. From this study I do hope to develop a better understanding of the possible need for a Safety Curriculum to be offered by one or more S.D.A. Colleges.

I hope you will be willing to take a few minutes to answer the questions in the attached questionnaire and return it promptly in the paid envelope enclosed. The questionnaires returned will be tabulated anonymously and the data will be kept in strict confidence. You will be rendering valuable assistance in providing needed data in a study that could benefit students attending the S.D.A. colleges and who would like to obtain a college education in Occupational Safety, as well as those institutions needing trained personnel in this field.

The success of this study will greatly depend upon your assistance. Thank you for your prompt reply.

Cordially,

Samuel Espinosa, MA., MS.
Doctoral Teaching Assistant
THE UNIVERSITY OF TENNESSEE
1914 Andy Holt Ave., Room 371
Knoxville, TN 37916

Encl.

APPENDIX H

LETTER MAILED TO THE ADMINISTRATORS WITH THE QUESTIONNAIRE

December 14, 1977

I am a graduate student at the University of Tennessee, Knoxville, I do expect to complete my Doctoral Program in Health Education with emphasis in Safety by the end of the Spring Quarter. I was admitted to candidacy in October, 1975.

I have eighteen years of Denominational service. My last Denominational employment was with Loma Linda University. Between 1972 and 1976 I had the opportunity to develop a Safety Program for La Sierra Campus. In 1976 the National Safety Council awarded L.L.U. the "Award of Honor," the highest safety award given to educational institutions. I am a former student of S.M.C. and an alumnus of C.U.C. and L.L.U.

The title of my Doctoral Dissertation is, "A Proposed Four-Year Safety Curriculum for the S.D.A. Colleges in the United States." Chapter III of my Dissertation Proposal, "Methods and Procedures," calls for:

D. Survey of Administrators of some of the S.D.A. institutions.

The research study I am conducting will try to show the possible need that theS.D.A. institutions might have for trained personnel in the field of occupational safety, as well as the possible need for a Safety Curriculum to be offered by one or more S.D.A. colleges.

I hope you will be willing to take a few minutes to answer the questions in the enclosed questionnaire and return it promptly in the paid envelope included. The questionnaires returned will be tabulated anonymously and the data will be kept in strict confidence.

Enclosed is a copy of a letter from Garland J. Millet, Associate Director, Department of Education, General Conference of S.D.A., authorizing this research study.

The success of this study will greatly depend upon your assistance. Thanks for your prompt reply and a happy Holiday Season.

Cordially,

Samuel Espinosa, MA., MS.
Doctoral Teaching Assistant

Encl.

APPENDIX I

LETTER SENT TO THE SAFETY EDUCATORS

January 23, 1978

Dear _____:

I am attending the University of Tennessee in Knoxville, expecting completion of my Doctoral Program in Health Education with emphasis in Safety by the Spring Quarter, 1978.

The title of my doctoral dissertation is the "Development of a Four-Year Safety Curriculum for the Seventh-Day Adventist Colleges in the United States." Following the recommendation of my Doctoral Committee, I would like to request your assistance in submitting the information requested below:

1. In your opinion, what are the two or three most outstanding four-year curricular programs in Safety in the United States? Please identify the contact person with the complete address.

2. In your opinion, job opportunities for qualified graduates with a degree in one of the following areas in safety is: excellent, good, fair, or poor:

Areas

A. Industrial Safety
B. Safety Education
C. Occupational Safety and Health
D. Environmental Health and Safety
E. Safety Administration
F. Other _____

In your reply write next to the letters indicating the different areas listed here (A, B, C, D, E, etc.) the letter E for excellent, G for good, F for fair, and P for poor, depending on what you believe are the job opportunities in that area.

The members of my Doctoral Committee share the opinion that I should receive the information requested in this letter from authorities outside my Committee.

Looking forward to your reply and thanking you for your assistance, I do remain

Cordially,

Samuel Espinosa, MA., MS.
Doctoral Teaching Assistant

APPENDIX J

LETTER SENT TO THE SAFETY EDUCATORS DIRECTING THE OUTSTANDING PROGRAMS IN SAFETY

March 7, 1978

Dear _____:

I am attending the University of Tennessee in Knoxville, expecting completion of my Doctoral Program in Health Education with emphasis in Safety by the Spring Quarter, 1978. The title of my Doctoral Dissertation is the "Development of a Four-Year Safety Curriculum for the Seventh-Day Adventist Colleges in the United States."

Ten Safety Educators were contacted by mail and they were asked to identify the two or three most outstanding four-year curricular programs in Safety in the United States. Your school was one of the four identified.

Furthermore, the Safety Educators were asked to express their opinion concerning job opportunities for qualified graduates with a degree in one of several areas in Safety listed. According to the replies received, the job opportunities for the areas of Industrial Safety, Occupational Safety and Health, and Environmental Health and Safety are EXCELLENT, while the job opportunities for the areas of Safety Education and Safety Administration are FAIR.

Considering the possible limitations peculiar to many private, denominational supported educational institutions,

> Which of the three areas chosen as EXCELLENT for job opportunities should be selected for the development of a four-year safety curriculum? -Please indicate your preference by ranking in order of importance.-
>
> ( ) Environmental Health and Safety
> ( ) Industrial Safety
> ( ) Occupational Safety and Health

Please send a copy of the Safety Program(s) you are directing in order to have a guide to follow during the development of the recommended new safety program. Thank you.

Looking forward to your reply and thanking you for your assistance, I do remain,

Sincerely,

Samuel Espinosa, M.A., M.S.
Doctoral Teaching Assistant

APPENDIX K

TABLE WITH THE SAFETY COURSES OFFERED BY THE SCHOOLS (NON-S.D.A.) SELECTED FOR THE STUDY

TABLE XXVIII

SAFETY COURSES

Subject	School	S	Q	U	G
Accident and Disaster Control	Indiana	2		x	
Accident Prevention and Loss Control	Catonsville	3		x	
Administration of Safety Program	Indiana	3		x	x
Adult Programs in Safety Education	Missouri	2		x	
Aerospace Safety	U.S.C.	4		x	x
Alcohol and Traffic Safety	Texas A & M	3			x
Analysis and Measurements in Accident Prevention	U.S.C.	3		x	x
Aviation Management	Missouri	3		x	x
Aviation Safety	Missouri	3		x	x
Behavioral Factors in Traffic Safety	Texas A & M	3			x
Behavioral Problems in Safety Education and Accident Prevention	U.T.		3		x
Civil and Defense Education	U.T.		3		x
Civil Defence and Emergency Procedures	Missouri	2		x	x
Community Public Safety and Legal Services	Texas A & M	3		x	
Construction Safety	Missouri	3		x	x
Construction Safety and Health	Catonsville	3		x	
Consumer Health and Safety Education	U.T.		3	x	x
Corporate Safety	Indiana	3		x	
Current Developments in Traffic Safety Education	Missouri	3		x	x
Current Issues in Safety Education	U.T.		1-3		x
Design for Hazard Reduction	Auburn		4	x	
Design of Occupational Safety and Health System	Auburn		3	x	x
Directed Studies in Safety Programs	Missouri	1-6		x	x
Document and Personal Security	Missouri	3			x
Driver and Traffic Safety Education—Laboratory Program	Indiana	3		x	
Driver and Traffic Safety Education—Seminar	Indiana	3			x
Driver Education	Indiana	3		x	x
Driver Education for Handicapped	Indiana	2		x	x
Driver Education Laboratory Program	Indiana	3		x	
Driver Simulation Theory and Practice	Indiana	3			x
Driver and Traffic Safety Education	U.T.		5	x	x
Driver and Traffic Safety Education I	Missouri	3		x	
Driver and Traffic Safety Education, Advanced	U.T.		5		x
Driving and Traffic Safety Education II	Missouri	3		x	
Driving Improvement Programs and Techniques	Missouri	2			x
Driving Simulators and Multiple Car Driving Ranges	Missouri	3		x	x
Earthquake Resistant Structures I and II	U.T.		4	x	x
Elements of Industrial Hygiene	U.S.C.	4		x	x
Emergency Safety Service and Security	Indiana	3		x	
Environmental Control Systems I and II	U.T.		4	x	
Environmental Safety	Indiana	3		x	
Ergonomics III	Auburn		3	x	
Ergonomics IV	Auburn		3		x
Evaluation and Control of the Occupational Environment	Texas A & M	4			x
Experimental Design and Safety Research	U.S.C.	3			x
Farm Safety	Missouri	3		x	x
Federal and State Codes and Standards	Housatonic	3		x	
Field Experience in Safety	Missouri	3			x
Field Study	U.S.C.	2-4		x	x
Field Study—Internship	U.S.C.	2-4		x	x

TABLE XXVIII (Continued)

Subject	School	S	Q	U	G
Field Work—Safety Management	Indiana	6		x	
Fire Prevention and Protection	U.S.C.	4		x	x
Fire Prevention and Protection	Missouri	3		x	
Fire Protection	Housatonic	3		x	
Fire Protection and Hazardous Materials Safety	Indiana	3		x	
Fire Protection and Prevention	Texas A & M	2			x
Fire Protection in Structures	U.T.	4		x	x
Fire Science, Introduction	Missouri	3		x	
First Aid and Emergency Care	U.T.		4	x	x
First Aid and Emergency Care—Advanced	Missouri	2-3			x
First Aid and Personal Safety—Standard	Missouri	2-3		x	
First Aid and Safety	Catonsville	2		x	
First Aid Instruction	Catonsville	2		x	
Fixed Extinguishing and Alarm System	Missouri	3		x	x
Fundamentals of Safety Techniques	U.S.C.	2-4		x	x
Fundamentals of System Safety	U.S.C.	3			x
General Safety and Safety Education	Indiana	3			x
Highway Engineering I and II	U.T.	3		x	x
Human Factors Engineering, Introduction to	Texas A & M	3		x	
Human Factors in Accident Causation	U.S.C.	3			x
Human Factors in Accident Prevention	U.S.C.	2-4		x	x
Human Factors in Safety	Housatonic	3		x	
Human Factors in Safety	Catonsville	3		x	
Human Factors—Safety	U.S.C.	4		x	
Industrial Accident Prevention	Indiana	3		x	
Industrial Engineering Project	Auburn		1-5		x
Industrial Fire Hazards	Catonsville	3		x	
Industrial Hygiene	Housatonic	3		x	
Industrial Hygiene	Texas A & M	3		x	
Industrial Hygiene	Texas A & M	2			x
Industrial Hygiene, Advanced	Catonsville	3		x	
Industrial Hygiene, Introduction	Catonsville	3		x	
Industrial Hygiene, Principles	Missouri	3			x
Industrial Psychology System Safety	U.S.C.	4		x	x
Industrial Safety	U.T.		3	x	x
Industrial Safety	Texas A & M	3		x	
Industrial Safety II	Texas A & M	3		x	
Industrial Safety Engineering	Missouri	3			x
Industrial Safety Engineering	Texas A & M	3			x
Industrial Safety—Internship	U.S.C.	2-4		x	x
Industrial Safety, Introduction to	Texas A & M	2		x	
Industrial Toxicology	U.T.		3		x
Industrial Ventilation for Environmental Health and Safety	Missouri	3			x
Instruction and Techniques in Safety Education Evaluation	Texas A & M	3			x
Instruction Methods and Materials in Safety Education	Texas A & M	3		x	
Instructors', Advanced First Aid and Emergency Care	U.T.	3		x	x
Intermodal Aerospace—Water Transportation	Missouri	3			x
Internship	U.S.C.	2-4		x	
Internship and Research in Safety Education	U.T.		3-9		x
Internship in Safety	Missouri	1-6			x
Introduction to Acoustics and Noise Control	Auburn		3	x	
Introduction to General Safety	Indiana	3		x	
Introduction to Industrial Hygiene	Missouri	3		x	
Introduction to Safety and Health	U.S.C.	4		x	x
Introduction to Safety Education	Missouri	3		x	
Introduction to Safety Engineering	Missouri	3		x	
Investigation of Accidents	U.S.C.	3			x
Issues and Trends in Safety Education	Texas A & M	3			x

TABLE XXVIII (Continued)

Subject	School	S	Q	U	G
Legal Aspects of Safety	U.S.C.	3			x
Legal Aspects of Safety Programs	Missouri	3		x	x
Machine Guarding	Texas A & M	2			x
Management of Accident Prevention Programs	U.S.C.	3			x
Management of Safety Transportation Systems	Missouri	3			x
Motorcycle Safety Transportation Systems	Missouri	2		x	x
Motorcycle Traffic Work	Indiana	1		x	x
Motor Fleet Safety	Housatonic	3		x	
Motor Vehicle Law	Missouri	3		x	x
Occupational Accident Prevention	Auburn		3	x	
Occupational Accident Prevention, Advanced	Auburn		3		x
Occupational Hygiene Engineering I	Auburn		3	x	
Occupational Hygiene Engineering II	Auburn		3	x	
Occupational Safety	Indiana	3		x	
Occupational Safety and Health	U.T.		5		x
Occupational Safety and Health I	Catonsville	3		x	
Occupational Safety and Health II	Catonsville	3		x	
Occupational Safety and Health Engineering	Auburn	3		x	
Occupational Safety and Health, Introduction	Housatonic	3		x	
Occupational Safety and Health Laboratory	Auburn	3		x	
Occupational Safety and Health Legislation	Missouri	3			x
Occupational Safety Engineering, Fundamentals	Auburn	3		x	
Operations and Facilities Design I	Auburn	3		x	
Operations and Facilities Design II	Auburn	3		z	
Organization, Administration and Supervision of Safety Programs	Missouri	3			x
Organization, Administration, and Supervision of Safety Programs	U.T.		3		x
Philosophical Basis for Accident Prevention	U.S.C.	3			x
Physical Hazards I	Housatonic	3		x	x
Physical Hazards II	Housatonic	3		x	x
Principles of Accident Prevention	Missouri	3		x	x
Principles of General Safety	U.T.		3	x	
Problems and Research in Accident Prevention	U.T.		3		x
Problems in Environmental Health	U.S.C.	4			x
Problems in Industrial Safety	Texas A & M	2			x
Problems in Safety	U.T.		1-3	x	x
Product Safety Engineering	Texas A & M	3			x
Professional Development in Safety Education	Texas A & M	3			x
Psychology in Safety and Accident Prevention	Missouri	2		x	x
Public Service, Current Literature and Research Techniques	Missouri	3			x
Quantitative Methods of Safety Analysis	U.S.C.	3			x
Radiation Protection Engineering	Texas A & M	3		x	
Radiation Protection, Principles of	Texas A & M	3		x	
Radiology Safety	Texas A & M	2		x	
Reading in Safety	Missouri	1-5			x
Recognizing and Control of Physical and Health Hazards	Catonsville	3		x	
Regulatory Aspects of Safety	U.S.C.	3		x	x
Safety Application of Industrial Hygiene	U.S.C.	4		x	x
Safety Communication	U.S.C.	4		x	x
Safety Education	Catonsville	3		x	
Safety Education	Texas A & M	2		x	

TABLE XXVIII (Continued)

Subject	School	S	Q	U	G
Safety Education and Training	U.S.C.	4		x	x
Safety Education, Nature and Scope	Texas A & M	3		x	
Safety and Health Laboratory	Missouri	2		x	x
Safety and Health Standards	Catonsville	3		x	
Safety Engineering and Facilities Design	Texas A & M	3			x
Safety Engineering in Design of Transportation Systems	Texas A & M	3			x
Safety in Materials Handling	Texas A & M	2			x
Safety Management	Texas A & M	3		x	
Safety Methods	Indiana	3		x	
Safety of Chemicals and Propellants	U.S.C.	3			x
Safety, Philosophy of	Missouri	3		x	x
Safety Planning, Seminar	Indiana	3		x	
Safety Program Administration	U.S.C.	4		x	x
Safety Program Management	Housatonic	3		x	
Safety Supervision	Indiana	2		x	x
Sanitation	U.T.	3		x	x
School and College Accident Prevention	Texas A & M	3			x
School Safety	U.S.C.	3		x	x
School Shop Safety	U.T.		3	x	x
Seminar in Safety	Missouri	2			x
Solid Waste Management	U.T.	3		x	x
Special Projects in Safety	Missouri	1-3		x	x
Special Security Problems	Missouri	3			x
Sports Safety	U.T.		5	x	x
Structural Safety and Failure Analysis	U.S.C.	3			x
Supervision of School Transportation	Missouri	2			x
Survey of Safety Research and Evaluation Techniques	Indiana	3		x	x
System Analysis for Occupational Safety	Auburn		3	x	
System Safety	U.S.C.	4		x	x
System Safety Engineering	Texas A & M	3			x
Teaching Driver and Traffic Safety Education	Texas A & M	3		x	
Teaching Motorcycle Safety Education	Texas A & M	3		x	
Technical Aspects of Freight Vehicle Safety	U.S.C.	3			x
Technical Aspects of Motor Vehicle Safety	U.S.C.	3			x
Techniques of Industrial Hygiene	Housatonic	3		x	
Theory of Risk Management	U.T.	3		x	x
Topics in Human Engineering, Advanced	Auburn		3		x
Topics in Occupational Safety and Health	Auburn		3		x
Total Loss Control	Missouri	3			x
Traffic Administration and Control	Missouri	3		x	
Traffic and Transportation Safety	Indiana	3		x	
Traffic Engineering	U.T.	3		x	x
Traffic Engineering I	Missouri	2		x	x
Traffic Engineering II	Missouri	2		x	x
Traffic Management	U.T.	3		x	x
Traffic Safety	Indiana	3			x
Traffic Safety Communication	Texas A & M	3			x
Traffic Safety—Current Problems	Missouri	2			x
Traffic Safety Education—Curriculum Development	Missouri	3		x	x
Traffic Safety Education, Innovations	Texas A & M	3			x
Transportation Law and Regulations	Missouri	3			x
Transportation Safety	U.S.C.	4		x	x
Transportation Safety, Innovations in	Missouri	2			x
Urban Traffic Facilities	Texas A & M	3		x	
Water Systems Analysis	Missouri	3			x
Workmen's Compensation Legislation	Missouri	2			x
Workshop in Safety	U.T.		3-6	x	x

APPENDIX L

AVERAGE RANK SCORES FOR QUESTION TWO

TABLE XXIX

AVERAGE RANK SCORES FOR QUESTION TWO, "WITH WHICH DO YOU ASSOCIATE SAFETY?"

Safety Area	Average Rank Scores				Sum of Rank Scores	Average Rank Score	Rank Order
	A.U.	C.U.C.	P.U.C.	S.M.C.			
A. Driver Education	4.86	4.87	3.77	4.39	= 17.89 ÷ 4 =	4.47	3
B. First Aid	2.81	1.92	2.64	2.27	= 9.64 ÷ 4 =	2.41	1
C. Industry	6.32	6.70	6.67	7.10	= 26.79 ÷ 4 =	6.70	7
D. Construction	7.67	6.68	7.35	5.92	= 27.62 ÷ 4 =	6.91	8
E. School	5.86	6.00	5.23	5.52	= 22.61 ÷ 4 =	5.65	6
F. Fire	4.48	4.66	4.64	4.53	= 18.31 ÷ 4 =	4.58	4
G. Home	4.68	4.31	4.62	4.15	= 17.76 ÷ 4 =	4.44	2
H. Sports	7.54	8.26	7.88	8.17	= 31.85 ÷ 4 =	7.95	10
I. Civil Defense	7.83	6.68	7.64	7.65	= 29.80 ÷ 4 =	7.45	9
J. Hospital	6.33	4.42	5.35	6.02	= 22.12 ÷ 4 =	5.53	5
K. Aviation	9.10	9.05	8.55	8.33	= 35.03 ÷ 4 =	8.76	11
L. Farm	9.81	9.68	9.53	9.03	= 38.05 ÷ 4 =	9.51	12

TABLE XXX

RESPONSES OF FRESHMEN AT ANDREWS UNIVERSITY TO QUESTION TWO, "WITH WHICH DO YOU ASSOCIATE SAFETY?"

	Safety Area	1	2	3	4	5	6	7	8	9	10	11	12	Sum of Rank Scores	Average Rank Score	Rank Order
A.	Driver Education	10	20	27	56	35	42	21	56	27	40	33	12	= 379 ÷ 78 =	4.86	4
B.	First Aid	38	32	12	16	20	24	21	8	18	10	11	12	= 222 ÷ 79 =	2.81	1
C.	Industry	2	18	6	28	60	36	35	80	117	50	55	0	= 487 ÷ 77 =	6.32	6
D.	Construction	3	0	21	21	20	54	49	104	72	100	55	84	= 583 ÷ 76 =	7.67	9
E.	School	3	10	27	32	50	78	77	56	36	40	0	36	= 445 ÷ 76 =	5.86	5
F.	Fire	4	28	60	36	30	30	35	32	36	10	11	24	= 336 ÷ 75 =	4.48	2
G.	Home	11	18	30	36	45	48	42	24	63	0	22	12	= 351 ÷ 75 =	4.68	3
H.	Sports	1	6	15	8	40	48	42	72	63	110	110	132	= 543 ÷ 72 =	7.54	8
I.	Civil Defense	3	12	12	8	25	12	63	16	45	110	110	132	= 548 ÷ 70 =	7.83	10
J.	Hospital	3	12	21	36	40	30	35	72	63	30	66	48	= 456 ÷ 72 =	6.33	7
K.	Aviation	0	1	3	16	15	24	49	32	54	110	231	120	= 655 ÷ 72 =	9.10	11
L.	Farm	1	1	3	20	5	0	14	40	54	100	154	324	= 716 ÷ 73 =	9.81	12

TABLE XXXI

RESPONSES OF FRESHMEN AT COLUMBIA UNION COLLEGE TO QUESTION TWO, "WITH WHICH DO YOU ASSOCIATE SAFETY?"

	Safety Area	1	2	3	4	5	6	7	8	9	10	11	12	Sum of Rank Scores	Average Rank Score	Rank Order
A.	Driver Education	3	4	18	8	15	6	0	0	9	30	0	12	= 105 ÷ 22 =	4.77	5
B.	First Aid	15	10	3	12	0	0	0	8	0	0	0	0	= 48 ÷ 25 =	1.92	1
C.	Industry	0	2	3	0	25	18	0	18	27	10	11	0	= 114 ÷ 17 =	6.70	9
D.	Construction	0	2	0	12	10	6	14	16	27	40	0	0	= 127 ÷ 19 =	6.68	7
E.	School	0	0	9	0	25	18	28	24	0	10	0	0	= 114 ÷ 19 =	6.00	6
F.	Fire	2	14	9	0	5	12	7	0	18	20	11	0	= 98 ÷ 21 =	4.66	4
G.	Home	2	10	3	20	10	12	21	8	9	0	0	0	= 95 ÷ 22 =	4.31	2
H.	Sports	0	0	3	8	0	18	14	16	18	10	22	48	= 157 ÷ 19 =	8.26	10
I.	Civil Defense	1	8	12	4	0	12	7	0	9	0	22	72	= 147 ÷ 22 =	6.68	8
J.	Hospital	4	0	15	8	10	0	14	24	9	0	0	0	= 84 ÷ 19 =	4.42	3
K.	Aviation	0	4	0	8	0	6	0	24	0	40	99	0	= 181 ÷ 20 =	9.05	11
L.	Farm	0	0	0	4	0	0	14	16	27	30	9	84	= 184 ÷ 19 =	9.68	12

TABLE XXXII

RESPONSES OF FRESHMEN AT PACIFIC UNION COLLEGE TO QUESTION TWO, "WITH WHICH DO YOU ASSOCIATE SAFETY?"

	Safety Area	1	2	3	4	5	6	7	8	9	10	11	12	Sum of Rank Scores	Average Rank Score	Rank Order
A.	Driver Education	16	54	66	68	40	42	28	40	27	10	22	24	= 437 ÷ 116 =	3.77	2
B.	First Aid	72	44	27	28	35	12	21	32	54	10	22	0	= 357 ÷ 135 =	2.64	1
C.	Industry	10	8	21	20	50	54	105	176	90	130	110	12	= 774 ÷ 116 =	6.67	7
D.	Construction	3	10	9	40	30	60	70	104	117	110	165	24	= 742 ÷ 101 =	7.35	8
E.	School	0	28	45	32	90	144	91	72	90	80	55	0	= 727 ÷ 139 =	5.23	5
F.	Fire	6	36	69	76	70	54	63	24	18	40	33	54	= 543 ÷ 117 =	4.64	4
G.	Home	18	36	51	44	70	54	49	40	54	60	33	36	= 545 ÷ 118 =	4.62	3
H.	Sports	0	4	24	40	40	78	56	96	90	160	154	156	= 898 ÷ 114 =	7.88	10
I.	Civil Defense	8	6	21	32	45	66	42	64	63	140	88	288	= 863 ÷ 113 =	7.64	9
J.	Hospital	9	22	48	44	45	72	63	64	81	70	44	0	= 562 ÷ 105 =	5.35	6
K.	Aviation	1	6	6	20	25	36	112	80	135	110	209	192	= 209 ÷ 109 =	8.55	11
L.	Farm	0	0	12	0	15	18	63	88	152	170	220	348	= 1086 ÷ 114 =	9.53	12

TABLE XXXIII

RESPONSES OF FRESHMEN AT SOUTHERN MISSIONARY COLLEGE TO QUESTION TWO, "WITH WHICH DO YOU ASSOCIATE SAFETY?"

	Safety Area	1	2	3	4	5	6	7	8	9	10	11	12	Sum of Rank Scores	Average Rank Score	Rank Order
A.	Driver Education	9	18	51	20	40	24	35	0	27	20	22	24	= 290 ÷ 66 =	4.39	3
B.	First Aid	45	16	9	12	20	18	14	8	9	10	0	0	= 161 ÷ 71 =	2.27	1
C.	Industry	2	8	15	8	25	24	49	80	63	50	66	36	= 426 ÷ 60 =	7.10	8
D.	Construction	4	8	3	28	15	48	56	24	54	60	55	12	= 367 ÷ 62 =	5.92	6
E.	School	0	8	33	48	60	36	35	48	36	20	11	24	= 359 ÷ 65 =	5.52	5
F.	Fire	2	36	33	20	35	30	49	24	18	20	11	12	= 290 ÷ 64 =	4.53	4
G.	Home	6	16	21	36	45	42	10	8	18	10	22	36	= 270 ÷ 65 =	4.15	2
H.	Sports	1	2	9	20	25	63	21	48	36	90	88	120	= 523 ÷ 64 =	8.17	10
I.	Civil Defense	3	4	12	20	25	18	28	72	45	60	99	96	= 482 ÷ 63 =	7.65	9
J.	Hospital	0	26	18	28	15	30	49	96	36	30	33	36	= 397 ÷ 66 =	6.02	7
K.	Aviation	1	2	12	8	10	48	21	48	99	70	110	96	= 525 ÷ 63 =	8.33	11
L.	Farm	1	2	6	8	10	18	21	16	99	100	90	180	= 551 ÷ 61 =	9.03	12

APPENDIX M

AVERAGE RANK SCORES FOR QUESTION THREE

TABLE XXXIV

AVERAGE RANK SCORES FOR QUESTION THREE, "WHICH OF THE FOLLOWING COURSES WOULD YOU CONSIDER TAKING AS AN ELECTIVE?"

Safety Area	Average Rank Scores				Sum of Rank Scores	Average Rank Score	Rank Order
	A.U.	C.U.C.	P.U.C.	S.M.C.			
A. Safety in Health Care Institutions	6.74	6.20	6.36	6.35	= 25.65 ÷ 4 =	6.41	8
B. Safety Management and Loss Loss Control	8.97	9.69	9.02	8.09	= 35.77 ÷ 4 =	8.94	11
C. Driver Education	6.41	5.59	6.01	5.08	= 23.09 ÷ 4 =	5.77	6
D. Occupational Safety	7.65	7.10	6.74	5.80	= 27.29 ÷ 4 =	6.82	9
E. Industrial Hygiene	12.01	8.68	8.79	8.88	= 38.36 ÷ 4 =	9.59	12
F. Disaster Preparedness	5.76	4.77	5.05	5.95	= 21.53 ÷ 4 =	5.38	3
G. First Aid and Emergency Care	2.54	1.48	1.85	2.06	= 7.93 ÷ 4 =	1.98	1
H. Safety in Sports	6.77	7.56	7.63	7.05	= 29.01 ÷ 4 =	7.25	10
I. Environmental Health	5.26	4.81	4.89	5.74	= 20.76 ÷ 4 =	5.18	2
J. Fire Prevention	5.70	4.75	5.75	5.43	= 21.63 ÷ 4 =	5.41	4
K. Safety Education	5.36	5.60	5.40	5.46	= 21.82 ÷ 4 =	5.46	5
L. Community Safety	6.41	5.64	6.35	6.85	= 25.25 ÷ 4 =	6.31	7

TABLE XXXV

RESPONSES OF FRESHMEN AT ANDREWS UNIVERSITY TO QUESTION THREE, "WHICH OF THE FOLLOWING COURSES WOULD YOU CONSIDER TAKING AS AN ELECTIVE?"

	Safety Area	1	2	3	4	5	6	7	8	9	10	11	12	Sum of Rank Scores	Average Rank Score	Rank Order
A.	Safety in Health Care Institutions	5	8	30	16	30	48	35	48	45	30	77	120	= 492 ÷ 73 =	6.74	8
B.	Safety Management and Loss Control	5	6	6	12	10	12	49	48	72	150	99	168	= 637 ÷ 71 =	8.97	11
C.	Driver Education	4	12	21	16	55	66	14	56	72	60	33	72	= 481 ÷ 75 =	6.41	7
D.	Occupational Safety	0	10	9	12	35	78	42	32	117	70	132	60	= 597 ÷ 78 =	7.65	10
E.	Industrial Hygiene	1	0	3	4	10	18	49	48	81	70	176	204	= 664 ÷ 55 =	12.01	12
F.	Disaster Preparedness	2	18	21	28	55	66	42	64	9	30	44	36	= 415 ÷ 72 =	5.76	5
G.	First Aid and Emergency Care	46	18	18	24	5	12	14	8	36	20	0	0	= 201 ÷ 79 =	2.54	1
H.	Safety in Sports	6	14	12	12	35	12	56	56	45	60	77	96	= 481 ÷ 71 =	6.77	9
I.	Environmental Health	6	28	21	36	15	42	42	40	63	40	22	24	= 379 ÷ 72 =	5.26	2
J.	Fire Prevention	2	14	36	28	45	36	42	56	9	80	33	12	= 393 ÷ 69 =	5.70	4
K.	Safety Education	5	12	39	40	45	42	35	40	54	30	55	0	= 397 ÷ 74 =	5.36	3
L.	Community Safety	0	14	15	52	40	30	70	64	45	60	55	36	= 481 ÷ 75 =	6.41	6

TABLE XXXVI

RESPONSES OF FRESHMEN AT COLUMBIA UNION COLLEGE TO QUESTION THREE, "WHICH OF THE FOLLOWING COURSES WOULD YOU CONSIDER TAKING AS AN ELECTIVE?"

	Safety Area	1	2	3	4	5	6	7	8	9	10	11	12	Sum of Rank Scores	Average Rank Score	Rank Order
A.	Safety in Health Care Institutions	1	8	9	4	0	0	14	24	18	10	0	36	= 124 ÷ 20 =	6.20	8
B.	Safety Management and Loss Control	0	0	3	0	0	0	0	16	27	30	55	24	= 155 ÷ 16 =	9.69	12
C.	Driver Education	2	4	6	4	0	24	21	0	0	10	0	24	= 95 ÷ 17 =	5.59	5
D.	Occuapational Safety	2	2	6	4	10	0	0	32	0	30	44	12	= 142 ÷ 20 =	7.10	9
E.	Industrial Hygiene	0	0	9	0	0	12	14	0	18	20	44	48	= 165 ÷ 19 =	8.68	11
F.	Disaster Preparedness	1	8	12	12	20	0	7	16	9	20	0	0	= 105 ÷ 22 =	4.77	3
G.	First Aid and Emergency Care	20	8	3	4	5	0	0	0	0	0	0	0	= 40 ÷ 27 =	1.48	1
H.	Safety in Sports	0	4	6	4	0	6	14	16	9	30	11	36	= 136 ÷ 18 =	7.56	10
I.	Environmental Health	0	6	12	8	20	30	0	16	9	0	0	0	= 101 ÷ 21 =	4.81	4
J.	Fire Prevention	0	8	9	12	10	24	14	0	18	0	0	0	= 95 ÷ 20 =	4.75	2
K.	Safety Education	0	6	9	8	0	12	7	8	18	20	0	24	= 112 ÷ 20 =	5.60	6
L.	Community Safety	1	0	0	12	20	0	28	0	18	0	0	0	= 79 ÷ 14 =	5.64	7

TABLE XXXVII

RESPONSES OF FRESHMEN AT PACIFIC UNION COLLEGE TO QUESTION THREE, "WHICH OF THE FOLLOWING COURSES WOULD YOU CONSIDER TAKING AS AN ELECTIVE?"

	Safety Area	1	2	3	4	5	6	7	8	9	10	11	12	Sum of Rank Scores	Average Rank Score	Rank Order
A.	Safety in Health Care Instititions	7	16	42	44	20	48	84	80	54	100	77	96	= 668 ÷ 105 =	6.36	8
B.	Safety Management and Loss Control	3	8	9	12	15	18	49	24	90	180	275	228	= 911 ÷ 101 =	9.02	12
C.	Driver Education	13	38	18	40	35	36	49	56	117	60	55	156	= 673 ÷ 112 =	6.01	6
D.	Occupational Safety	4	10	24	24	65	60	112	96	153	120	55	12	735 ÷ 109 =	6.74	9
E.	Industrial Hygiene	1	4	18	4	20	42	28	88	90	190	231	228	944 ÷ 105 =	8.99	11
F.	Disaster Preparedness	9	22	42	84	50	96	42	80	45	30	44	12	556 ÷ 110 =	5.05	3
G.	First Aid and Emergency Care	75	42	42	8	20	6	7	24	0	0	0	0	224 ÷ 121 =	1.85	1
H.	Safety in Sports	6	24	15	36	45	36	112	40	171	70	176	300	1030 ÷ 135 =	7.63	10
I.	Environmental Health	8	48	39	56	45	48	35	45	45	50	88	36	543 ÷ 111 =	4.89	2
J.	Fire Prevention	2	18	69	52	120	90	77	40	27	80	33	48	656 ÷ 114 =	5.75	5
K.	Safety Education	3	30	42	48	90	120	42	45	63	40	33	60	616 ÷ 114 =	5.40	4
L.	Community Safety	4	14	12	52	50	66	49	152	117	80	22	36	654 ÷ 103 =	6.35	7

TABLE XXXVIII

RESPONSES OF FRESHMEN AT SOUTHERN MISSIONARY COLLEGE TO QUESTION THREE, "WHICH OF THE FOLLOWING COURSES WOULD YOU CONSIDER TAKING AS AN ELECTIVE?"

	Safety Area	1	2	3	4	5	6	7	8	9	10	11	12	Sum of Rank Scores	Average Rank Score	Rank Order
A.	Safety in Health Care Institutions	3	12	33	20	20	24	21	24	36	60	44	84	= 381 ÷ 60 =	6.35	8
B.	Safety Management and Loss Control	1	4	9	12	20	36	21	24	72	70	132	60	= 461 ÷ 57 =	8.09	11
C.	Driver Education	11	16	24	36	5	18	28	40	27	30	44	36	= 315 ÷ 62 =	5.08	2
D.	Occupational Safety	0	4	12	40	25	24	42	48	36	30	44	36	= 319 ÷ 55 =	5.80	6
E.	Industrial Hygiene	0	0	6	8	35	12	28	32	18	140	110	108	= 497 ÷ 56 =	8.88	
F.	Disaster Preparedness	4	16	6	24	55	18	21	64	72	10	55	12	= 357 ÷ 60 =	5.95	7
G.	First Aid and Emergency Care	44	28	9	12	5	12	0	16	9	0	11	0	= 146 ÷ 71 =	2.06	1
H.	Safety in Sports	2	14	12	4	20	36	63	16	45	30	33	120	= 395 ÷ 56 =	7.05	10
I.	Environmental Health	2	16	39	12	5	54	42	48	54	40	44	0	= 356 ÷ 62 =	5.74	5
J.	Fire Prevention	0	22	30	20	45	18	35	32	27	40	22	24	= 315 ÷ 58 =	5.43	3
K.	Safety Education	5	10	24	32	55	24	35	16	54	20	22	36	= 333 ÷ 61 =	5.46	4
L.	Community Safety	0	4	15	24	30	30	56	72	18	50	11	60	= 370 ÷ 54 =	6.85	9

APPENDIX N

AVERAGE RANK SCORES FOR QUESTION FOUR

TABLE XXXIX

AVERAGE RANK SCORES FOR QUESTION FOUR, "IF OFFERED, WHICH OF THE FOLLOWING MINORS WOULD YOU CONSIDER TAKING?"

Safety Area	Average Rank Scores				Sum of Rank Scores	Average Rank Score	Rank Order
	A.U.	C.U.C.	P.U.C.	S.M.C.			
A. Safety Education	2.83	2.76	2.76	2.63	= 10.98 ÷ 4 =	2.75	2
B. Occupational Health and Safety	3.16	3.08	2.74	3.33	= 12.31 ÷ 4 =	3.08	3
C. Safety Administration	3.51	4.05	3.62	3.35	= 14.53 ÷ 4 =	3.63	4
D. Community Health and Safety	2.18	2.13	2.29	2.37	= 8.97 ÷ 4 =	2.24	1
E. Industrial Hygiene	4.97	4.42	4.45	4.66	= 18.50 ÷ 4 =	4.63	6
F. Traffic Safety	3.93	3.52	3.96	3.50	= 14.91 ÷ 4 =	3.73	5

TABLE XL

RESPONSES OF FRESHMEN AT ANDREWS UNIVERSITY TO QUESTION FOUR, "IF OFFERED, WHICH OF THE FOLLOWING MINORS WOULD YOU CONSIDER TAKING?"

Safety Area	1	2	3	4	5	6	Sum of Rank Scores	Average Rank Score	Rank Order
A. Safety Education	13	46	60	40	20	36	= 215 ÷ 76 =	2.83	2
B. Occupational Health and Safety	9	30	69	76	35	24	= 243 ÷ 77 =	3.16	3
C. Safety Administration	17	26	21	44	60	102	= 270 ÷ 77 =	3.51	4
D. Community Health and Safety	35	30	27	40	4	36	= 172 ÷ 79 =	2.18	1
E. Industrial Hygiene	1	4	12	44	150	162	= 373 ÷ 75 =	4.97	6
F. Traffic Safety	4	26	45	56	90	90	= 311 ÷ 79 =	3.93	5

TABLE XLI

RESPONSES OF FRESHMEN AT COLUMBIA UNION COLLEGE TO QUESTION FOUR, "IF OFFERED, WHICH OF THE FOLLOWING MINORS WOULD YOU CONSIDER TAKING?"

Safety Area	1	2	3	4	5	6	Sum of Rank Scores	Average Rank Score	Rank Order
A. Safety Education	4	4	9	8	5	6	= 36 ÷ 13 =	2.76	2
B. Occupational Health and Safety	5	6	15	24	15	6	= 71 ÷ 23 =	3.08	3
C. Safety Administration	0	6	15	8	20	24	= 73 ÷ 18 =	4.05	5
D. Community Health and Safety	12	6	12	8	5	6	= 49 ÷ 23 =	2.13	1
E. Industrial Hygiene	1	2	9	12	30	30	= 84 ÷ 19 =	4.42	6
F. Traffic Safety	3	6	9	8	10	24	= 60 ÷ 17 =	3.52	4

TABLE XLII

RESPONSES OF FRESHMEN AT PACIFIC UNION COLLEGE TO QUESTION FOUR, "IF OFFERED, WHICH OF THE FOLLOWING MINORS WOULD YOU CONSIDER TAKING?"

Safety Area	1	2	3	4	5	6	Sum of Rank Scores	Average Rank Score	Rank Order
A. Safety Education	28	52	78	60	50	42	= 310 ÷ 112	= 2.76	3
B. Occupational Health and Safety	22	50	81	92	30	24	= 299 ÷ 109	= 2.74	2
C. Safety Administration	15	42	48	68	100	126	= 399 ÷ 110	= 3.62	4
D. Community Health and Safety	49	52	57	48	35	30	= 271 ÷ 118	= 2.29	1
E. Industrial Hygiene	2	22	48	68	115	204	= 459 ÷ 103	= 4.45	6
F. Traffic Safety	12	30	57	48	145	156	= 448 ÷ 113	= 3.96	5

TABLE XLIII

RESPONSES OF FRESHMEN AT SOUTHERN MISSIONARY COLLEGE TO QUESTION FOUR, "IF OFFERED, WHICH OF THE FOLLOWING MINORS WOULD YOU CONSIDER TAKING?"

Safety Area	1	2	3	4	5	6	Sum of Rank Scores	Average Rank Score	Rank Order
A. Safety Education	19	32	54	24	20	30	= 179 ÷ 68 =	2.63	2
B. Occupational Health and Safety	8	36	15	40	50	48	= 197 ÷ 59 =	3.33	3
C. Safety Administration	15	12	27	48	70	36	= 208 ÷ 62 =	3.35	4
D. Community Health and Safety	23	28	57	24	15	12	= 159 ÷ 67 =	2.37	1
E. Industrial Hygiene	2	10	12	40	65	132	= 261 ÷ 56 =	4.66	6
F. Traffic Safety	8	24	36	44	45	60	= 217 ÷ 62 =	3.50	5

APPENDIX O

AVERAGE RANK SCORES FOR QUESTION SIX

TABLE XLIV

AVERAGE RANK SCORES FOR QUESTION SIX, "INDICATE THE MAJOR AREA OF PREFERENCE"

Safety Area	Average Rank Scores				Sum of Rank Scores	Average Rank Score	Rank Order
	A.U.	C.U.C.	P.U.C.	S.M.C.			
A. Safety Education	2.00	1.00	1.95	1.64	= 6.59 ÷ 4 =	1.65	1
B. Occupational Health and Safety	2.13	2.43	1.81	1.90	= 8.27 ÷ 4 =	2.07	2
C. Industrial Safety	3.07	3.14	3.27	3.50	= 12.98 ÷ 4 =	3.25	4
D. Safety Administration	2.60	3.43	2.95	2.82	= 11.80 ÷ 4 =	2.95	3

TABLE XLV

RESPONSES OF FRESHMEN AT ANDREWS UNIVERSITY TO QUESTION SIX, "INDICATE THE MAJOR AREA OF PREFERENCE"

Safety Area	1	2	3	4	Sum of Rank Scores	Average Rank Score	Rank Order
A. Safety Education	6	10	6	8	= 30 ÷ 15 =	2.00	1
B. Occupational Health and Safety	6	6	12	8	= 32 ÷ 15 =	2.13	2
C. Industrial Safety	1	6	12	24	= 43 ÷ 14 =	3.07	4
D. Safety Administration	3	8	12	16	= 39 ÷ 15 =	2.60	3

TABLE XLVI

RESPONSES OF FRESHMEN AT COLUMBIA UNION COLLEGE TO QUESTION SIX, "INDICATE THE MAJOR AREA OF PREFERENCE"

Safety Area	1	2	3	4	Sum of Rank Scores		Average Rank Score	Rank Order
A. Safety Education	7	0	0	0	7	7	1.00	1
B. Occupational Health and Safety	0	8	9	0	17	7	2.43	2
C. Industrial Safety	0	4	6	12	22	7	3.14	4
D. Safety Administration	0	2	6	16	24	7	3.43	3

TABLE XLVII

RESPONSES OF FRESHMEN AT PACIFIC UNION COLLEGE TO QUESTION SIX, "INDICATE THE MAJOR AREA OF PREFERENCE"

Safety Area	1	2	3	4	Sum of Rank Scores	Average Rank Score	Rank Order
A. Safety Education	8	16	15	4	= 43 ÷ 22 =	1.95	1
B. Occupational Health and Safety	11	8	15	4	= 38 ÷ 21 =	1.81	2
C. Industrial Safety	0	10	18	44	= 72 ÷ 22 =	2.95	4
D. Safety Administration	3	8	18	36	= 65 ÷ 22 =	2.95	3

TABLE XLVIII

RESPONSES OF FRESHMEN AT SOUTHERN MISSIONARY COLLEGE TO QUESTION SIX, "INDICATE THE MAJOR AREA OF PREFERENCE"

Safety Area	1	2	3	4	Sum of Rank Scores	Average Rank Score	Rank Order
A. Safety Education	5	10	3	0	= 18 ÷ 11 =	1.64	1
B. Occupational Health and Safety	5	4	6	4	= 19 ÷ 10 =	1.90	2
C. Industrial Safety	0	0	15	20	= 35 ÷ 10 =	3.50	4
D. Safety Administration	2	4	9	16	= 31 ÷ 11 =	2.82	3

APPENDIX P

AVERAGE RANK SCORES FOR QUESTION NINE

TABLE XLIX

AVERAGE RANK SCORES FOR QUESTION NINE, "IF YOU RECEIVE A B.S. DEGREE IN SAFETY, WHICH OF THE FOLLOWING OCCUPATIONS WOULD YOU SELECT?"

Safety Area	Average Rank Scores				Sum of Rank Scores	Average Rank Score	Rank Order
	A.U.	C.U.C.	P.U.C.	S.M.C.			
A. Compliance Officer (State or Federal)	3.84	3.55	4.29	4.22	= 15.90 ÷ 4 =	3.98	5
B. Safety Inspector (Insurance Company)	3.78	3.61	3.86	3.83	= 15.08 ÷ 4 =	3.77	4
C. Safety Director (Industrial)	4.42	4.18	3.52	3.96	= 16.08 ÷ 4 =	4.02	6
D. Safety Director (Hospital or University)	2.09	2.44	1.92	2.09	= 8.54 ÷ 4 =	2.14	1
E. Safety Instructor (Junior College)	3.05	2.73	2.68	2.68	= 11.14 ÷ 4 =	2.79	2
F. Driver/Traffic Safety Instructor	3.33	3.33	3.42	3.15	= 13.23 ÷ 4 =	3.31	3

TABLE L

RESPONSES OF FRESHMEN AT ANDREWS UNIVERSITY TO QUESTION NINE, "IF YOU RECEIVE A B.S. DEGREE IN SAFETY, WHICH OF THE FOLLOWING OCCUPATIONS WOULD YOU SELECT?"

Safety Area	1	2	3	4	5	6	Sum of Rank Scores	Average Rank Score	Rank Order
A. Compliance Officer (State or Federal)	9	16	36	72	55	96	= 284 ÷ 74 =	3.84	5
B. Safety Inspector (Insurance Company)	12	14	18	76	90	66	= 276 ÷ 73 =	3.78	4
C. Safety Director (Industrial)	4	10	27	56	95	126	= 318 ÷ 72 =	4.42	6
D. Safety Director (Hospital or Univ.)	34	32	57	12	20	6	= 161 ÷ 77 =	2.09	1
E. Safety Instructor (Junior College)	9	52	48	28	65	30	= 232 ÷ 76 =	3.05	2
F. Driver/Traffic Safety Instructor	11	32	36	40	15	96	= 230 ÷ 69 =	3.33	3

TABLE LI

RESPONSES OF FRESHMEN AT COLUMBIA UNION COLLEGE TO QUESTION NINE, "IF YOU RECEIVE A B.S. DEGREE IN SAFETY, WHICH OF THE FOLLOWING OCCUPATIONS WOULD YOU SELECT?"

	Safety Area	1	2	3	4	5	6		Sum of Rank Scores		Average Rank Score	Rank Order
A.	Compliance Officer (State or Federal)	4	8	9	12	15	30	=	78 ÷ 22	=	3.55	4
B.	Safety Inspector (Insurance Company)	2	8	15	0	20	24	=	69 ÷ 19	=	3.61	5
C.	Safety Director (Industrial)	1	0	12	20	35	24	=	92 ÷ 22	=	4.18	6
D.	Safety Director (Hospital or Univ.)	12	10	3	15	15	6	=	61 ÷ 25	=	2.44	1
E.	Safety Instructor (Junior College)	6	14	3	20	5	12	=	60 ÷ 22	=	2.73	2
F.	Driver/Traffic Safety Instructor	2	6	27	12	5	18	=	70 ÷ 21	=	3.33	3

TABLE LII

RESPONSES OF FRESHMEN AT PACIFIC UNION COLLEGE TO QUESTION NINE, "IF YOU RECEIVE A B.S. DEGREE IN SAFETY, WHICH OF THE FOLLOWING OCCUPATIONS WOULD YOU SELECT?"

	Safety Area	1	2	3	4	5	6		Sum of Rank Scores		Average Rank Score	Rank Order
A.	Compliance Officer (State or Federal)	11	24	33	44	95	222	=	429 ÷ 100	=	4.29	6
B.	Safety Inspector (Insurance Company)	12	22	57	60	145	102	=	398 ÷ 103	=	3.86	5
C.	Safety Director (Industrial)	11	36	54	140	95	48	=	384 ÷ 109	=	3.52	4
D.	Safety Director (Hospital or Univ.)	44	54	51	44	30	36	=	213 ÷ 111	=	1.92	1
E.	Safety Instructor (Junior College)	36	48	69	52	55	48	=	308 ÷ 115	=	2.68	2
F.	Driver/Traffic Safety Instructor	16	40	72	68	50	120	=	366 ÷ 107	=	3.42	3

TABLE LIII

RESPONSES OF FRESHMEN AT SOUTHERN MISSIONARY COLLEGE TO QUESTION NINE, "IF YOU RECEIVE A B.S. DEGREE IN SAFETY, WHICH OF THE FOLLOWING OCCUPATIONS WOULD YOU SELECT?"

	Safety Area	1	2	3	4	5	6	Sum of Rank Scores	Average Rank Score	Rank Order
A.	Compliance Officer (State or Federal)	4	12	24	32	60	96	= 228 ÷ 54 =	4.22	6
B.	Safety Inspector (Insurance Company)	6	10	24	52	65	42	= 199 ÷ 52 =	3.83	4
C.	Safety Director (Industrial)	3	12	24	68	45	54	= 206 ÷ 52 =	3.96	5
D.	Safety Director (Hospital or Univ.)	27	34	30	8	25	6	= 130 ÷ 62 =	2.09	1
E.	Safety Instructor (Junior College)	18	40	15	20	20	48	= 161 ÷ 60 =	2.68	2
F.	Driver/Traffic Safety Instructor	12	16	60	16	40	42	= 186 ÷ 59 =	3.15	3

APPENDIX Q

RESPONSES OF ADMINISTRATORS REGARDING AREA OF MAJOR EMPHASIS FAVORED FOR A B.S.

TABLE LIV

RESPONSES OF ADMINISTRATORS TO QUESTION SIXTEEN, AREA OF MAJOR EMPHASIS FAVORED FOR A B.S.

Safety Area	1	2	3	4	5	6	Sum of Rank Scores	Average Rank Score	Rank Order
A. Safety Education	4	6	9	12	0	0	= 31 ÷ 13	= 2.38	2
B. Occupational Health and Safety	3	12	6	4	5	0	= 30 ÷ 13	= 2.30	1
C. Safety Administration	3	6	3	16	5	0	= 39 ÷ 12	= 3.25	3
D. Environmental Health and Safety	2	4	12	4	10	12	= 44 ÷ 13	= 3.38	4
E. Traffic Safety	1	0	0	0	15	42	= 58 ÷ 11	= 5.27	6
F. Industrial Safety	2	2	12	8	20	6	= 50 ÷ 14	= 3.57	5

APPENDIX R

RESPONSES OF ADMINISTRATORS REGARDING COURSES RECOMMENDED AS PART OF A B.S. IN SAFETY

TABLE LV

RESPONSES OF ADMINISTRATORS TO QUESTION SEVENTEEN, COURSES RECOMMENDED AS PART OF A B.S. IN SAFETY

	Safety Area	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18		Sum of Rank Scores		Average Rank Score	Rank Order
A.	Basic Safety Management	6	0	6	4	0	0	0	16	0	0	0	0	0	0	0	0	0	0	=	32 ÷ 11	=	2.90	1
B.	Principles of Safety Admin.	2	6	0	4	5	6	14	0	0	0	0	0	0	0	0	0	0	0	=	37 ÷ 10	=	3.70	3
C.	First Aid and Emergency Care	2	0	0	4	0	6	0	0	9	10	0	12	13	0	0	0	17	0	=	73 ÷ 9	=	8.11	13
D.	Safety Education	1	0	3	8	0	0	0	0	27	0	11	0	0	0	15	0	0	0	=	65 ÷ 10	=	6.50	7
E.	Health Care and Safety	1	0	0	4	10	6	0	0	9	20	11	0	0	0	0	0	0	0	=	71 ÷ 9	=	7.88	11
F.	School Safety	0	0	0	0	0	6	0	0	0	0	0	0	0	0	0	64	0	18	=	88 ÷ 6	=	14.66	16
G.	Safety in Sports	0	0	0	0	5	0	0	0	0	0	0	0	0	0	15	0	51	18	=	89 ÷ 6	=	14.83	17
H.	Environmental Health	2	0	0	8	0	0	7	8	0	10	22	0	13	0	0	0	0	0	=	70 ÷ 10	=	7.00	9
I.	Industrial Hygiene	0	0	0	0	0	0	0	8	0	0	0	24	13	14	15	0	0	0	=	74 ÷ 6	=	12.33	15
J.	Safety in Health Care Inst.	5	4	3	0	5	0	0	8	0	0	0	0	0	0	0	0	0	18	=	43 ÷ 11	=	3.90	4
K.	Occupational Safety	0	2	9	0	5	0	0	0	0	0	11	12	0	0	0	0	17	0	=	56 ÷ 8	=	7.00	8
L.	Civil and Disaster	1	2	3	0	0	12	7	0	18	10	0	0	0	0	0	0	0	0	=	53 ÷ 9	=	5.88	5
M.	Driver Education	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	16	34	54	=	104 ÷ 6	=	17.33	18
N.	Fire Prevention	4	2	0	8	5	6	0	8	0	0	0	0	0	0	0	0	0	0	=	33 ÷ 10	=	3.30	2
O.	Occupational Health	2	0	6	0	5	0	14	0	9	20	0	0	13	0	0	0	0	0	=	69 ÷ 11	=	6.27	6
P.	Industrial Safety	2	0	3	8	0	0	0	0	0	0	11	12	0	28	15	0	0	0	=	79 ÷ 10	=	7.90	12
Q.	Risk Management	2	2	0	4	5	6	0	8	0	0	11	12	0	14	15	0	0	0	=	79 ÷ 11	=	7.18	10
R.	Total Loss Control	2	0	0	0	5	0	7	8	0	0	0	12	26	0	30	0	0	0	=	90 ÷ 10	=	9.00	14

APPENDIX S

RESPONSES OF ADMINISTRATORS REGARDING

MINOR AREA RECOMMENDED

TABLE LVI

RESPONSES OF ADMINISTRATORS TO QUESTION EIGHTEEN,
MINOR AREA RECOMMENDED

Safety Area	1	2	3	4	5	6	7	8	Sum of Rank Scores	Average Rank Score	Rank Order
A. Business Administration	3	4	0	0	5	12	7	8	= 39 ÷ 10 =	3.90	4
B. Health Education	1	6	6	12	5	6	0	0	= 36 ÷ 11 =	3.27	1
C. Industrial Education	3	6	0	4	5	6	0	16	= 40 ÷ 11 =	3.63	2
D. Psychology	2	2	3	0	15	0	7	8	= 37 ÷ 9 =	4.11	7
E. Personnel Management	2	2	9	8	0	12	7	0	= 40 ÷ 11 =	3.63	3
F. Public Relations	0	2	6	4	5	6	14	0	= 32 ÷ 8 =	4.00	5
G. Environmental Health	1	2	3	0	5	6	7	0	= 24 ÷ 6 =	4.00	6
H. Counseling	0	0	6	4	0	6	14	32	= 62 ÷ 10 =	6.20	8

APPENDIX T

SUMMARY OF SAFETY LEGISLATION PASSED

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August 7, 1789. The U.S. Lighthouse Service was created by Congress.

August 4, 1790. By Act of Congress the Revenue Cutter Service was authorized this day.

August 9, 1819. The New York City Common Council passed a law banning the use of velocipedes in public places and on the sidewalks of the city.

March 3, 1843. On this date the second Steamboat Inspection Act of Congress was signed into law.

March 3, 1847. The State of Massachusetts passed the first act appropriating funds for rendering assistance from shore to shipwrecked sailors.

July 28, 1852. The Steamboat Inspection Act was passed.

August 30, 1852. Congress passed the first effective steamboat safety law.

October 9, 1854. The Steamboat Inspection Board promulgated the rule that every vessel must have a steam whistle to be used in fog instead of a bell.

February 2, 1860. New York City first law requiring fire escapes for all buildings.

Early in 1869. A bill passed by the Pennsylvania State Legislature called for a single inspector for Schuylkill County.

February 9, 1870. Congress authorized the establishment of a national weather service.

October 9, 1870. The city of Chicago passed new building codes and standards, along with changes in insurance practices.

May 11, 1877. Massachusetts passed the first law in the country requiring safety guards on machinery and regular inspection by official inspector's of the state's factories.

Earlier in 1882. The American Transit Association was formed, and an accident prevention program was started almost immediately.

March 3, 1893. The first national Railroad Safety Appliance Act was passed.

March 3, 1899. The Refuse Act (under the River and Harbor Act) was passed to help in the effort to clean up the nation's waters.

October 30, 1903. The Rules for Driving were adopted by New York City this day. It was the first such traffic code in the world.

June 15, 1904. Congress passed legislation to tighten steamship laws, inspection requirements, and the equipment to be maintained aboard.

In 1905. New York passed a set of safety regulations, similar to the rules passed in London in 1900, for compressed air work, the first in our country.

In 1905. The Massachusetts legislature passed the first boiler construction code in our country.

August 1, 1908. The first federal Workmen's Compensation Act in the U.S.

July 1, 1910. The Bureau of Mines was created by Act of Congress.

March 25, 1911. A Bureau of Fire Prevention was added to the New York City Fire Department.

May 3, 1911. On this date the Wisconsin Industrial Commission was created.

March 4, 1913. The Sulzer Act was signed by President William Howard Taft, creating the Department of Labor.

July 1, 1913. A law passed by Congress placed such a high tax on white phosphorous, its use became prohibitive in industry.

Early in 1915. The Bureau of Mines approved Thomas Edison's battery-powered electric cap lamp.

July 11, 1916. President Woodrow Wilson signed the first federal highway aid act.

August 14, 1935. The Social Security Act was passed.

June 30, 1936. The Walsh-Healy Public Contracts Act was signed on this day.

In 1936. Congress created the Maritime Commission to control merchant marine shipping and passed other legislation to improve the safety standards of U.S. vessels.

May 18, 1938. New York University established its Center for Safety Education.

June 25, 1938. The Fair Labor Standards Act was signed.

November 28, 1942. After the Cocoanut Grove fire, Massachusetts laws and the fire codes in practically every American city and state were revised.

July 6, 1944. After the fire on the canvas of the Ringling Brothers Circus in Hartford, Conn., municipalities and states passed laws requiring fireproof finishes and proper exits for tent-type shows.

July 22, 1945. The Occupational Health Institute was founded by the American Occupational Medical Association on this day.

June 5, 1946. After the fire in the LaSalle Hotel in Chicago, fire marshals, the National Board of Fire Underwriters, and other experts, became convinced that hotels and all places of public gathering needed improvements in construction. A number of cities changed their building codes.

July 16, 1952. The Federal Coal Mine Safety Act was signed by President Truman.

June 30, 1953. Congress enacted the Flammable Fabrics Act.

August 23, 1958. The Longshoremen's and Harbor Workers' Compensation Act was amended on this day.

September 23, 1959. The Radiation Standards Act was enacted this day.

July 12, 1960. The Federal Hazardous Substances Labeling Act was signed into law this day.

September 9, 1966. The National Traffic and Motor Vehicle Safety Act was signed into law.

September 16, 1966. The Federal Metal and Nonmetallic Mine Safety Act became law.

November 3, 1966. The Federal Hazardous Substances Act was amended this date and was called the Child Protection Act of 1966.

November 20, 1967. Public Law 90-146 was a Joint Resolution passed by Congress on this day to create a National Commission on Product Safety. The result: passage of the Toy Safety Act, the Poison Prevention Packaging Act, new regulations under the Flammable Fabrics Act, and the addition of certain safety rules to HUD's various housing authorities. Later, a permanent Consumer Product Safety Commission was established.

December 14, 1967. The amendments to the Flammable Fabrics Act of 1953 of this date extended the coverage to all textile products used in clothing and household fabrics.

March 1, 1968. The Fire Research and Safety Act was signed on this date by President Lyndon B. Johnson.

August 12, 1968. The Natural Gas Pipeline Safety Act was signed into law this day.

August 9, 1969. On this date the Construction Safety Act was signed into law.

November 6, 1969. Congress amended the Federal Hazardous Substances Act of 1966 to ban any toy or other article intended for use by children which presented an electrical, mechanical, or thermal hazard.

December 30, 1969. The Coal Mine Safety Act was signed into law this day.

August 28, 1970. Texas became the first state to place specific limitations on the amount of heavy metals it would allow to be dumped into public water.

December 29, 1970. The Occupational Safety and Health Act (OSHA) of 1970 was signed into law this day.

December 30, 1970. The Poison Prevention Packaging Act was passed and signed into law.

April 28, 1971. The O.S.H. Act of 1970 became effective on this date.

October 3, 1973. The collapse of the 2,000-foot radio broadcasting tower in Rowley, Iowa, triggered action by the Occupational Safety and Health Administration to write rules for the safety or workers on these transmission towers.

August 9, 1974. An oil spill into Chilean waters prompted Congress to finally pass legislation regarding safer, stronger construction of supertankers.

August 10, 1974. A bill signed by President Gerald Ford authorized the Coast Guard to modify its boiler and pressure vessels standards.

VITA

Samuel Espinosa was born in Matanzas, Cuba, on December 5, 1930. He attended elementary school in that city and was graduated from the Antillian College Academy, Santa Clara, Cuba, in 1952. He worked as a salesman while awaiting acceptance from a college in the United States.

From 1955 to 1957 he attended Southern Missionary College, Collegedale, Tennessee. He received his Bachelor of Arts degree in Business Administration with a minor in Economics from Columbia Union College, Takoma Park, Maryland, in 1961. He received a Master of Arts degree in Business Education from Loma Linda University in 1966, and a Master of Science degree in Safety Education from the University of Tennessee in 1974.

He has been employed as an Accountant by the International Insurance Company in Washington, D.C. From 1961 to 1964 he was employed as Business Manager of the Antillian College, Mayaguez, P.R. After a study leave, he returned to the Antillian College as Chairman of the Business Administration Department. In 1968 he accepted a position as Assistant Director of Student Finance with Loma Linda University in Riverside, California. In 1972 he was asked by the Administration of Loma Linda University to assist in the development of a Safety Program. He became the Director of the Department of Safety.

He received a teaching assistantship and entered the doctoral program full time at the University of Tennessee in September 1974.

His responsibilities with Loma Linda University required him to return to California in August 1975. In September 1977 he accepted a one-year teaching assistantship from the University of Tennessee, and received the Doctor of Education degree with a major in Health Education with emphasis in Safety and a minor in Business Education in June 1978.

He is a member of the American Society of Safety Engineers; the American Public Health Association; American Hospital Association; American Alliance for Health, Physical Education and Recreation; Campus Safety Association; College and University Safety Educators Association; and Pi Lambda Theta, Alpha Xi Chapter.

In 1953 he married Eva Esther Hernandez, also of Cuba. On March 23, 1960, one son, Victor Samuel, was born and on September 5, 1967, another son, David Samuel, was born.