The Special Committee to Study Safeguards in Construction Projects

Report to 97th Legislature

Part I - SUMMARY

January 1, 1955

S T A T E O F M A I N E

The Special Committee to Study Safeguards in Construction Projects

1953-1955

Report to 97th Legislature

Part I - SUMMARY

Prepared and published for the Committee by:

Department of Labor and Industry, Marion E. Martin, Commissioner

Division of Research and Statistics, T. T. Trott, Jr., Director

January 1, 1955

DLI Bulletin 236 A

Maine, Resolves of, 1953, Chapter 191

RESOLVE, to Create a Special Committee to Study Safeguards in Construction Projects

Committee appointed. Resolved: That a special committee be appointed consisting of 2 persons representing the construction industry and 2 persons representing employees in the construction industry, to be appointed by the governor with the advice and consent of the council; one member from the senate appointed by the president of the senate; and one member of the house of representatives to be appointed by the speaker of the house of representatives; the commissioner of labor and industry who shall serve as chairman, and be it further

Resolved: That this committee be empowered to investigate and study all accident factors in the construction of buildings, works or other projects with the objective to prevent accidents in such projects and to protect the worker and the public from undue hazards, and be it further

Resolved: That said committee make a report of its findings to the 97th legislature with any recommendations that it deems necessary.

Effective August 8, 1953

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As directed by the 96th Legislature in the Resolves of 1953, Chapter 191, Burton M. Cross, Governor of the State of Maine, on August 27, 1953, appointed to membership in the Special Committee to Study Safeguards in Construction Projects:

Mr. William Salter of Stewart and Williams, Augusta, and

Mr. Erik Sanders of Sanders Construction Company, Portland, from the construction industry;

Mr. George Bates, Bangor, and Mr. Walter Reynolds, Augusta, both of the United Brotherhood of Carpenters and Joiners of America, AFL, representing employees in the construction industry;

The President of the Senate, Senator Haskell, appointed Senator Jean C. Boucher, Lewiston, and the Speaker of the House of Representatives, Dr. Bates appointed Representative Albert West, Stockton Springs from the Legislature;

And, by authority of Chapter 191, Resolves of 1953, the Commissioner of Labor and Industry, Marion E. Martin, served as Chairman.

The Committee met at the call of the chair on the following dates to carry out the directives of the 96th Legislature:

November 4, 1953
April 29, 1954
October 1, 1954
December 6, 1954

FINDINGS AND RECOMMENDATIONS

The Special Committee to Study Safeguards in Construction Projects finds, in the period from January 1950 through September 1954, that there were 30 fatalities in the Maine construction industry or 20.2% of the total 148 fatalities reported to the Maine Industrial Accident Commission for the same period.

In this same period there were 4466 disabling work injuries in the Maine construction industry, or 10.7% of the estimated total non-agricultural disabling work injuries reported to the Industrial Accident Commission, resulting in an injury rate of 78.8 disabling work injuries per thousand of average employment in the construction industry--two times higher than the 37.9 in manufacturing, and 2½ times higher than the 31.2 for all non-agricultural industry. While accounting for 10.7% of the total disabling work injuries in Maine, the construction industry accounted for only 4.2% of the average total of non-agricultural employment.

It is evident that a serious accident problem exists in the Maine construction industry

--which exacts a tragic toll from Maine's construction workers and their families

--which causes extensive direct and indirect costs to Maine contractors, and

--which, thereby, is a loss to the State of Maine.

The committee feels that the most practicable approach to the reduction of accidents and the consequent minimization of human suffering

and economic loss to employees and employers of the Maine Construction Industry is remedial legislation, involving the creation of a code making authority.

Be it, therefore, resolved that the Special Committee to Study Safeguards in Construction Projects recommends to the 97th Legislature the enactment into statute of the proposals hereinafter specified:

I. An Act Creating the Board of Construction Safety Rules and Regulations.
This Board to draft a standard safety code for the Maine construction industry and to revise and supplement that code as time and experience reveals the necessity.

II. Certain amendments to the Labor Laws, Ch 30, R. S. 1954, to implement the aforesaid act and thereby afford protection to the people of Maine, and

III. An amendment to the Workmen's Compensation Act, Ch 31, R.S. 1954, to induce construction employers of one or more workers to assent to the Act by removing their common law defenses, should they not assent, and would in some measure better protect the Maine construction worker and his family and at least minimize their personal loss from work injuries.

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AMENDMENTS TO CHAPTERS 30 and 31,
REVISED STATUTES OF MAINE, 1954,
AS RECOMMENDED BY THE SPECIAL
COMMITTEE TO STUDY SAFEGUARDS IN
CONSTRUCTION PROJECTS

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AN ACT CREATING THE BOARD OF
CONSTRUCTION SAFETY RULES AND REGULATIONS

R.S. 1954, c 30, s 88A-88E additional: Chapter 30 of the revised statutes is hereby amended by adding thereto five new sections to be numbered 88A to 88E, inclusive, to read as follows:

BOARD OF CONSTRUCTION SAFETY RULES AND REGULATIONS

Section 88A: Establishment and Purpose

There is hereby created and established the board of construction safety rules and regulations for the purpose of formulating and adopting reasonable safety regulations and codes in order to provide for personal, material and public safety in connection with construction, and such other activities usually associated with the construction industry. The said board shall consist of 7 members of which 6 shall be appointed to membership by the commissioner of labor and industry, subject to the approval of the governor and council. Of the 6 appointed members of the board, 2 shall represent the construction contractors within the state; 2 shall represent the construction workers within the state; 1 shall represent the insurance companies licensed to insure Workmen's Compensation within the state; 1 shall represent the public. The 7th member of the board shall be the commissioner of labor and industry, who shall also be chairman. The board shall meet at least twice yearly at the state capitol, or at any other place designated by the chairman. Of the 6 appointed members, 2 shall be appointed for a term of 2 years; 2 shall be appointed for a term of three years; and

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2 shall be appointed for a term of 4 years. Each member shall hold office until his successor is duly appointed and qualified. At the expiration of each member's term his successor shall be appointed by the commissioner of labor and industry, subject to the approval of the governor and council, from the same classification in accordance with the provisions of this section for a term of 4 years. In case of a vacancy in board membership, the commissioner of labor and industry, with the approval of the governor and council, shall appoint a member of the proper classification to serve the unexpired term of the absent member.

The 6 appointed members of the board shall serve without salary and shall receive their actual expenses while engaged in the performance of their duties as members of said board. The chairman of said board shall approve and countersign all vouchers for expenditures under the provisions of this section.

Section 88B: Definitions

Under the provisions of sections 88A through 88B, inclusive, the following words shall have the following meanings:

BOARD shall mean: the board of construction safety rules and regulations

COMMISSIONER shall mean: the commissioner of labor and industry

APPROVED shall mean: as approved by the board of construction safety rules and regulations

CONSTRUCTION shall mean and include: forming, erection, demolition, dismantling, alteration, repair, and moving of buildings and all other

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structures and all operations in connection therewith; and shall also include all excavation, roadways, sewers, trenches, tunnels, pipe lines and all other operations pertaining thereto. The definition of "construction" shall apply to all sections of Chapter 30 unless a different meaning is plainly required by the context.

SECTION 88C: DUTIES AND POWERS OF THE BOARD:

The board shall formulate and adopt, or adopt by reference, reasonable rules and regulations for safe and proper operations in construction within the state. The rules and regulations so formulated shall conform as far as practicable to the standard safety codes for construction. Such rules and regulations shall become effective 90 days after the date they are adopted, provided, however, that before any rules and regulations are adopted a public hearing shall be held after suitable notice has been published in at least 3 daily newspapers within the state.

SECTION 88D: APPEALS:

Any person aggrieved by an order or act of the inspector or the department under the provisions of sections 88A-88E, inclusive, may, within 15 days after notice thereof, appeal from such order or act to the board which shall hold a hearing thereon, and said board shall, after such hearing, issue an appropriate order either approving or disapproving said order or act.

Any such order of said board or any rule or regulation formulated by

said board shall be subject to review by a justice of the superior court in term time or vacation by an appeal taken within 30 days after the date of such order to the superior court held in and for the county in which the operation is located at the instance of any party in interest and aggrieved by said order or decision. Such appeal shall be prosecuted by petition to which such party shall annex the order of the board and in which the appellant shall set out the substance of and the reasons for the appeal. Upon the filing thereof the court in term time or a justice thereof in vacation shall order notice thereof. Upon the evidence and after hearing which shall be held not less than 7 days after notice thereof, the court or a justice thereof may modify, affirm or reverse the order of the board and the rule or regulation on which it is based in whole or in part in accordance with law and the weight of the evidence. The court or a justice thereof shall, upon hearing, determine whether the filing of the appeal shall operate as a stay of any order pending the final determination of the appeal, and may impose such terms and conditions as may be deemed proper.

SECTION 88E: EXCEPTIONS:

The provisions relating to safety in the construction industry shall not apply to construction for self use providing not more than two persons are employed for wages in such construction or that such construction is not performed by a party for hire under a verbal or written contract.

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AMENDMENTS TO EXISTING SECTIONS OF CHAPTER 30, R.S. 1954
FOR THE IMPLEMENTATION OF THE FOREGOING ACT

Maine R.S. 1954, Ch 30:

Section 4: After "may enter any factory or mill," add the following: "construction activity."

To Section 5, an additional paragraph:

"If the commissioner or any authorized agent of the department shall find, upon inspection of construction activities, that conditions of the activity are in violation of the rules and regulations and so as to be dangerous to employees working at or near them, he shall notify immediately the contractor or person in charge of such activity to make alterations or additions consistent with the rules and regulations by him deemed necessary for the safety and protection of the employee. Such notice shall be served personally upon the contractor or the person in charge of the activity, or in cases of obvious or extreme hazard where immediate action is necessary to preserve life and limb and where the contractor or person in charge of such activity is not readily accessible, he may conspicuously affix a written notice or tag to the object or device or to the part thereof declared to be unsafe. After such notice has been served or affixed, all persons shall cease using until the object or device, or part thereof, is altered or strengthened in such a manner as to provide safe conditions. The inspector shall make every effort to notify immediately the contractor or person in charge of such activity before undertaking such action.

To Section 8:

Add after "workshop" -"construction activity."

To Section 9:

Add after "workshop" in paragraph 2 (re "entry") - "construction activity"

Add after "workshop" in paragraph 3 (re "alterations") - "construction activity."

III

AMENDMENT TO THE WORKMEN'S COMPENSATION ACT, CH 31, R.S. 1954

R. S. 1954, Ch 31, s 4 is hereby amended by adding to the first sentence the following: "except that the provisions of section 3 shall apply to employers of one or more workers where said employer is engaged in construction or the associated building trades."

NOTE

In Part II of this report will be found the detailed statistical summary and other related data upon which the decisions and recommendations of the Special Committee to Study Safeguards in Construction Projects were based. Both Part I and Part II were prepared for the Committee in the Department of Labor and Industry, Division of Research and Statistics, upon request by the Committee.

T. T. Trott, Jr., Director
Division of Research and Statistics

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The Special Committee to Study Safeguards in Construction Projects

Report to 97th Legislature

Part II - STATISTICAL SUPPLEMENT

January 1, 1955

S T A T E O F M A I N E

The Special Committee to Study Safeguards in Construction Projects

1953 - 1955

Report to 97th Legislature

Part II - Statistical Supplement

Prepared and published for the Committee by:

Department of Labor and Industry, Marion E. Martin, Commissioner

Division of Research and Statistics, T. T. Trott, Jr., Director

January 1, 1955

DLI Bulletin 236 B

CONTENTS

FOREWORD

In order to obtain the benefits of the regular organization existent in the Department of Labor and Industry, the Special Committee to Study Safeguards in Construction Projects requested that Chairman, Marion E. Martin, assign the duty of gathering statistics and other research data for the Committee's use, as well as the preparation and publication of the Committee's report to 97th Legislature, to Mr. T. T. Trott, Director of Research and Statistics, Department of Labor and Industry.

For ease in use this report has been prepared in two parts. Part I contains the conclusions and recommendations of the Committee.

Part II contains the summarized results of the researches made for the Committee.

SUMMARY REPORT ON MAINE
CONSTRUCTION ACCIDENT
STATISTICS, JANUARY 1950
THROUGH SEPTEMBER 1954

To: The Special Committee to Study Safeguards in Construction Projects

From: T. T. Trott, Jr., Director, Research and Statistics, DLI

Re: Consolidated report on the Maine Construction Accident Problem

INTRODUCTION: Pursuant to a request of the Committee, I respectfully submit herewith a consolidated report on Maine construction accidents. This report is a summary of the several studies made for the committee, by this division, covering the period from January 1950 through September 1954.

FATALITIES:

Fatal injuries to construction workers in Maine have exacted a toll over the 57-month period analyzed of 30, or over one fifth of the 148 fatalities reported to the Industrial Accident Commission.

The impact of these deaths can never be completely assessed but

.....the average age of the 30 fatalities in Maine construction was 35 years, which

.....based upon life expectancy of 66 years is a loss of 930 years, which

.....applied against the seventy dollar average weekly earnings of the deceased at death would amount to over three million dollars of lost earnings.

.....using the maximum death benefit of 8 thousand dollars plus burial amount of 350 dollars (and not including the actual medical expenses incurred prior to death), the thirty fatalities were "worth"

250,500 dollars to the survivors, which

.....deducted from the total loss of three million still leaves a net personal loss of some two and three-quarter million dollars.

The distribution of that loss in terms of those survivors was:

.....3 mothers

.....1 father

.....24 wives

.....35 minor children

.....AND one unborn infant.

The group of 35 minor children was composed of:

20 daughters, ranging from 6 months to 14 years of age, an average age of 5.8 years, and

15 sons, ranging from 2 to 17 years of age, an average age of 8.9 years.

AND, over this entire period, while accounting for more than one fifth (1/5) of the total fatalities reported to the Industrial Accident Commission, the construction industry in Maine never exceeded one twentieth (1/20) of the total non-agricultural employment in the state.

A summary of these fatalities is shown on page 14, Table I.

DISABLING WORK INJURIES IN MAINE CONSTRUCTION:

A. January 1, 1950, through September 1954

From January 1, 1950, until September 30, 1954, there were 4466 disabling work injuries reported to the Industrial Accident Commission from the construction industry, 10.7% of the total disabling injuries reported to the Commission. Converted into a rate per thousand of average employment for the full 57-month period construction had 78.7 disabling injuries; manufacturing, 37.9; and all non-agricultural industry (which includes those two as well as the service and trade industries), 31.2.

Construction experience, therefore, was twice as high as manufacturing and $2\frac{1}{2}$ times higher than all industry. For the full period analyzed, both construction and manufacturing rates declined, but construction declined much more slowly than manufacturing and did not indicate any marked degree of solution to the accident problem in the construction industry. The breakdown of these data is found on page 14, Table II.

The standard measure for accident experience is the Injury Frequency Rate or the number of disabling work injuries per million hours worked. This division compiles and publishes this measure for the manufacturing industry in Maine. While we could estimate the Injury Frequency Rate for construction, we feel it inadvisable due to the inequities in available construction exposure data, i.e., the distribution of manhours does not always move in a like direction and magnitude with average employment. The comparative rates, based on

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monthly average employment, are shown on page 13, Chart B.

A second important measure in accident experience is the severity rate for which we have neither the facilities nor the data to compute. Taking, however, the national average number of days lost or charged per disabling work injury published by the Bureau of Labor Statistics for construction and manufacturing, we find that construction showed in 1952, 105 days compared with 85 for manufacturing. Using this construction figure with the 4466 disabling injuries in Maine construction would give a total time lost of 468,930 mandays or 1,284.7 manyears.

Analysis of cause, another tool of safety work, is used to detect the factors contributing to injuries in any specific group. Such an analysis for the construction industry reveals unsafe acts, improper machine use, lack of proper housekeeping and other items as primary faults which may be, in turn, attributed to a lack of standards and the safety consciousness usually engendered by such standards. The predominant features of the cause analysis are shown on page 15, Table III, in which it may be seen that there was relatively little shift among the factors from period to period on a percentage basis, although they did vary widely in absolute numbers.

B. The current period, January through September 1954:

In the first nine months of 1954 there was an increase in construction accidents from the comparable period in 1953 which was not commensurate with the increase in construction employment. The

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number of the disabling injuries increased from 507 in 1953, to 754 in 1954 or 48.7%; while average monthly employment in construction for the same period increased by only 9% from 11 to 12 thousand. (See Chart A, page 12). The seriousness of the injuries was also on the increase; fractures,went from 59 in 1953 to 131 in 1954, or from 11.6% of the total in 1953 to 17.6% of the total in 1954, a 51.7% increase in the relative proportions and an absolute increase of 72 fractures. The less serious Cuts and Bruises declined by approximately the same amounts.

A further analysis of this data showed that 143 or 19% of the 754 disabling construction injuries in the nine months of 1954 involved workers for out-of-state contractors. It also revealed that, with a few exceptions, no one contractor or sub-contractor had a significantly larger number of these injuries than another...very few concerns had more than ten (disabling) injuries and most of those were accumulated from several different projects. Only one project was recorded with more than 1/20 of the total number of injuries, the Limestone Air Force Base, and that involved several prime and sub-contractors.

WHAT OTHER STATES DO

The committee requested that we survey the other forty-seven states and determine their approach to the accident problem in construction.

.....35 of the 42 replying states had safety legislation covering the construction industry.

.....26 of that 35 used the "code making authority" type of law

.....26 of the 35 provided for regular periodic inspection and required

notification to the administering department of the commencement of any construction project.

.....17 of the 35 adopted in part or in full the ASA, American Standard Safety Code for Building Construction.

None of the states was able to furnish us with usable statistical data on their experience before and after the adoption of safety legislation. All that had such legislation commented that it helped a great deal in reducing accidents. From the scanty statistics furnished us by the various states which contained few comparable classifications, we were unable to reach many valid conclusions. We did find the distribution of major causal factors in construction approximately the same everywhere and despite the lack of supporting statistics most administrators were enthusiastic in their support of safety codes as the means of decreasing work injuries in all industries including construction.

SUMMARY:

There can be no doubt that a serious accident problem exists in the Maine construction industry. It is also evident that immediate remedial action is necessary to prevent or even mitigate the toll exacted by these injuries. Having furnished the committee with the facts at our disposal, I am confident of their recognition of this serious problem.

T. T. Trott, Jr., Director
Division of Research and Statistics
Department of Labor and Industry

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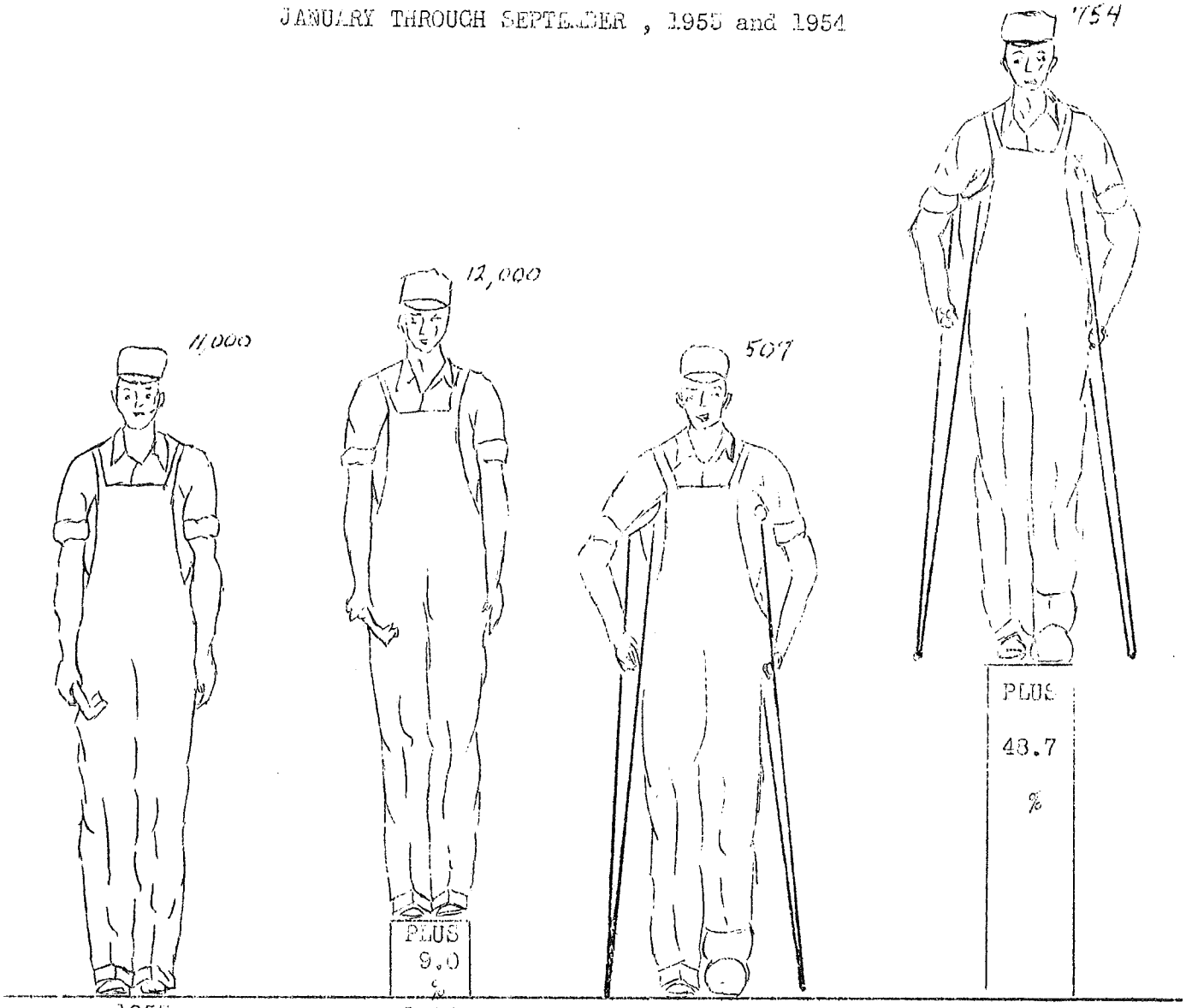
CHARTS AND TABLES ON MAINE CONSTRUCTION ACCIDENT STATISTICS, JANUARY 1950 THROUGH SEPTEMBER 1954

CHART A : COMPARATIVE INCREASES IN AVERAGE MONTHLY EMPLOYMENT AND DISABLING WORK INJURIES IN MAINE CONSTRUCTION JANUARY THROUGH SEPTEMBER , 1953 and 1954



Average Monthly Employment in Maine Contract Construcion, January through September, 1953 and 1954

Disabling Work Injuries in Maine Contract Construction, January through September, 1953 and 1954

CHART B : NUMBER OF DISABLING WORK INJURIES AS REPORTED TO THE MAINE INDUSTRIAL ACCIDENT COMMISSION PER THOUSAND OF AVERAGE MONTHLY EMPLOYMENT, JANUARY 1950 THROUGH SEPTEMBER 1954

(Plotted on a semi-logarithmic or ratio scale in order to show the rate of change from period to period, which is indicated by the slope of the curve. The steeper the curve the higher the rate of change)

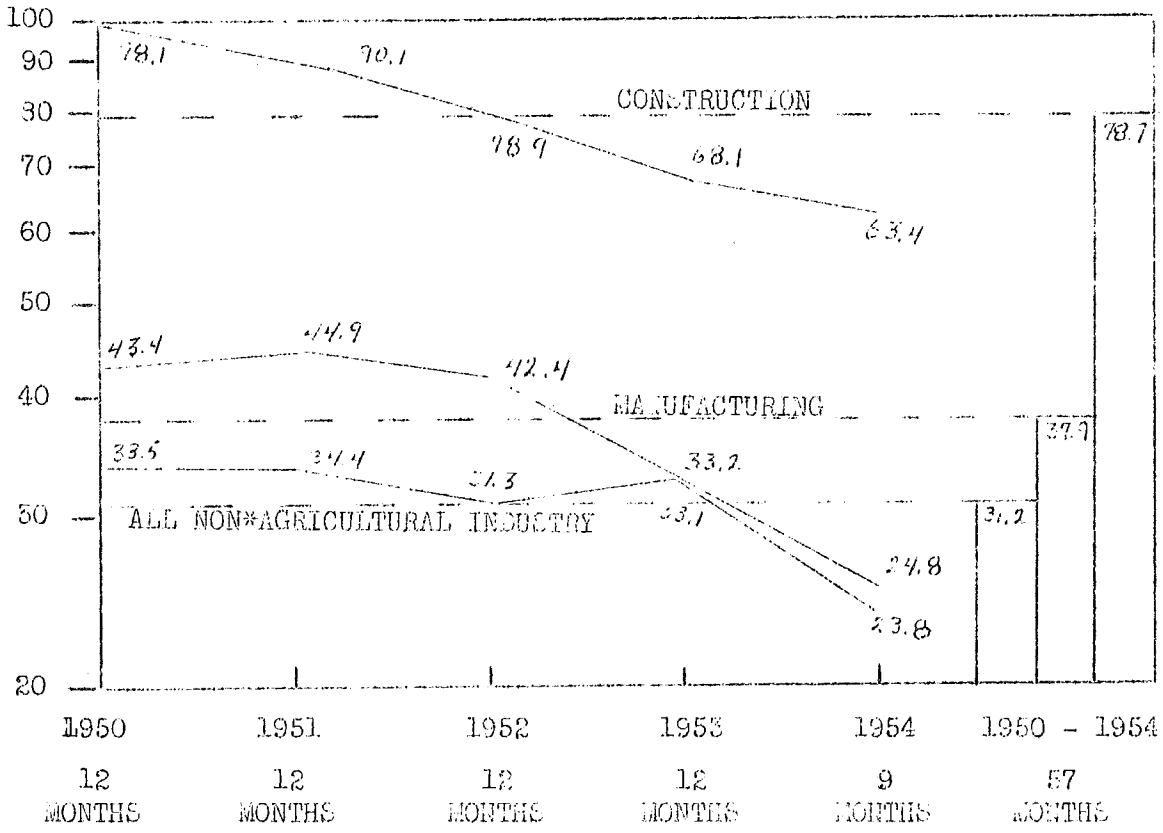


TABLE I : FATAL WORK INJURIES IN MAINE AS REPORTED TO THE INDUSTRIAL ACCIDENT COMMISSION FROM JANUARY 1950 THROUGH SEPTEMBER 1954

PERIOD	TOTAL FATALS	CONSTRUCTION FATALS			
		NUMBER	% OF TOTAL	AVERAGE AGE OF DECEASED /A	AVERAGE WEEKLY EARNINGS OF DECEASED /A
TOTAL	148	30	20.2	35	70.00
1954 /B	18	7	38.8	38	76.00
1953	29	5	17.2	50	67.00
1952	30	3	10.0	35	102.00
1951	46	12	26.0	40	65.00
1950	25	3	12.0	37	50.00

TABLE II : DISABLING WORK INJURIES AS REPORTED TO THE INDUSTRIAL ACCIDENT COMMISSION AND ESTIMATED EMPLOYMENT FOR CONSTRUCTION, MANUFACTURING, AND ALL NON-AGRICULTURAL INDUSTRY IN MAINE FROM JANUARY 1950 THROUGH SEPTEMBER 1954

ITEM	1950	1951	1952	1953	1954 /B	1950 - 1954 /C
TOTAL DISABLING WORK INJURIES /D	8 468	9 318	8 617	9 085	6 308	41 796
ESTIMATED TOTAL NON-AGRICULTURAL EMPLOYMENT (000's)	253.1	271.0	275.6	274.6	285.1	1339.4
MANUFACTURING DISABLING WORK INJURIES	4 704	5 187	4 896	3 789	2 590	21 166
ESTIMATED MANUFACTURING EMPLOYMENT (000's)	108.4	115.6	115.5	114.1	104.3	557.9
CONSTRUCTION DISABLING WORK INJURIES	844	1 117	947	804	754	4 466
ESTIMATED CONSTRUCTION EMPLOYMENT (000's)	8.6	12.4	12.0	11.8	11.9	56.8
DISABLING WORK INJURIES IN CONSTRUCTION AS A PER CENT OF TOTAL DISABLING WORK INJURIES	10.0	12.0	11.0	8.8	12.0	10.7
ESTIMATED CONSTRUCTION EMPLOYMENT AS A PERCENT OF ESTIMATED TOTAL NON-AGRICULTURAL EMPLOYMENT	3.4	4.6	4.4	4.3	4.5	4.2

/A AS REPORTED TO THE INDUSTRIAL ACCIDENT COMMISSION AT THE TIME OF DEATH.
/B JANUARY THROUGH SEPTEMBER, 1954
/C JANUARY 1950 THROUGH SEPTEMBER 1954
/D THE TOTALS FOR 1953 AND 1954 ARE ESTIMATED ON THE BASIS OF KNOWN RELATIONSHIPS IN THE PRECEDING THREE YEARS.

TABLE III : DISABLING WORK INJURIES IN THE MAINE CONSTRUCTION INDUSTRY AS REPORTED TO THE INDUSTRIAL ACCIDENT COMMISSION -- CAUSE AND TYPE ANALYSIS -- FROM JANUARY 1950 THROUGH SEPTEMBER 1954

ITEM	1950	1951	1952	1953	1954 /2	TOTAL /1	% OF TOTAL
TOTAL	844	1 117	947	804	754	4 466	100.0
AGENCY							
MACHINES AND VEHICLES	119	144	115	140	144	662	14.8
HAND TOOLS	81	74	75	76	60	366	8.2
WORKING SURFACES	106	82	99	126	120	533	11.9
STAGING AND SCAFFOLDING	57	60	68	75	33	293	6.6
ALL OTHERS	481	757	590	387	397	2612	58.5
ACCIDENT TYPE							
STRUCK BY	253	321	293	267	262	1396	31.3
STRIKING AGAINST, CAUGHT IN OR BETWEEN	187	263	222	183	165	1021	22.8
FALLS AND SLIPS	168	252	229	185	178	1012	22.6
OVEREXERTION	98	72	92	100	95	457	10.2
ALL OTHERS	138	209	111	69	54	580	13.1
NATURE OF INJURY							
AMPUTATIONS	19	11	18	10	9	67	1.5
FRACTURES	115	106	135	98	131	585	13.1
CUTS AND BRUISES	309	332	364	290	223	1518	33.9
STRAINS AND SPRAINS	178	216	230	196	198	1018	22.8
ALL OTHERS	223	452	200	210	193	1278	28.7
AGE OF INJURED							
25 YEARS OF AGE AND UNDER	172	191	182	153	144	842	18.9
26 - 50 YEARS OF AGE	414	567	506	416	413	2316	51.8
51 YEARS OF AGE AND OVER	137	203	145	139	123	747	16.8
UNSTATED	121	156	114	96	74	561	12.5

/1 CF FOOTNOTE C, PAGE 14
/2 CF FOOTNOTE B, PAGE 14

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WORK INJURIES IN MAINE CONTRACT CONSTRUCTION, 1953
DLI Bulletin 230
(Includes COMPARATIVE STATE STATISTICS IN CONTRACT CONSTRUCTION
DLI Bulletin 227 B)

WORK INJURIES IN THE UNITED STATES DURING 1952
U.S. Department of Labor, Bureau of Labor Statistics
Bulletin Number 1164

ARTICLES:

THE CONTRACTORS STAKE IN JOB SAFETY, John D. Gallagher, Assistant Superintendent, Engineering Department, Hartford Accident and Indemnity Company, taken from a talk given before the National Association of Electrical Contractors in March 1953 which was reproduced in the September 1953 issue of "Engineering for Safety," the monthly publication of the American Society of Safety Engineers.

The second article was an editorial in the August 1954 issue of "The Carpenter," the monthly publication of the United Brotherhood of Carpenters and Joiners of America, AFL, by John R. Stevenson, First General Vice President of that organization.

ACKNOWLEDGMENTS

The majority of data used in these analyses was obtained from the Maine Industrial Accident Commission and the existent records of the Department of Labor and Industry as extracted from the First Reports of Injury filed with the Industrial Accident Commission and other sources.

We are indebted to the administrators of the labor departments in the several states for their attempts to furnish us with the information we desired, and to Mr. Frank McElroy, Chief, Industrial Hazards Branch, Bureau of Labor Statistics, U. S. Department of Labor, for the national injury statistics which were supplied to us in the course of these studies.

My thanks to the members of the Committee for their consideration and cooperation which was greatly appreciated during the course of this many faceted analysis and for their kind reception of the results we were able to supply for their use.

T.T.T.

APPENDIX I: INTRODUCTION

Accident experience in the Maine construction industry, which is not covered by any safety law in Maine, is proportionately more than double that of manufacturing in Maine which enjoys such protection. The problem, however, is not one of policing as much as it is one of enlightenment. Adherence to safety standards and training is the known effective approach and has produced evident results in the manufacturing industry. It has been said that the very static nature of manufacturing makes it sensitive to this approach which would be inapplicable to the highly seasonal and locationally fluid construction industry. There is perhaps some validity to these arguments in that it would very likely be a more difficult job; however, any step that might lessen the personal and economic effect of work injuries is a step worth taking.

That the construction accident problem is significant at the state level cannot be denied in view of the appointment and actions of this special committee. The national interest accorded the problem can best be seen in the two articles which follow this page. We have, in the course of our research, found these two articles which we feel might best represent the overall significance of the construction accident problem coming as they do from the opposing sides of the industry; namely, (1) management-insurance and (2) labor. The first of these is by Mr. John Gallagher of the Hartford Accident and Indemnity Company and the second by Mr. John Stevenson of the United Brotherhood of Carpenters and Joiners of America.

THE CONTRACTOR'S STAKE IN JOB SAFETY

by John D. Gallagher

Construction operations, from the standpoint of preventing accidents on the job, are often not done according to uniform standards. Just as in any other large group, some contractors do an outstanding job in this respect, many do an average job, and a minority do a less than average job.

It certainly seems like a fair question to ask, "Why should any contractor make the effort to keep injuries and job accidents at a minimum?" What is his stake in accident prevention on the job?

Like most other employers, the average contractor has a normal humanitarian interest in the safety of his men and of the public. However, in addition, there are actually three important economic advantages in his setting up and maintaining an active, continuing program for safeguarding his men and the public against accidents that may arise out of his job operations.

These three economic advantages are:

1. Keeping his cost of workingmen's compensation and public liability insurance at a minimum by keeping accidents at a minimum.
2. Keeping at a minimum the important hidden overhead costs that result from accidents.
3. Eliminating hindrances to profitable job progress that arise out of the same conditions that cause work injuries.

One of these factors that can often be important in job costs is the contractor's cost of his workmen's compensation and public liability insurance.

Each year in the United States there are approximately 230,000 men seriously injured on construction jobs, and about 2500 of these injuries result in fatalities. These figures include all trades, but they do tend to indicate the importance of accidents in construction operations. Specialists in the field of construction safety estimate that half of these accidents are preventable by practical methods.

The average contractor can usually expect his insurance premiums to be generally higher if he has a consistently poor accident experience, and to be lower if he has a consistently good accident experience.

For example, when a contractor is of moderate size or larger, he is usually subject to what is called, "experience rating." Let's assume that we have two contractors, both doing the same kind of construction; and that one of these has a poor claims experience because of not paying much attention to safety in his job operations, and the other has a consistently good accident experience because he consistently applies good safety standards on the job. If the first man is paying a 50% "debit rate" because of his poor experience, and if the Manual or standard compensation premium rate is $7.00 per $100.00 of payroll, this means he would be paying 50% above the standard rate, or $10.50 per $100.00 of payroll. Therefore he would have to figure 10½% of his payroll in his job

costs for insurance. If the second man, because of good experience, is paying a "credit rate" of 50%, which means he would only be paying half of the standard rate, this man would only be paying $3.50 per $100.00 of payroll, and would only have to figure 3% of payroll in his job cost for insurance, against the 10½% for the first man, which might be a competitive advantage in bedding. Although the insurance rate on other classes of work is considerably lower than $7.00, this illustrates how the cost of insurance can be an important incentive for the contractor to follow good safety standards on the job.

It is generally recognized also that there are many types of non-insurable costs in the contractor's overhead, over and above the cost of insurance, that are due to accidents. In addition to personal injuries, it is generally recognized that construction accidents cause hidden overhead costs due to such accident results as:.

1. Interruptions to work progress.
2. Damaged equipment and tools.
3. Spoiled work.
4. Cost of time lost by foremen in helping the injured man in case of accident; in arranging for his production to be continued by someone else; in hiring and breaking in a new man to replace the injured man.
5. Cost of time lost by other men who stop work out of sympathy, or to assist the injured man.
6. Loss of production because of having to use a replacement man who is not as skilled or reliable as the man who was injured; especially when an experienced key man in an organization is hurt.
7. Loss of production by the injured man if he continues on the job while still handicapped, until his injury is completely healed, etc.

These hidden losses average between four and five times the cost of the compensation and medical payments.

So that an accident may not only interrupt or interfere with the orderly progress of the job, but it may also result in damage to equipment, spoiled work, injuries, or other hindrances to normal efficient operations. In fact, one generally accepted definition of an accident is that it is "any sudden or unexpected event that interrupts or interferes with the orderly progress of the work; resulting in damage to equipment, spoiled work, injuries, or other hindrances to normal work progress."

For example, if an overloaded scaffold collapses on a job, there may or may not be someone underneath who is injured or killed. However, regardless of whether there is any such injury or not, the scaffold usually has to be rebuilt; the materials that were on it must be rehandled; some of those materials may be damaged beyond use; there may be a delay in job progress; etc. Even though there may be no injury, we have still had an accident, and also some definite production hindrances; and the fact that there is not an injury is just a lucky break we've had this time, that we may not be lucky enough to get the next time something similar happens. Accidents do happen without causing injuries; but in such cases, they usually result in some other form of hindrance to profitable job progress.

Let's consider briefly some of the basic controls that are important in any organized work activity in keeping at a minimum such things as production delay, excess man-hours of work, injuries, damaged equipment, spoiled work, and other production hindrances. We know from experience that these controls are not always carried out properly, and that the resulting injuries and work hindrances are reflected in both increased insurance costs and job costs. In other words, injuries that increase insurance costs arise out of the same conditions that increase job costs.

In order that the electrical contractor can achieve his objective of completing the job to specifications, by the completion date required, and at minimum cost, the various levels of supervision must apply (1) their knowledge of the work, and of their supervisory responsibilities; (2) skill in planning their work; (3) skill in instructing their men how to do the job properly and safely; and also (4) they must apply skill in supervising their men effectively. For example, if there is any weakness in planning, this may cause a job delay; or such re-work as having to tear out concrete because conduit or other installations were not in place before concrete was poured.

I understand your organization has a very fine slogan that says, "Plan your work, and work your plan." I know of another good slogan that goes right along with this, which says, " A job well done is inherently safe", which simply means that if a job is well planned, then that safety has been given full attention in planning and carrying out the job. Our experience in insurance safety work shows that if planning fails to give full attention to such factors as (1) the arrangement and use of equipment, (2) erection procedures, (3) handling and storage of materials, (4) cooperation with other trades, etc., then injuries and other hindrances to profitable job progress will result.

For example, if foremen and other supervisors are weak in applying skill in instructing their men, and skill in supervising, the result may be mistakes that interfere with work, slow up the job, cause injuries, and reduce the job profit.

If the foreman does not apply constructive principles of human relations in supervising his men, he often will not have a cooperative and efficient work force. In this regard he needs to remember that the men he is dealing with are people like himself, that like to be treated the same way he would like to be treated if he were on the other side of the fence; and this means (1) fair and square dealing, (2) giving credit where credit is due, (3) keeping any promises made, and (4) giving men credit for having enough intelligence to carry out any instruction or order, provided it is explained clearly.

Accident prevention in construction is largely a matter of education, vigilance, and cooperation, and hard and fast rules alone will not insure safety on the job. This can only be gained by constant and careful attention on the part of the foreman, with the cooperation of the men; and the men should be taught to think in terms of safety, and not to take unnecessary chances.

In general, if the basic causes of injuries are eliminated, then both the injuries and such hindrances as excess man-hours of work, job delays, spoiled work, and so on, will be prevented or kept at a minimum; because injuries on the job arise out of the same conditions that increase job costs. This can be accomplished

by proper application of the supervisory skills in planning, instructing, and supervising, to certain basic control factors that are related to the equipment, materials, and people that are required for the job.

With respect to equipment these control factors are:

(1) The selection of adequate and safe equipment to get the job done efficiently;
(2) The arrangement of equipment to minimize unnecessary handling of materials; and to insure the smooth flow of materials to points of installation;
(3) The proper and safe use of equipment for the purpose it is intended for;
(4) The maintenance of equipment in safe and good operating conditions at all times.

With respect to materials these control factors are:

(1) The selection, ordering and scheduling of materials deliveries, so that the right materials are on hand, in the quantities required, and at the proper time and place for installation;
(2) The locating of materials in the best areas for unloading upon delivery; their storage (a) to facilitate efficient usage, (b) to maintain them in good condition, and (c) to avoid unnecessary excess handling; and their location to insure their smooth and efficient handling to points of installation;
(3) Use of the most efficient materials-handling methods and equipment possible (including a systematic means of scrap disposal), because materials-handling is always an important labor cost factor, and also because it is a source of approximately 25% of all work injuries;
(4) The safe and proper installation of materials.

With regard to the men, the inherent hazards of construction work are intensified of course by the temporary duration of jobs, and by men shifting from one type of job to another. Some of the important causes of construction accidents are:

(a) Inexperience of workers on a specific type of job;
(b) Improper care of equipment, tools, etc.;
(c) Lack of men's knowledge in proper use of equipment and materials;
(d) Lack of men's attention to safety precautions, their taking chances, and so on.

The important control factors with respect to people are:

(1) Their proper selection for the job to be done with regard to skill, experience, and physical capabilities;
(2) Their assignment to specific work tasks to which they are fitted by their skill, experience, and physical condition; such as working in high and exposed places; etc.
(3) Their adequate instruction in proper and safe job methods, so as to avoid mistakes resulting from lack of knowledge, misunderstandings, etc.

(4) Their adequate and proper supervision to avoid the possibility, due to continually changing conditions on the job, of some mistake or hazard entering the work pictures and causing an injury or other hindrance to profitable job progress before the foreman is aware of its existence. Good supervision not only includes prompt correction of improper production, but it should also include prompt correction of unsafe physical conditions or unsafe work practices that may be observed.

Weakness in applying the supervisory skills of planning, instructing, and supervising, to those twelve basis control factors regarding equipment, materials and people result in injuries, and also in production hindrances to profitable job progress. Since both injuries and these other hindrances arise out of the same cause, injuries in general are an evidence of weaknesses in these skills and control factors that are possibly also causing some of these other hindrances that we may not recognize or be aware of as coming from these sources. So that if we give some attention to investigating and determining, the basic causes of our injuries, then we are in a position to apply more effective controls over these sources; and by correcting these weaknesses at their source we not only reduce the occurrence of injuries, but at the same time minimize the occurrence of these other hindrances to profitable job progress. This is a definite economic incentive, which experience in the field of accident prevention has proven to have real value to management.

Actually, the biggest part of accident prevention is just plain common sense. Supervisors trained in construction are familiar with the best methods of doing various jobs, but in their hurry to get on with the work, they sometimes allow short-cut methods that may result in injuries and other hindrances, and in the long run these may tend to delay rather than speed up the job. The workman's attitude towards safety depends entirely on the attitude of the foreman. If the foreman is indifferent, the men will be indifferent; but if he believes in safety, if by what he does he convinces his men that he is determined to have safe work practices followed, and to have a good safety record on the job, then his men will usually respond accordingley.

What is actually needed is to remind the average foreman periodically about things he already knows about safety; and to emphasize the importance of job methods which are best, not only from a production standpoint, but also from the standpoint of safety.

Because job foremen and supervisors are the key men in maintaining good safety standards on the job, management should impress upon them that it is a definite part of their job to incorporate safety into their continuing a day-to-day supervisory activities. It is up to them to see:

(1) That unsafe physical conditions are eliminated;
(2) That good job housekeeping is maintained, and congestion avoided;
(3) That when working around such places as steel mills, and in other industrial installations, adequate attention is given to special environmental hazards, and that local safety rules are followed:
(4) That safety and protective equipment, such as goggles, hard hats, safety shoes, etc, are work;
(5) On power line construction where there is exposure to high voltage equipment, to see that rubber gloves, line hose, rubber blankets, "hot sticks" etc., are used;

(6) That, on building construction, safe ladders and scaffolds are used protection around floor openings is kept in place; etc.

To summarize the picture, the contractor has, in addition to the normal "humanitarian motive," three important "economic motives" for giving specific attention to following recognized safety standards in his job operations. These are:

1. Keeping his cost of workmen's compensation and public liability injuries and claims at a minimum; instead of paying insurance premiums above the standard, on account of a poor accident experience.
2. Keeping at a minimum the hidden accident costs which generally run between four and five times as much as his compensation insurance cost, and which include such costs as loss of services of experienced and valuable men through injuries; cost of time lost by foremen and men in connection with accidents; etc.
3. Elimination of hindrances to profitable job progress which arise out of the same weaknesses in the control factors and the supervisory skills that also cause work injuries.

Experience in all industries, including electrical contracting, shows that accidents can be practically eliminated, or at least controlled to a low minimum, by paying proper attention to good safety standards on the job.

The contractor can usually secure helpful assistance in achieving a good accident experience through the engineering department of the insurance company which carries his workmen's compensation insurance.

If he is large enough to justify having some one man responsible for safety in his organization, the American Society of Safety Engineers has local chapters of most of the cities around the country, and membership in one of these would enable him to attend their periodic meetings and discussions on accident prevention.

Membership in one of the local safety councils, which are active in most cities, would also be worth while in the same way, because they also hold periodic meetings on accident prevention.

Membership in the National Safety Council is also a useful aid in safety work, because they conduct safety schools and have considerable material available that is helpful in safety work on contracting operations.

United Brotherhood of Carpenters and Joiners of America
By John R. Stevenson, First General Vice-President

When whistles and bells are ringing out the year 1954 in the traditional fashion, there will be some 2,500 American families which will not participate in the New Year's festivities. These will be families of the 2,500 building trades workers who will be killed in industrial accidents during the year. Another 230,000 families of construction workers will celebrate only half-heartedly because their breadwinners will be recovering from on-the-job accidents.

This is a frightening picture; unfortunately, however, it is a true one. If the accident rate for construction workers for the year 1954 conforms with the rate for the past few years, some 2,500 construction workers will be killed between January 1st and December 31st. Approximately 230,000 others will be laid up for varying lengths of time by disabling accidents.

As a member of our United Brotherhood's Apprenticeship Committee, I have been digging into accident statistics, because the Committee is now in the process of compiling a unit on safety to be included in the Standard Apprenticeship training course. When I discovered the appalling toll which accidents are taking in the construction industry, I was literally shocked.

Statisticians have figured out that the cost of deaths and injuries in the construction industry runs somewhere in the neighborhood of 700 million dollars per year--250 for craftsmen and 450 million for employers. No one can deny that 700 million dollars represent a lot of money.

But the dollars-and-cents cost of accidents is insignificant in comparison to the pain and suffering and misery entailed. Who can measure the grief of a bereaved family, or the agony a widow faces in having to rear a family alone, or the heartache that orphaned children go through in growing up without a father? These are the real costs of an accident. Money lost can be replaced, but a life snuffed out or an arm amputated or an eye blinded is lost forever.

In order to fully appreciate the frightening toll which accidents take in the construction industry, it is necessary to know a little bit about how accident statistics are maintained. "Injury Frequency Rate" is a term constantly used by those compiling accident statistics. It is the measuring stick statisticians use for comparing accident records in various fields and in various periods of time.

Simply put, the Injury Frequency Rate is a device statisticians have developed for measuring the number of accidents incurred per million manhours of work. For example, let us take the case of a Local Union having 250 members in it. If every member works eight hours per day for a period of 20 days, it means that the members of the Local Union worked 250 x 8 x 20, or a total of 40,000 man hours. If, in that 20-day period, two men were hurt, the statistician would figure out the Injury Frequency Rate by multiplying the number of accidents by one million and then dividing the result by the number of man hours worked in the period. In this case the formula would be $\frac{2 \times 1,000,000}{40,000}$.

This would give a frequency rate of 2,000,000 divided by 40,000, or 50.

Two disabling accidents in a group of 250 men working for a period of 20 days is something anyone can understand without being a statistician. This constitutes an Injury Frequency Rate of 50. How does this theoretical case compare with actual statistics?

For the year 1949, Department of Labor figures show that the Injury Frequency Rate was 45.5 for highway construction; 41.9 for heavy engineering construction; and 41.7 for building construction. All these figures, of course, represent lost time accidents only. Minor accidents are not even considered.

In the carpentry trade in the years 1948 and 1949, the rate was 38.2 disabling accidents for each million man hours worked. The injury rate for carpenters was among the highest in the building trades.

It is only when the injury rate in the building trades is compared with injury rates in other types of work that the real seriousness of the situation becomes apparent. For example, the injury rate in the iron and steel industry, which no one can consider a pink-tea affair, was only 6.8. In the manufacture of explosives, an occupation many people might think of as extremely dangerous, the injury rate was a low 1.8. Among those who manufacture industrial chemicals, the rate was only 8.7.

By contrast, the Injury Frequency Rate for some trades in the construction industry ran from three 10 times higher. For the year 1949, the rate in the pipe trades was 30.7; in painting and paperhanging, nearly 18; in electrical work, a fat 27.7; in masonry and stone work, something close to 30; in plastering and lathing; a startling 42.5; and in structural and ornamental iron work, a whopping 52.8.

I think these figures make it plain that we in the construction trades have a big job to do in the safety field. Construction will always be more hazardous than some other trades, simply because it involves a great deal of moving equipment. Futhermore it is usually carried out on rough ground where good housekeeping is difficult to maintain. Equipment and environment will always present extra dangers which are absent in other lines of work, but even when allowances are made for these two factors, the gap between the accident rate in construction and the accident rate in steel, for example, is too great.

Accident prevention is a matter of education. The National Safety Council, the American Standards Association, the insurance companies and a dozen other agencies are all constantly sorking on ways and means of preventing accidents. In the final analysis, however, all the work they do is in vain if the men on the job do

not understand or follow the recommendations they make. The most efficient guard in the world will not prevent an accident if the man on the job takes it off his machine. The most elaborate set of standards for scaffold construction are useless if the man building the scaffold ignores them through ignorance, laziness or indifference.

Everybody loses when a needless accident takes place. The employer loses because production time is lost in helping the injured man. Then, too, there is the problem of finding a replacement. The insurance company loses because it has to pay the expenses of the injured man. The general public loses because accidents run up the cost of building.

But it is the injured man who loses most. He loses working time which Workmen's Compensation cannot begin to make up. If he is seriously injured, he may lose the ability to follow his trade, thereby incurring the tremendous expense of learning a new one. But it is in pain and suffering and worry that the price comes the highest. No amount of money can compensate for weeks or months of physical pain and mental anguish.

The fellow who thinks that safety is solely the employer's responsibility and worry is dead wrong.

The employer may stand to lose some time or some profits through an accident, but a worker stands to lose his body, his future, and perhaps even his life.

So far as I can see there is no conflict of interest between employer and employee in the field of accident prevention. They both stand to lose through an accident even though the employee stands to lose a good deal to cut down the accident toll.

I think the time has come when we should take a page out of their book. If they can cut down the accident rate, so can we, if we work together more closely.

But whether or not a program of cooperation is worked out with employers I feel that we in our Local Unions or District Councils ought to be stepping up our efforts to promote safety. Every state has a safety code of its own. All of us should familiarize ourselves with the safety code in our own particular states.

In the main, these safety codes are pretty close to being the same. They are based on years of actual experience as to the causes of accidents on the building site. If necessary, I believe it might be wise to take up a study of these codes in Local Union meetings, so that they can be analyzed, section by section, over whatever period of time it takes.

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Safety committees may profitably be set up in Local Unions, too, for the express purpose of studying safety methods and procedures and reporting back findings to the Local Unions.

Above all, I think it is imperative that we thoroughly educate every apprentice in the need for learning all there is to know about safety and then following safety rules religiously. The apprentice of today becomes the craftsman of tomorrow.

In 1954 construction workers may suffer accidents three of four times as often as workers in other fields of endeavor. But if we really apply ourselves to the problem of reducing accidents in construction, five years from now we may rate with the lowest industries in the nation.

That, at least, should be our goal.

STATE OF MAINE
DEPARTMENT OF LABOR AND INDUSTRY
DIVISION OF RESEARCH AND STATISTICS