



The Price of Inaction

The Cost of Unsafe Construction in New York City

Part of a Series of City and State Reports

Acknowledgments

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Executive Summary

During 2011 and 2012, 1,513 construction workers lost their lives on the job in the United States, more than any other industry. Thirty-six of these fatalities occurred in New York City.

New York City could reduce the risk of construction industry fatalities by requiring the use of registered New York State apprentices on all publically assisted development and construction projects, including those financed through public benefit corporations. *Intro 1169-2013*, a bill introduced in the New York City Council, would seek to improve safety by closing gaps in requirements for employers to maintain apprenticeship programs. Safety training is the cornerstone of apprenticeship programs. The benefits of these programs are shared by industry, workers and taxpayers.

Our review of the construction industry in New York City for the years 2011 and 2012 found:

- In 2011 and 2012, 36 New York City construction workers lost their lives on the job;
- Three percent of New York City's workforce is composed of construction workers, but construction worker deaths represent 24 percent of all workplace fatalities in the city;
- Seventy-two percent of the fatalities occurred on job sites where workers did not participate in state-approved training and apprenticeship programs;
- Fatal construction injuries in New York City in these years cost the New York City economy \$186.3 million;
- It would take the Occupational Safety and Health Administration approximately 107 years to inspect each workplace in New York State once; and
- New York City provides about \$2 billion a year in the form of loans, tax incentives, grants and other credits to public benefit corporations, which are subject to reduced safety and training requirements.

I. Introduction

Baby boomers are retiring and are taking with them a lifetime of skills and expertise.¹ This is of particular concern in the construction industry, in which generations of workers have learned the skills they need from elders who pass their knowledge down through apprenticeship. Nearly three-fourths of construction firms across the country report they are having trouble finding qualified craft workers.² Beyond the technical skills learned through apprenticeship, younger workers also learn how to conduct their jobs safely.

The Occupational Safety and Health Administration (OSHA) has reported that construction is one of the most dangerous occupations in the United States. For example, during 2011 and 2012, fatalities due to workplace accidents claimed the lives of 1,513 construction workers, making construction the most deadly occupation in the United States.³ New York City has not avoided these types of tragedies. During 2011 and 2012, 36 construction workers in New York City lost their lives on the job.

This paper highlights the economic burden of occupational fatalities in New York City's construction industry by estimating the direct, indirect, and quality of life costs resulting from fatal injuries. In 2011 and 2012, fatal construction injuries in New York City cost the New York City economy \$186.3 million, according to a Public Citizen analysis of a 2004 research paper that quantifies the costs of worker fatalities. (The figures in this paper are adjusted to 2013 dollars.)

One way for New York City to address the economic burdens caused by fatal injuries is by taking steps to reduce construction accidents. A significant and inexpensive step the city could take is to use its power as a chief purchaser of construction services to insist on high-standards on all construction and development projects to which it provides financial assistance. Such standards should apply to developers and contractors who receive tax incentive financing from entities categorized as "public benefit corporations."

During the last 10 years, New York City has disbursed an average of \$7.9 billion per year from its capital asset budget, which funds the majority of construction projects that the city

¹ *For Employers-Registered Apprenticeships-Good For Business*, WASHINGTON STATE DEPARTMENT OF LABOR AND INDUSTRIES, <http://1.usa.gov/17zXaGY> (viewed on Oct. 25, 2013).

² Press Release, Associated General Contractors of America, *Seventy-Four Percent of Construction Firms Report Having Trouble Finding Qualified Workers Amid Growing Labor Shortages* (Sept. 4, 2013) <http://bit.ly/1fzM44N>.

³ U.S. Department of Labor, Bureau of Labor Statistics, Press Release, *Census of fatal Occupational Injuries Summary, 2012* (2013), <http://1.usa.gov/7KHMh>.

finances through conventional means.⁴ But every year, New York City also provides an average of about \$2 billion a year to public benefit corporations in the form of loans, tax incentives, grants and other credits.⁵ These corporations provide about 6.8 percent of total private employment in New York City.⁶ Public benefit corporations are typically tasked with fostering economic development, often through construction projects.⁷ For example, the New York City Economic Development Corporation (NYCEDC) in 2012 distributed \$1.2 billion in city assistance (such as loans, grants and tax benefits) to help finance 607 projects. These projects, the NYCEDC reports, received \$21.8 billion in private investment.⁸

Although public benefit corporations receive loans, tax incentives, grants and other things of value from the city government, they are not required to abide by safety standards and other requirements that govern conventional city contractors. For instance, public benefit corporations are not required to abide by certain safety standards in the construction of buildings of fewer than 10 stories, nor are they required to hire contractors who participate in New York State registered apprenticeship programs.⁹

Additionally, the public disclosures that public benefit corporations are required to make do not reveal the names of the individuals who receive assistance. For example, New York City's Industrial and Commercial Abatement Program provides the addresses of recipients, but not the name of recipient or the amount received.¹⁰

New York City should adopt a policy of requiring construction contractors to establish state-accredited apprenticeship training programs to be eligible to compete for any public benefit corporation contract.

New York City has long been at the forefront of safety reforms. Specifically, in 2008, the city required construction workers to become certified under an OSHA training program in

⁴ NEW YORK CITY INDEPENDENT BUDGET OFFICE, UNDERSTANDING NEW YORK CITY'S BUDGET: A GUIDE TO THE CAPITAL BUDGET 1 (June 2013), <http://1.usa.gov/17ZWtV>.

⁵ FISCAL POLICY INSTITUTE, GOOD JOBS NEW YORK, NATIONAL EMPLOYMENT LAW PROJECT, AN OVERVIEW OF JOB QUALITY AND DISCRETIONARY ECONOMIC DEVELOPMENT SUBSIDIES IN NEW YORK CITY 1 (February 2011) <http://bit.ly/1arbzro>.

⁶ NEW CITY ECONOMIC DEVELOPMENT CORPORATION, ANNUAL INVESTMENT PROJECTS REPORT PURSUANT TO LOCAL LAW 62-FY 2012 VOLUME I 2 (Jan. 31, 2013), <http://bit.ly/17cdZ6T>.

⁷ FISCAL POLICY INSTITUTE, GOOD JOBS NEW YORK, NATIONAL EMPLOYMENT LAW PROJECT, AN OVERVIEW OF JOB QUALITY AND DISCRETIONARY ECONOMIC DEVELOPMENT SUBSIDIES IN NEW YORK CITY 1 (February 2011), <http://bit.ly/1arbzro>.

⁸ NEW CITY ECONOMIC DEVELOPMENT CORPORATION, ANNUAL INVESTMENT PROJECTS REPORT PURSUANT TO LOCAL LAW 62-FY 2012 VOLUME I 2 (Jan. 31, 2013), <http://bit.ly/17cdZ6T>.

⁹ *Id.* at 3.

¹⁰ BARNES K., AND KELLERMAN J., ALIGN, THE 7,000,000,000 WAGER: NEW YORK STATE'S COSTLY GAMBLE IN ECONOMIC DEVELOPMENT (May 2013), <http://bit.ly/16G0LIX>.

order to be eligible to work on “major buildings.”¹¹ Also during 2008, New York City began requiring all new rigging foremen to complete 32 hours of training to safely perform the duties of an on-site supervisor.¹² In 2009, the city enacted a several laws to ensure that asbestos abatement is conducted safely by reforming the ways that asbestos projects are filed, approved and inspected.¹³

In neighboring Nassau County, the Nassau County Industrial Development Agency (a public benefit corporation) requires prospective contractors to participate and use registered apprentices as a part of their conventional and subsidized development and construction work.¹⁴ Considering New York City has been willing to implement other bold construction safety reforms, it should be willing to follow the lead of its neighboring county in matters regarding public benefit corporations.

This report proposes requiring public benefit corporations to maintain the higher standards that apply at present to city development and construction projects. Development contractors performing services for public benefit corporations should be required to participate in New York State registered apprenticeship programs. Additionally, requirements should be placed on developers and contractors as a part of the public benefit corporation financial assistance awarding process. Violations of labor, safety and health or tax laws should be publicly disclosed.

¹¹ The term “Major Buildings” is defined in Chapter 33 of the NYC Building Code, specifically, section 3310.2. See <http://on.nyc.gov/Y7bkKI>.

¹² *Safety Training Classes-32-Hour Rigging Foreman Training*, DLB TRINITS INC. <http://bit.ly/1csUQpl> (viewed on Oct.31, 2013).

¹³ NEW YORK CITY OFFICE OF THE MAYOR MICHAEL BLOOMBERG, ASBESTOS TECHNICAL REVIEW: A GUIDE TO THE NEW YORK CITY ASBESTOS REGULATIONS FIRST EDITION (October 2009) <http://on.nyc.gov/1h3VxYf>.

¹⁴ NASSAU COUNTY INDUSTRIAL DEVELOPMENT AGENCY, *Prevailing Wage Policy, 05-429695.1* (2008) <http://bit.ly/HQ84in>.

II. Data and Methods

This paper's methodology draws on the work and data from the Bureau of Labor Statistics (BLS); the AFL-CIO's annual report *Death on the Job: The Toll of Neglect*; and a 2004 study by Waehrer et al. that quantifies the costs of occupational injuries.

The findings of Waehrer et al. are used in concert with recent data on the number of construction fatalities and consumer price index data to estimate the inflation-adjusted costs of construction fatalities in New York City for recent years. The Appendix explains how Waehrer et al. arrived at estimated costs, and how we adjusted such figures to account for recent data.

Although this report invokes the costs of fatalities to buttress the case that the New York City Council should take steps to reduce the incidence of workplace accidents, this should not be interpreted as an endorsement of the use of cost-benefit analysis as a prerequisite for moving forward with public safety measures. Policymakers who are beholden to cost-benefit analysis require government agencies to demonstrate that the quantifiable monetary benefits of any proposed action would outweigh the costs. Adherence to this philosophy inhibits problem-solving for numerous reasons. For instance, the formulas invoked for cost-benefit analyses invariably overstate the costs and understate the benefits. On the cost side, they often ignore the ability of industry to develop less-expensive solutions through innovation and economies of scale. On the benefits side, they typically do not permit agencies to place a value on protecting against potential harms that are not quantifiable. Ultimately, bowing to cost-benefit analysis prevents government agencies from implementing feasible solutions to major problems.

III. Dangerous Work

Construction is dangerous work. The Occupational Safety and Health Administration (OSHA) has reported that construction is one of the most dangerous occupations in the United States. In 2011, fatalities due to workplace accidents claimed the lives of 738 construction workers, representing 16 percent of total workplace fatalities.¹⁵ In 2012, fatalities due to workplace accidents claimed the lives of 775 construction workers, representing 18 percent of total workplace fatalities.¹⁶ Of 20 construction fatalities in New York City in 2012, 72 percent occurred on job sites where workers did not participate in state approved training and apprenticeship programs.¹⁷

On Feb. 10, 2012, an employee of Star Wars Technology Systems Inc. was killed while installing heat control cabling after falling off a ladder and hitting his head on a concrete floor.¹⁸ Star Wars Technology Systems Inc. was fined \$8,400 concerning the incident.¹⁹ Through the Industrial and Commercial Incentive Program, NYCEDC invested more than \$400,000 in the property at which the fatality occurred (located at 100 Church St.) in 2011 and 2012.²⁰

Many different issues lead to fatal injuries in the construction industry. Accidental falls and contact with objects and equipment are two of the leading causes of fatal injuries, and oversight agencies have failed to do their part to reduce the frequency of such tragedies. “Despite efforts to reduce the risk of occupational injuries and illness in construction, the [construction] industry continues to account for a disproportionate share of work-related injuries and illnesses in the United States,”²¹ authors Geetha Waehrer et al. wrote in a 2007 paper that assessed the costs of construction-related fatalities.

¹⁵ AFL-CIO, DEATH ON THE JOB: THE TOLL OF NEGLECT, 48 (2013), <http://bit.ly/1hxniWM>.

¹⁶ *Number and Rate of Fatal Occupational Injuries, by Industry Sector, 2012*, U.S. DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS, 14 (2013), <http://1.usa.gov/16PeVnk>.

¹⁷ *NYC Construction Safety Fact Sheet*, BUILD UP NYC, <http://bit.ly/1bTfXvU>, (viewed on Nov. 4, 2013).

¹⁸ United States Department of Labor Occupational Safety and Health Administration, Press Release, *Weekly Summary (Federal and State data tabulated week ending April 21, 2012)* <http://1.usa.gov/1b9EKKt>.

¹⁹ *Inspection: 191455.015-Star Wars Technology Systems, Inc.*, UNITED STATES DEPARTMENT OF LABOR OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION, <http://1.usa.gov/1b5tUa5> (viewed on Nov. 5, 2013).

²⁰ *Database of Deals*, GOOD JOBS NEW YORK, <http://bit.ly/1iKIQNh> and <http://bit.ly/1dq2tco> (viewed on Nov. 5, 2013). For relationship between Industrial and Commercial Incentive Program and NYCEDC, See Industrial & Commercial Abatement Program (formerly Industrial & Commercial Incentive Program), <http://bit.ly/14tKkUm>.

²¹ Waehrer G, Dong X, Miller T, Haile E and Men, Y. *Costs of Occupational Injuries in Construction in the United States*. 39 ACCIDENT ANALYSIS AND PREVENTION 1259-1266 (2007).

The leading causes of worker deaths on construction sites are falls, electrocution, being struck by an object, and being caught in or between an object. In 2011 these “Fatal Four” were responsible for 57 percent of construction worker deaths nationwide.²² Eliminating the Fatal Four would save 410 workers’ lives in the United States every year.²³

In New York City a similar scenario has unfolded. In 2011 there were 16 construction fatalities, of which:

- Eight workers died from slips, trips and falls, and
- Five workers were killed due to contact with an object or equipment, and
- Three workers died due to unclassified hazards.²⁴

The 16 construction fatalities in New York City accounted for 22 percent of the city’s 72 fatal work injuries in 2011.²⁵

In 2012, there were 20 workplace deaths among construction workers, according to figures provided by the Bureau of Labor Statistics.²⁶ These fatal injuries were classified as:

- Eight deaths from slips, trips and falls;
- Eight deaths from crushing/collapse;
- Four from contact with an object or equipment.²⁷

The 20 construction fatalities in New York City accounted for 27 percent of the city’s 75 combined fatal work injuries in 2012.

In sum, in 2011 and 2012, 36 New York City construction workers lost their lives on the job. Construction workers compose 3 percent of New York City’s workforce,²⁸ but construction worker deaths represent 24 percent of all workplace fatalities in the city.

²² *Commonly Used Statistics, Construction’s Fatal Four*, U.S. DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS 2011 (viewed on Oct. 22, 2013), <http://1.usa.gov/T1JoR8>.

²³ *Id.*

²⁴ *Fatal Occupational Injuries by Selected Demographic Characteristics and Major Events or Exposures, New York City 2011*, U.S. DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS, <http://1.usa.gov/17vGKl8>.

²⁵ *Fatal Work Injuries in New York City 2011-2012, Table 2*, U.S. DEPARTMENT OF LABOR, BUREAU OF LABOR STATISTICS, <http://www.bls.gov/ro2/cfoi9660.htm>.

²⁶ *Id.*

²⁷ *NYC Construction Deaths on the Rise*, PAINT SQUARE (July 8, 2013), <http://bit.ly/16pIYPV>. (This summary reports one extra construction related fatality, beyond the 20 reported by the Bureau of Labor Statistics, due to “other hazard.”)

²⁸ See, *Current Employment Statistics*, NEW YORK STATE, DEPARTMENT OF LABOR (data for August 2013), <http://bit.ly/17pzCBe>.

IV. Quantifying the Costs of Fatalities in New York City

The Occupational Safety and Health Act of 1970 states “that personal injuries and illnesses arising out of work situations impose a substantial burden upon, and are a hindrance to, interstate commerce in terms of lost production, wage loss, medical expenses, and disability compensation payments.”²⁹ Days away from work due to fatal occupational injuries are costing employers, workers and New York City taxpayers. Likewise, when occupational fatalities occur, more is lost than a day’s work. The tragedies of workplace deaths devastate families and their surrounding communities.

This report relies on an analysis by Waehrer et al. (2004) coupled with more recent consumer price index data to estimate the costs of occupational fatalities in New York City. Waehrer et al. determined costs of occupational injuries and fatalities by adding up three broad categories of consequences from such incidents: direct costs, indirect costs and quality of life costs. Direct costs include payments for hospital, physician and allied services. Indirect costs refer to victim productivity losses, employer productivity losses and administrative cost associated with an occupational accident. Quality of life costs refer to the value attributed to the pain and suffering of victims and their families.³⁰

The 2004 Waehrer et al. study estimated that the cost of a fatal occupational injury was \$3.2 million (in 1993 dollars).³¹ This translates to a cost of \$5.2 million per fatal occupational injury in 2013 dollars.

There were 36 fatal construction accidents in New York City in 2011 and 2012. Applying the inflation-adjusted \$5.2 million cost per fatality, this translates to a total of \$186.3 million in costs for New York City resulting from these fatalities.³²

This estimate almost certainly understates actual costs because many of the factors Waehrer et al. included in their calculation have increased at a faster rate than inflation.

²⁹ Occupational Safety and Health Act, S.2193, 91st Congress, § 2 (1970), <http://1.usa.gov/9gSBuk>.

³⁰ WAEHRER G, LEIGH JP, CASSADY D, AND MILLER T, *Costs Of Occupational Injury and Illness Across States*, 46 JOURNAL OF OCCUPATIONAL AND ENVIRONMENTAL MEDICINE 1084-1095 (2004).

³¹ *Id.*

³² Due to rounding, some category averages may not equal the total sum.

V. Insufficient Resources

In 2012, there were only 113 OSHA inspectors assigned to inspect 592,148 of New York State's workplaces.³³ With such insufficient resources, OSHA was only able to inspect 0.93 percent of New York State's workplaces in 2012. At this rate, it would take OSHA approximately 107 years to inspect each workplace in New York State once.³⁴

OSHA inspected 2,481 construction sites in New York State in 2012, accounting for slightly more than 45 percent of inspections in the state. Of these, 741 concerned New York City's construction industry, representing just under 30 percent of all inspections of construction sites in the state.³⁵ New York City represents 42 percent of the population of New York State.

Even though OSHA has dedicated relatively significant resources to the construction industry, fatal injuries continue to occur an alarming rate. More needs to be done to deal with this problem.

VI. The Collapse

During 2012, New York City experienced a horrific event when a building under construction collapsed in the Fort Greene neighborhood of Brooklyn. The collapse killed a construction worker.³⁶ Although this incident did not occur on a publicly funded or subsidized construction project, this is a prime example of what can happen when contractors do not participate in a registered apprenticeship program.

OSHA's investigators concluded that:

- The fourth floor joists were not braced in accord with either the manufacturer's requirements or the structural engineer's instructions;
- The masonry contractor placed excessive construction materials on the 4th floor;
- The masonry contractor placed construction materials on the 4th floor deck without ascertaining the load capacity of the 4th floor;

³³ AFL-CIO, DEATH ON THE JOB: THE TOLL OF NEGLECT (2013), <http://bit.ly/1hxniWM>.

³⁴ *Id.*

³⁵ *NYC Construction Deaths on the Rise*, PAINT SQUARE (July 8, 2013), <http://bit.ly/16pIYPV>.

³⁶ INVESTIGATION OF THE SEPTEMBER 10, 2012 PARTIAL COLLAPSE OF A BUILDING UNDER CONSTRUCTION AT 227 CARLTON AVENUE IN BROOKLYN, NY, OCCUPATIONAL HEALTH AND SAFETY ADMINISTRATION (December 2012) <http://1.usa.gov/1d4yXZu>.

- The floor joists were not installed as required by the drawings and other documents; and
- The contractor temporarily substituted steel deck for plywood but neither fastened it to the floor joists nor used 2 inch wide straps.³⁷

The contractors that OSHA reported on who were responsible for this project, Professional Grade Construction Group Inc. and S&B Masonry Corp.,³⁸ do not appear to participate in a New York State registered apprenticeship program, according to Public Citizen's search of the program's participant database.³⁹ If the companies were in the programs, their workers would have been able to identify the hazards associated excessive materials being stored on unsecured platforms. Additionally, the workers would have been able to properly construct the building as per the blueprint drawings.

VII. Apprenticeship Training

Registered apprenticeship is a formal training relationship between an employer and an employee.⁴⁰ Construction industry apprenticeships are for a specific period averaging four years. During this time, the apprentice learns a trade that combines hands-on work experience, classroom instruction and safety and health training.⁴¹ This leads to professional, independent and skilled workers.

Construction contractors share in the rewards of apprenticeship too. By having a skilled and safe workforce, a reduction in employee turnover and strong employer-employee relations contractors can perform without losing valuable production time.⁴²

There are also direct economic benefits for contractors who have a registered apprenticeship program, for example:

- Contractors qualify to pay apprentice wages (usually 40 percent to 50 percent of journey worker wages);

³⁷ *Id.*

³⁸ *Id.*

³⁹ See *Apprenticeship Sponsor List*, NEW YORK STATE DEPARTMENT OF LABOR (database) (viewed on Nov. 8, 2013), <http://bit.ly/17pzCBe>.

⁴⁰ *Become an Apprentice*, STATE OF NEW YORK DEPARTMENT OF LABOR, <http://bit.ly/1d4W1HP> (viewed on Nov. 8, 2013).

⁴¹ *Appendix A, Carpenter, D.O.T. Code 860.831.022* (July 7, 2006), STATE OF NEW YORK DEPARTMENT OF LABOR, <http://bit.ly/HLvp4U> (viewed on Nov. 8, 2013).

⁴² *Businesses and Sponsors*, STATE OF NEW YORK DEPARTMENT OF LABOR, [HTTP://BIT.LY/1DSBOPQ](http://bit.ly/1DSBOPQ) (viewed on Nov. 8, 2013).

- They do not pay overtime to apprentices for the related instruction part of the training, and
- They qualify for tax credits if hiring people who meet certain criteria and their business is located in specific areas.

In New York State, there is no cost to contractors to register an apprenticeship program or for technical assistance that is associated with operating an apprenticeship program.⁴³ The employer usually bears the cost of classroom instruction.

VIII. A Decent Proposal

At present, New York City taxpayers are not privy to detailed information on the types and amounts of subsidies provided by public benefit corporations. Nor is the public able to discern whether subsidies are given to unscrupulous contractors that have violated labor and tax laws or placed their workers' lives in jeopardy.

New York City's elected officials should take a major, yet inexpensive, step toward addressing construction industry safety shortcomings by requiring:

- All contractors on projects financed by public benefit corporations to have apprenticeship agreements appropriate for the type and scope of work to be performed on the project;
- Each contractor's apprenticeship to be registered and approved by the New York State Commissioner of Labor in accordance with Article 23 of the New York State Labor Law; and,
- All workers participating in such projects to become certified under OSHA's training program and all site-supervisors receive certification under OSHA 30 Hour training program.

Additionally, New York City should improve the level of disclosure involving public benefit corporations. New York City should:

- Require any developer or contractor who will provide services on a subsidized project to disclose and provide a description of any wage, discrimination,

⁴³ *Register an Apprenticeship Program, What does it Cost?* STATE OF NEW YORK DEPARTMENT OF LABOR, [HTTP://BIT.LY/HFSQMA](http://bit.ly/HFSQMA) (viewed on Nov. 8, 2013).

unemployment, workers compensation, tax laws, environmental, health and safety violations that have been committed in the past ten years;

- Require any developer or contractor who will provide services on a subsidized project to list of any pending bankruptcy proceedings that have commenced in the last ten years; and
- Require any developer or contractor who will provide services on a subsidized project to disclose any names with which they previously conducted business, including any and all alter egos.

IX. Conclusion

New York City should establish requirements for all employers who receive city funding. These requirements should include mandatory participation in a state-certified apprenticeship program, which would encompass a requirement to provide employees with safety and health training.

Implementing a local law to establish apprenticeship training and transparency requirements for publicly subsidized construction and development projects will not address all of the safety problems that threaten construction workers. But such a step has the potential to yield significant gains for minimal costs. Additionally, workers who are hired for publicly subsidized construction jobs would be confident that they are working for a company with demonstrated safety credentials.

New York City should adopt legislation that speaks to safety, health and apprenticeship training requirements. It's the right thing to do and will help lower New York City's fatality rates in the construction industry and create a more transparent bidding process.

Appendix: Calculations of Occupational Fatal Injuries

Waehrer et al. determined the costs of workplace fatalities and injuries by adding up costs under three categories: direct costs, indirect costs, and quality of life costs.

Direct costs include payments for hospital visits, allied services, rehabilitation, nursing home care, medical equipment, burial costs, and insurance administrative costs for medical claims, payments for mental health treatment, police, fire, emergency transport, coroner services, and property damage.⁴⁴

Indirect costs refer to: victim productivity losses, which include wage losses and household production losses; employer productivity losses, which is time spent by supervisors and coworkers investigating accidents, juggling schedules, and recruiting and training replacements for injured workers; and administrative costs, which include the cost of administering Workers' Compensation programs.

Quality of life costs refer to the value attributed to the pain and suffering of victims and their families.⁴⁵

In this paper, we adjusted the costs per incident as reported by Waehrer et al. for inflation (in 2013 dollars), and multiplied the inflation-adjusted costs by New York City's frequency of incidents from 2011 to 2012.

In 1993, Waehrer et al. reported that 106 workers lost their lives across New York's private industry occupations and concluded that these fatalities imposed a cost of \$977 million.

$\$977 \text{ million} \div 306 \text{ worker fatalities} = \$3,192,810.45$ (\$3.2 million) in 1993. This is the cost per fatality. Adjusted for inflation, this would equal $\$5,173,656.57$ (\$5.2 million) per fatality in 2013 dollars.

This report calculates the costs of New York City's construction related fatalities in 2011 and 2012. In 2011, there were 16 fatalities among construction workers, resulting in a calculated cost of $\$82,778,505.12$ (\$82.8 million). In 2012, there were 20 fatalities among construction workers, resulting in a calculated cost of $\$103,473,131.40$ (\$103.5 million). The combined costs were $\$186,251,636.52$ (\$186.3 million).⁴⁶

⁴⁴ WAEHRER G, LEIGH JP, CASSADY D, AND MILLER T, *Costs of Occupational Injury and Illness Across States*, 46 JOURNAL OF OCCUPATIONAL AND ENVIRONMENTAL MEDICINE 1084-1095 (2004).

⁴⁵ *Id.*

⁴⁶ Due to rounding, some category totals may not equal the total sum.