

**NIOSH RECOMMENDATIONS
for
REVISION OF HAZARDOUS ORDERS**

**Non-agricultural Hazardous Order No. 14
Occupations involved in the Operations of Circular
Saws, Band Saws and Guillotine Shears**

**Cost & Benefit Analysis
by
SiloSmashers Inc.
for
Wage & Hour Division
ESA/DOL**

TABLE OF CONTENTS

1. INTRODUCTION	3
2. ASSUMPTIONS & LIMITATIONS	4
2.1 Scope: Machines Covered.....	4
2.2 Scope: Apprentice Exemption	5
2.3 General Assumptions	6
3. METHODOLOGY	6
4. LITERATURE REVIEW	7
5. DATA ANALYSIS & INTERPRETATION.....	9
5.1 Estimated Number of Workers	9
5.2 Estimated Number of Fatalities	10
5.3 Estimated Number of Injuries & Illnesses	11
6. STATE CHILD LABOR LAWS	12
7. IMPACT ON SMALL & FAMILY-OWNED BUSINESSES.....	12
8. FEASIBILITY OF IMPLEMENTATION	13
9. EVALUATION OF COSTS & BENEFITS	13
9.1 Quantitative.....	13
9.1.1 Methodology.....	13
9.1.2 Assumptions & Constraints specific to Quantitative Analysis.....	14
9.1.3 Results.....	15
9.2 Qualitative.....	17
10. SENSITIVITY ANALYSIS	19
11. SUMMARY & CONCLUSIONS.....	20
APPENDIX 1 : NUMBERS EMPLOYED.....	21
APPENDIX 2 : DETAILS OF THE CALCULATION OF COSTS & BENEFITS	22
APPENDIX 3 : NET PRESENT VALUE (NPV) CALCULATIONS.....	25
APPENDIX 4 : QUALITATIVE COSTS & BENEFITS.....	30
APPENDIX 5 : ANALYSIS OF STATE CHILD LABOR LAWS	31
REFERENCES	45
BIBLIOGRAPHY.....	48

1. INTRODUCTION

The NIOSH report [NIOSH 2002] makes two recommendations for changes to Non-agricultural Hazardous Order No. 14, Occupations involved in the Operations of (Power-driven) Circular Saws, Band Saws and Guillotine Shears. The two recommendations (and the alternative for one of them) and their corresponding rationales are shown in the following Table 1.

Table 1 : Recommendations & Rationale		
No.	Recommendation	Rationale
1	Revise definition of machinery covered by this HO to include other machines, such as chainsaws, which perform cutting and sawing functions through direct contact between the cutting surfaces and the material (the current definition is based on the presence of a continuous series of notches or jagged teeth).	Stationary saws and hand-held power saws, including chainsaws, continue to be the source of substantial numbers of fatalities as well as nonfatal injuries, which may be unusually severe. The HO bases the definition of prohibited machines on the presence of a continuous series of notches or jagged teeth. Not all machinery that perform cutting or trimming functions have visible notches or teeth, e.g. chainsaws or abrasive cutting discs which perform the same function.
1 alt.	<i>Alternatively, NIOSH encourages DOL to consider developing a new HO that combines the sawing machinery covered under this HO with other specialized machinery that performs cutting and sawing functions through direct contact of the cutting surface and the material.</i>	
2	Retain the exemption for apprentices/student learners, except in the case of chainsaws and other hand-held power saws.	For stationary saws and shearing machines, an apprentice/student learner exemption is warranted given that means of controlling hazardous energy associated with these machines are well-understood, and that the hazards are generally confined to the machine itself. In contrast, hand-held power saws, including chainsaws, are used in less controlled conditions, often in construction and logging operations. Injury risk factors associated with hand-held power saws are more diverse, and more difficult to recognize and eliminate.

The recommendations and corresponding rationales were amplified in the NIOSH report and provided the starting point for the Cost & Benefit Analysis carried out by the SiloSmashers Team. The analysis is reported in the following sections.

2. ASSUMPTIONS & LIMITATIONS

2.1 Scope: Machines Covered

The scope of the existing non-agricultural Hazardous Order No. 14 is well-defined by the Hazardous Order itself, the WHD's Field Operations Handbook [WHD 2001] and the NIOSH Report [NIOSH 2002]. The WHD's Field Operations Handbook points out many of the areas or aspects outside the jurisdiction of the Hazardous Order. The first recommendation of the NIOSH Report gives some indication as to the proposed extension of coverage of the Hazardous Order.

Note that the existing Hazardous Order specifies three specific types of cutting equipment. The WHD's Field Operations Handbook [WHD 2001] explains the background to Hazardous Order No. 14: it was intended as a "catch all" to fill in the gaps left after implementation of Hazardous Orders Nos. 4, 5, 8, 10, 11 and 12. It is also important to note that the Hazardous Order does not apply to machines that have fully automatic feed and ejection with suitable safety devices to prevent injury to operators. However, the occupations of setting up, adjusting, repairing, oiling, or cleaning all types of circular saws, band saws and guillotine shears apply to all types, with or without automatic feed and ejection.

The NIOSH report recommends extending the coverage of the Hazardous Order to chainsaws and similar machines. Although only chainsaws are specifically mentioned, it is assumed that saws such as jigsaws, wire saws and friction saws are also to be included in the extension. These 3 types of saws are mentioned in the WHD's Field Operations Handbook as not being included in the existing Hazardous Order.

The NIOSH report infers that chainsaws do not have teeth. Chainsaws do have teeth that are attached to the chain links or are integral with the links. The report is correct in stating that abrasive wheels do not have teeth. These wheels are made of a very hard abrasive material, e.g., Silicon Carbide, that abrades the material being cut.

Friction saws are similar to circular saws but the disc and speed are different. A circular saw cuts through the material using the teeth on the disc. A friction saw also has teeth, albeit small ones in accordance with the material being cut, but the rotational speed of the disc is much higher than that of a circular saw so that the friction between disc and material melts and cuts the material. Wire saws also have fine teeth integrated into the wire and cut through the material as the wire is pulled across the surface.

The NIOSH report makes no specific mention of extending coverage beyond guillotine shears. WHD's Field Operations Handbook notes that alligator shears, circular knives and circular shears are not included in the HO. The NIOSH report

focuses on saws rather than other cutting equipment. For the sake of completeness, this Cost & Benefit Analysis assumes that other power-driven cutting machines are included in the extended coverage.

Alligator shears are powerful machines found typically in scrap yards where they are used to cut large pieces of metal into smaller pieces. The straight edged blades have one fixed and stationary and the other comes down close and parallel to it with hydraulic force. Circular knives comprise discs which have a sharp knife-edge and can be mounted on a rotating shaft either singly or in multiples. They are found typically in the paper industry. Circular shears are machines typically used to cut sheet metal into discs or other curved shapes. There are two blades – one stationary and fixed and the other coming down close and parallel to it.

Likewise, it is assumed that the NIOSH report recommendations extend to abrasive wheels, disc grinders and paper shredders. Abrasive wheels and disc grinders would also be covered by the revisions proposed by NIOSH for Hazardous Order No. 8. Paper shredders are found in many places, e.g., offices, warehouses, retail outlets and factories. Perhaps their most intensive use is in the paper industry, particularly in handling recycled paper. The ones used in offices usually have safety devices to prevent injury to the operator and nearby personnel.

The above power-driven saws and cutting and shearing machines are used universally in industry and, some, possibly in the retail and wholesale trades. Whilst the operation of such machines will take up most or all of some employees working time, there will be a large number of incidental users. Therefore, estimating the total number of people using such machines will be impossible. However, it may be possible to estimate the number of people using the machines for most or all of their working hours.

There is no mention in the existing Hazardous Order, the WHD Field Operations Handbook or the NIOSH report of oxy-acetylene cutting or plasma arc. It is assumed that these methods of cutting (mostly metals) will be covered by the proposed Hazardous Order for welding.

2.2 Scope: Apprentice Exemption

The retention of the exemption for apprentices and student learners is a continuation of the status quo except for the recommendation to exclude chainsaws and other hand-held, power-driven saws. Whilst hand-held band saws and guillotine shears are rare, if they exist at all, hand-held circular saws are commonly used power-driven tools. Their main use is probably in sawing wood and, therefore, they would already be covered by Hazardous Order No. 5. Hence, the recommendation only affects the Cost & Benefit Analysis to the extent that circular saws are used on materials other than wood.

Hand-held, power-driven jigsaws are also commonly used tools in wood cutting and would also be covered by Hazardous Order No. 5. On the other hand, hand-held, power-driven disc grinders are used on wood, metals and other materials and their use on wood would only be covered by Hazardous Order No. 5. Use on metals and other materials would have to wait for the NIOSH report recommendations to extend the coverage of either Hazardous Order No. 5 or No. 8.

2.3 General Assumptions

After definition of the scope of the Hazardous Order after revision, the other general assumptions are:

- The study includes part-time and full-time employment.
- Seasonal employment has been included.
- Small businesses and family-owned and operated businesses are included.
- The revised Hazardous Order will apply to new hires and existing employed youth, i.e., there will be no “grand-fathering”.
- By implementing the recommendation(s), it is assumed that adult fatalities, injuries, and illness will not take place in lieu of youth fatalities, injuries, and illnesses.

There are limits to the jurisdiction of the Wage & Hour Division (WHD) in enforcing the Hazardous Orders. It has been assumed that these limitations include:

- Hazardous Orders do not apply to Native American areas.
- Hazardous Orders do not apply beyond the Continental Shelf so, for example, use of hand-held, power-driven circular saws on ships is covered up to the limit of the Continental Shelf.
- Hazardous Orders do not apply to businesses not engaged in inter-state trade.
- Hazardous Orders do not apply to businesses with less than \$500,000 per annum turnover.

If the NIOSH recommendations to change the Hazardous Orders are not implemented, then it is assumed that the current situation will continue. Consideration has been given to the ongoing costs of the present situation. The analysis presented later in this document shows the financial consequences of maintaining the status quo and the effect of implementing the NIOSH report recommendations to revise the Hazardous Order.

3. METHODOLOGY

- A. The literature was reviewed to learn more about power-driven circular saws, band saws, guillotine shears and the extension of coverage to chainsaws, jigsaws, friction saws, wire saws, alligator shears, circular shears, circular

knives, abrasive wheels, disc grinders and paper shredders and the areas of industry where these machines are used. General information about relevant employment trends, safety and health issues, and economic factors was also gathered.

- B. Facts and information were collected and analyzed related to fatalities, injuries and illnesses arising from the use of power-driven saws and shears.
- C. Other factors regarding implementation of the changes to the regulation were examined. This included the feasibility of implementing the changes, the impact on small businesses and family-owned businesses, and possible cause and effect relationships.
- D. Quantitative costs and benefits were developed using Office of Management & Budget (OMB) guidelines, in particular OMB Circular A-4 [OMB 2003a]. Costs and benefits for the individual person, industry and the government were separated for possible analytical use and then brought together in a composite figure.
- E. Based on information developed in A to D above, the study developed qualitative costs and benefits for which dollar figures cannot be determined or which result in an intangible cost or benefit (e.g. effect of regulation on quality of life).
- F. The relevant stakeholders for the analysis were considered to be individuals (employed youth), industry and government (federal and state). The analysis focused on costs and benefits to each of these stakeholders independently.
- G. Sensitivity analysis were conducted on those assumptions and variables considered to be the most uncertain to determine the impact of the changes on the overall quantitative results.
- H. Summary and conclusions were based on an analysis of the totality of all facts developed and data collected during this study.

4. LITERATURE REVIEW

The Report on the Youth Labor Force [DOL 2002] states, “during 1996-1998 period, 2.9 million youths aged 15 to 17 worked during school months and 4.0 million worked during summer months”. This gives an idea of the total number of youth employed.

In 2002 [BLS 2003], total number of occupational fatalities for youth under 16 years of age was 16 and for youth aged 16 and 17 years of age it was 25. Of the latter 25 fatalities, 6 were highway related. These figures are small in comparison to the number of youth employed but any fatality is a tragedy to be avoided and

the Hazardous Orders set out to do just that for a section of society more vulnerable than most.

The NIOSH Report [NIOSH 2002] had difficulty in obtaining data relevant to the recommendations for extension of coverage of the Hazardous Order. This is not surprising when you remember that No. 14 was introduced as a “catch all” to take care of what Hazardous Orders Nos. 4, 5, 8, 10, 11 and 12 missed. Some of the data quoted is also shown in the section of the NIOSH report relating to Hazardous Order for Power-driven Woodworking Machine Operations (No. 5). Data for fatalities, injuries and illnesses are classified according to the Occupational Injury and Illness Structures (OIICS) [NIOSH 2002, National Safety Council 1995]. OIICS classifies machines by function rather than the material processed by the machine. Hence, the data includes fatalities, injuries and illnesses for machines sawing, shearing, cutting and abrading wood, metal, glass, plastic, stone, etc.

With the contents of the previous paragraph in mind, the following statistics have been extracted from the section on Power-driven Circular Saws, Band Saws and Guillotine Shears in the NIOSH report [NIOSH 2002] and are quoted here:

- The Census of Fatal Occupational Injuries (CFOI) identified 151 deaths in the 6-year period, 1992-97, among workers of all ages in which stationary sawing machinery, powered chainsaws, other hand-held powered saws and shearing machines were deemed to be the primary or secondary cause of death [NIOSH 2002, NIOSH 2001c];
- In 1997, the Survey of Occupational Injuries & Illnesses (SOII) identified 12,111 injuries and illnesses serious enough to require time away from work associated with stationary sawing machinery, powered chainsaws, other hand-held powered saws and shearing machines [NIOSH 2002, BLS 1999b].

There are no data specific to the under 18 age group in any of the statistics presented in this section of the NIOSH Report. The CFOI data and the SOII data were searched by the Cost & Benefit Analysis Team and no deaths of youth could be found and few injuries or illnesses. The matter is dealt with further in the section on Data Analysis and Interpretation.

As noted earlier, Hazardous Order No. 14 is a “catch all” regulation. Many of the deaths, injuries and illnesses quoted in the CFOI and SOII data, if they had involved youth, would have been covered by one of the other Hazardous Orders Nos. 4, 5, 8, 10, 11 and 12. For example, power-driven chainsaws are common in logging operations. As noted in the NIOSH report, “among the 70 chainsaw-related fatalities, the primary fatal events were being struck by a tree (38 deaths) and being struck by a swinging or slipping object (16 deaths)”. If there had been any deaths of youth in the 38 tree-related incidents, Hazardous Order No. 4 for Logging and Sawmilling should have covered them, i.e., it would have been illegal working.

The NIOSH report cites one fatality of a 17-year-old youth in 1995 resulting from his loss of control of a chainsaw [NIOSH 2002, NIOSH 1995a]. A literature survey was carried out to see if there were any references in addition to those found by NIOSH for their report. The NIOSH web site contains a link to their “FACEWeb” – the NIOSH Fatality Assessment and Control Evaluation Program. Only one FACE report was found relating to youth under 18 years of age and fatalities, injuries or illnesses caused by power-driven saws, cutting and shearing machines. This result is rather surprising given the widespread use of such machines in industry. There were, of course, FACE Reports of fatalities and injuries relating to adults over 18 years of age and power-driven saws, cutting and shearing machines.

The FACE Report mentioned above [FACE 2003] concerned a 15-year-old student who had fingers amputated while operating an unguarded table saw (stationary circular saw) in a woodworking class at a school. The case would have been covered under Hazardous Order No. 5 and, in any case, would have been subject to the student learner exemption.

An internet search for reports or articles covering accidents involving power-driven saws, cutting and shearing machines also resulted in only a few references and none involving youth. For example, OSHA’s Accident Investigation Search [OSHA 2004b] showed no accidents involving youth related to power-driven saws, cutting and shearing machines.

The Bibliography at the end of this analysis lists the items which were found and reviewed. Web site addresses have also been included where appropriate.

5. DATA ANALYSIS & INTERPRETATION

5.1 Estimated Number of Workers

Power-driven saws and cutting and shearing machines are used throughout industry. In some cases, their use forms the entire occupation of a worker. In most cases, the use will only be part of the overall occupation. Hence, it is impossible to calculate precisely the total number of workers who use such machines. It is possible, though, to identify at least some of the workers who use power-driven saws and cutting and shearing machines for most or all of their working time.

The source of data is America’s Career InfoNet Occupation Report [Career InfoNet 2004]. Data extracted from this source is shown in Appendix 1. The total number of workers identified as using power-driven saws and cutting and shearing machines for the main part of their jobs is 492,000. The occupations shown in Appendix 1 are unlikely to be covered by Hazardous Orders Nos. 4, 5, 8, 10, 11 and 12. If it is assumed that the ratio of total youth employed (4 million

from Section 4) to the total USA employment (120,000,000 approximately) i.e., 1 : 30, infers that there are around 16,000 youth employed in occupations using power-driven saws and cutting and shearing machines on materials other than wood.

The above figures from America's Career InfoNet are for employees who use power-driven saws and cutting and shearing machines as the main part of their jobs. There will be even more employees who make incidental use of power-driven saws and cutting and shearing machines in their work. For example, a millwright will use such machines in his work. It is possible that a million or more employees use these machines in their jobs. In that case, applying the same 1 : 30 ratio, the number of youth also using such equipment could be around 33,000.

When the Hazardous Order is revised and implemented, some or all of the 33,000 youth using power-driven saws and cutting and shearing machines will lose their jobs and will have to be replaced by adults. Let us assume that it will be the 16,000 who use the machines for most of their working time. It should be emphasized that the estimate is highly speculative and relies on an even distribution of ages using power-driven saws and cutting and shearing machines.

5.2 Estimated Number of Fatalities

The Literature Review in Section 4 quoted extracts from the NIOSH Report [NIOSH 2002]. There were 151 fatalities for all age groups in the period 1992-97 that happened during activities covered by the existing Hazardous Orders Nos. 4, 5, 8, 10, 11, 12 and 14 or the extended coverage brought about by implementation of the NIOSH report recommendations. There is insufficient information to separate out those fatalities which would have been covered by the extension of coverage from those already covered.

As noted in the Literature Review in Section 4, the NIOSH Report [NIOSH 2002] presents no data for fatalities, injuries and illnesses of youth under age 18 who have been using power-driven saws and cutting and shearing machines. The Cost & Benefit Analysis Team reviewed the available CFOI data from BLS and could find no deaths of youths that fall within the coverage of the existing Hazardous Order or its extended coverage after implementation of the recommendations of the NIOSH Report. The CFOI data was supplied by OSHA on a CD ROM [BLS 2003a] and spanned the period 1992 to 2002, i.e., 5 years more than the NIOSH report data. NIOSH used the same data but quoted from the period 1992-1997.

From the above analysis, it is difficult to conclude that any lives of youth under 18 years of age will be saved as a result of implementation of the NIOSH Report recommendations. The CFOI data from BLS for the 11 years from 1992 to 2002 simply provides no evidence. Therefore, in the quantitative analysis described in section 9, the assumption is that no lives will be saved.

5.3 Estimated Number of Injuries & Illnesses

The Literature Review in Section 4 quoted extracts from the NIOSH Report [NIOSH 2002]. There were 12,111 injuries and illnesses for all age groups in 1997 that happened during activities either covered by the existing Hazardous Orders Nos. 4, 5, 8, 10, 11, 12 and 14 or would have been covered if the NIOSH Report recommendations had been in place. The NIOSH report does not distinguish between the two cases.

The Cost & Benefit Analysis Team obtained a CD ROM from OSHA which contained the same BLS data as quoted by NIOSH but extending the time period to 1992-2001 [BLS 2003b]. Table 2 below shows extracts from that data for the same sources of injury and illness as quoted by NIOSH but also breaking down into age groups and extending the time period to 1996-2001.

1996-2001	OIICS code	Number of Injuries/Illnesses			
		All age groups	Under 14	14 to 15	16 to 19
Cutting hand tools - powered	722	32,903	--	--	1,686
Chainsaws - powered	7221	8,862	--	--	244
Saws – powered, except chainsaws	7224	17,230	--	--	911
Shearing machines	3512	2,432	--	--	69
Sawing machinery - stationary	357	41,703	--	--	1,612
Band saws	3572	9,074	--	--	168

The presentation of the data is complicated by one age group category being “16 to 19” whilst the cut-off for youth under the Hazardous Orders is under 18. There are many more workers in the 18-19 age group than in the 16-17 age group.

As noted earlier, the above injuries may already be covered under the Hazardous Orders Nos. 4, 5, 8, 10, 11, 12 and 14. It is not possible to distinguish between those that are already covered (and would then be classified as illegal working) and those that would have been covered by the NIOSH report recommendations for No. 14, had they been in place.

Another piece of evidence of few injuries and illnesses is the lack of FACE reports and OSHA Accident Investigation Searches, as described in the Literature Review. Hence, the conclusion is that the Cost & Benefit Analysis can show no reduction in injuries and illnesses to youth under 18 as a result of the implementation of the NIOSH report recommendations for Hazardous Order No. 14, Power-driven Circular Saws, Band Saws and Guillotine Shears.

6. STATE CHILD LABOR LAWS

The summaries of the State Child Labor Hazardous Orders Regulations [WHD 2004b] were examined to find references relevant to the Federal Child Labor Hazardous Orders and to determine if the State Laws already include the revisions to the Federal Laws proposed in the NIOSH Report.

There are direct references to Power-driven Circular Saws, Band Saws and Guillotine Shears in 15 of the summaries of the State Laws [WHD 2004b]. Many of the references are clearly prompted by the existing Federal Hazardous Order. Although this analysis records all references to the subject, the aim was to identify State Hazardous Orders which are stricter than the Federal Hazardous Orders. The next step was to compare the additional restrictions imposed by State Laws with the NIOSH recommendations.

There are very few States that do not have Child Labor Hazardous Orders. In general, they follow the Federal Child Labor Hazardous Orders. There are some States which already have Laws that cover the revisions proposed in the NIOSH Report. However, in most cases, the States merely re-state the Federal Orders but in a less comprehensive way.

There are 15 States that specifically mention Circular Saws, Band Saws and Guillotine Shears and, therefore, are replicating Hazardous Order No. 14. Only two States go further with their own Laws in including some or all of the NIOSH report recommendations. South Carolina prohibits Alligator Shears, Rotary Shears and Squaring Shears. Connecticut prohibits Flame Cutting but this method would not necessarily be prohibited by the revised Hazardous Order No. 14. It might be prohibited under a new Hazardous Order for Welding.

Overall conclusion is that the NIOSH recommendations will strengthen Child Labor Hazardous Orders in most States. Industry in most States will find that they have something to take note of when the revised Hazardous Order comes into effect. The States mentioned above as having some of the NIOSH recommendations already in place do not have the complete recommendations.

Please refer to Appendix 5 for details of each State.

7. IMPACT ON SMALL & FAMILY-OWNED BUSINESSES

Since power-driven saws, cutting and shearing machines are universal throughout industry, the effect will be widespread but evenly felt across the entire country. This means that small and family-owned businesses will be just as affected as larger businesses. Small and family-owned businesses should not be disproportionately affected by implementation of the NIOSH recommendations.

8. FEASIBILITY OF IMPLEMENTATION

No particular difficulty is foreseen in implementing the revised Hazardous Order. Those entities concerned with power-driven saws, cutting and shearing machines need to be informed of the revisions to the Hazardous Order. This will be done during the rule-making process. They will have an opportunity to comment on the proposed new Hazardous Order.

9. EVALUATION OF COSTS & BENEFITS

9.1 Quantitative

The objective of the quantitative analysis is to distinguish between two alternatives, the “Without Implementation” approach (or status quo) and the “With Implementation” approach (or implementing the HO as suggested in the NIOSH recommendation), by systematically identifying the various costs and benefits associated with each alternative and assigning a derived monetized value to compare the net effect. As an end result, both the Net Present Value (NPV) and Benefit to Cost Ratio (BCR) are used as comparison ratios to economically value the alternatives in terms of highest benefit and lowest cost. The NPV shows the discounted effect of the monetized costs and benefits, which include injury, illness, and fatality reduction, promulgation and implementation costs to industry and government, and post-implementation enforcement costs. The BCR ratio reflects the total discounted benefits of implementing the HO divided by the total discounted costs, which are primarily the costs associated with promulgation, implementation, and post-implementation. More specific methodology is discussed below.

9.1.1 Methodology

In conducting the quantitative analysis, the following methodology was used to formulate the various costs and benefits associated with each alternative.

- A. Costs and benefits were examined over a 10-year planning horizon.
- B. In order to reflect benefits and costs equally, both are presented in constant Fiscal Year (FY) 2004 dollars. All prior year, current, and any future costs reflect the level of prices of base year 2004, which has the equivalent effect of inflation removed.
- C. Both 3 percent and 7 percent discount rates were used. The 3 percent rate is the “social rate of discount,” which attempts to compensate for the social implication of the analysis, while the 7 percent rate is the discount rate as prescribed under OMB guidance.
- D. Any adjustments for inflation were made using the GDP Deflator index

and are converted to FY04 dollars.

- E. The incremental approach examines the net effect of implementing the HO versus not implementing the HO. The full value approach provides the full Net Present Value (NPV) for both alternatives equally.
- F. Estimates for individual costs of non-fatal injuries and illnesses were based on \$50,000 per injury having at least one lost work-day [Viscusi 1992]. Industry costs for injuries have been derived from the OSHA “SafetyPays!” database using the category “Injuries, not specified” for FY04 [OSHA 2004].
- G. Fatalities have been estimated for individuals using a value of \$5 million per life [Fed Reg 2003]. The costs of fatalities to industry were estimated at \$25,687 per life, a figure updated for inflation from 1996 [Leigh et al. 2001].
- H. Costs to industry are costs associated with implementing the order based on internal efficiency workplace regulatory costs in *service* firms and include workforce education, worker replacement costs, and any wage differential costs. The costs do not include transfer costs, which have an overall effect on the economy and measure price increases but are outside the scope of this analysis [Crain, WM, Hopkins, TD].
- I. Costs to government include cost to implement the order as well as surveillance costs attributed to enforcing the order. Federal and state enforcement costs were derived using historical data on past child labor investigations, including number of investigations conducted, average time spent on investigations, total man-hours expended, and average investigator wages. Average penalties were not calculated as they are assumed to be wash costs for this analysis (cost to industry; benefit to government).

9.1.2 Assumptions & Constraints specific to Quantitative Analysis

In addition to the general assumptions and constraints described in Section 2 above, the following are more specific assumptions that relate specifically to the quantitative analysis.

- A. Implementation of the HO, if adopted, will not occur until FY05. Year 0 (FY04) includes some costs attributed to government implementation; however, the full effects, including benefits, of implementation do not occur until FY05.
- B. It is assumed that the injury, illness, and fatality rate will continue indefinitely without implementation of the HO. This assumption is based

on the current growth within the construction industry and associated trends.

- C. With regard to government enforcement costs, it is assumed that state governments conduct twice as many investigations as the federal government. Although it is understood that the states have varying degrees of budgetary constraints concerning labor law enforcement, child labor laws have remained unaltered for decades and changing them in the near future, therefore, would suggest a concerted enforcement effort by both state and federal government.

9.1.3 Results

Table 3 presents a summary of the results of the analysis. More in-depth views of the underlying estimates are provided in Appendices 3 and 4.

There is neither benefit nor cost to the Individual because there are no lives saved or injuries or illnesses avoided.

Implementation of the NIOSH report recommendations **costs** Industry an NPV of \$3.532 million at 3% discount or \$3.400 million at 7% discount. There is no benefit to industry.

Implementation of the NIOSH report recommendations **costs** Government an NPV of \$7.370 million at 3% discount or \$6.138 million at 7% discount. There is no tangible benefit to Government.

The overall **costs** are, in Net Present Values, \$10.901 million at 3% discount or \$9.537 million at 7% discount.

This analysis confirms that, if no lives are saved or no injuries and illnesses avoided, then there are only costs to Industry and Government.

TABLE 3

**WITH IMPLEMENTATION EFFECT - NPV @ 3 PERCENT AND 7 PERCENT
(\$'000s)**

Year	NPV @ 3 Percent			NPV @ 7 Percent		
	<i>Benefits/Cost Avoidances (Costs) to Individuals</i>	<i>Benefits/Cost Avoidances (Costs) to Industry</i>	<i>Benefits/Cost Avoidances (Costs) to Government</i>	<i>Benefits/Cost Avoidances (Costs) to Individuals</i>	<i>Benefits/Cost Avoidances (Costs) to Industry</i>	<i>Benefits/Cost Avoidances (Costs) to Government</i>
2004 (Year 0)	\$0	\$0	(\$223)	\$0	\$0	(\$223)
2005 (Year 1)	\$0	(\$3,532)	(\$1,005)	\$0	(\$3,400)	(\$967)
2006 (Year 2)	\$0	\$0	(\$766)	\$0	\$0	(\$710)
2007 (Year 3)	\$0	\$0	(\$744)	\$0	\$0	(\$663)
2008 (Year 4)	\$0	\$0	(\$722)	\$0	\$0	(\$620)
2009 (Year 5)	\$0	\$0	(\$701)	\$0	\$0	(\$579)
2010 (Year 6)	\$0	\$0	(\$680)	\$0	\$0	(\$541)
2011 (Year 7)	\$0	\$0	(\$661)	\$0	\$0	(\$506)
2012 (Year 8)	\$0	\$0	(\$641)	\$0	\$0	(\$473)
2013 (Year 9)	\$0	\$0	(\$623)	\$0	\$0	(\$442)
2014 (Year 10)	\$0	\$0	(\$605)	\$0	\$0	(\$413)
Total NPV:	\$0	(\$3,532)	(\$7,370)	\$0	(\$3,400)	(\$6,138)
Overall Net Benefit		(\$10,901)			(\$9,537)	
BCR:	Not applicable as there are no benefits			Not applicable as there are no benefits		

9.2 Qualitative

There are costs and benefits which are difficult to calculate precisely in numerical terms. These costs and benefits may be termed qualitative as opposed to the quantitative costs and benefits described in Appendix 3. The table in Appendix 4 summarizes the qualitative costs and benefits of the new Hazardous Order.

Other points of a qualitative nature are:

- *Apprenticeship Programs:* The existing Hazardous Order has an apprentice and student learner exemption. The NIOSH recommendation is to allow this exemption to continue for stationary machines but to prohibit hand-held, powered saws and cutting and shearing machines. The prohibition will have an effect on apprentices and student learners but it is difficult to be specific about the extent of the effect. Firstly, many of the power-driven saws and cutting and shearing machines are covered by other Hazardous Orders so, No. 14 would not have jurisdiction. Secondly, these machines are often used infrequently as part of a person's job. Hence, the number of apprentices and student learners affected is difficult to determine.
- *Fairness and Equity:* Power-driven saws and cutting and shearing machines have many inherent risks which can be mitigated by engineered safety and by procedural safety. This is more so for stationary machines than it is for hand-held machines. However, it seems fair and equitable to avoid the risk to youth by implementing the proposed changes to the Hazardous Order.
- *Technological Feasibility:* There is no change in technology advocated by the proposed changes to the Hazardous Order and, hence, there will be no impact.
- *Economic Impact:* The implementation of the recommendations in the NIOSH Report may have a significant impact because there could be around 16,000 youth 17 years of age and younger who would no longer be able to use power-driven saws and cutting and shearing machines.
- *Economic Feasibility:* The implementation of the recommendations in the NIOSH Report extending the coverage of the Hazardous Order seems economically feasible; at least, nothing is immediately obvious that would stop the implementation.
- *Illegal Working:* In some cases, illegal working is willful disregard of the regulations by youth or their supervisors and in other cases it is simply ignorance of the regulations. In the absence of precise statistics, the

current analysis has assumed full compliance with the Hazardous Orders, before and after implementation of the NIOSH recommendations.

- *Alternative to a complete ban:* One possible alternative would be to give under 18 year olds training in the safe operation of power-driven saws and cutting and shearing machines. It is unlikely that such an alternative will be acceptable as it would also require some means of certification to ensure that the training is carried out to an adequate standard. Also, the hazardous nature of hand-held machines such as chainsaws would not necessarily be completely mitigated by safety training.
- *Effect on supply of labor:* Since there could be around 33,000 youth under 18 years of age using power-driven saws and cutting and shearing machines at work, the impact on the labor supply could be significant when the revised Hazardous Order is implemented as a result of the NIOSH recommendations.

TABLE 4

IMPACT OF QUALITATIVE FACTORS

FACTOR	POTENTIAL IMPACT
Apprenticeships	Moderate
Economic feasibility and impact	Moderate
Illegal working	Moderate
Technological impact	No Impact
Effect on supply of labor	Moderate

Definitions:

No Impact: Factor has no effect, either positively or negatively, on individuals, industry, and/or government.

Low Impact: Factor may have some effect, either positively or negatively, on individuals, industry, and/or government.

Moderate Impact: Factor will most likely have an effect, either positively or negatively, on individuals, industry, and/or government.

High Impact: Factor will have an effect, either positively or negatively, on individuals, industry, and/or government.

10. SENSITIVITY ANALYSIS

For Cost & Benefit Analyses of Hazardous Orders that show both costs and benefits, sensitivity analysis is carried out in order to assess more clearly the effects of certain assumptions and other variables. This is done because of the degree of uncertainty of the data. A sensitivity analysis is usually conducted on several of these key assumptions. Changing each assumption individually while holding all other variables constant, the sensitivity analysis reflects the overall change to NPV at both the 3 percent and 7 percent discount rates and reflects the level of sensitivity the overall results have to the change.

In the case of this Hazardous Order, the analysis of the data available has led to the conclusion that no lives would be saved and no injuries and illnesses would be avoided. There were four variations from the base case that were tested in the sensitivity analysis. Their descriptions are shown below. Table 5 presents a summary of the numerical results of the analysis, including the percentage change from the baseline analysis.

- *Industry implementation costs are 100% higher.* This Sensitivity Analysis No. 1 shows what happens if, for example, the number of youth affected is much higher than the estimated 16,000.
- *Promulgation costs are 100% higher.* Although the estimate for promulgation costs has been estimated using reasonable assumptions, this Sensitivity Analysis No. 2 shows what happens if the costs turn out to be 100% higher.
- *Enforcement costs are 50% lower.* Sensitivity analysis No. 3 shows what happens if enforcement costs turn out to be half of the current estimate.
- *Impact of implementation will occur within five years.* This Sensitivity Analysis No. 4 predicts that full impact of implementation of the HO will occur earlier based on the current need to update child labor laws, which have not been changed for over 30 years, as well as the relatively low estimate of youth workers in the industry.

TABLE 5 : RESULTS OF SENSITIVITY ANALYSIS
(\$'000s)

Change in Assumption	NPV @ 3%		NPV @ 7%	
	<i>Incremental Benefit (Cost)</i>	<i>% Change from Baseline</i>	<i>Incremental Benefit (Cost)</i>	<i>% Change from Baseline</i>
<i>Base Case</i>	(\$10,901)		(\$9,537)	
<i>1. Industry implementation costs 100% higher.</i>	(\$14,433)	(32.40%)	(\$12,937)	(35.65%)
<i>2. Promulgation costs are 100% higher.</i>	(\$11,340)	(4.03%)	(\$9,968)	(4.52%)
<i>3. Enforcement costs are 50% lower.</i>	(\$7,436)	31.79%	(\$6,684)	29.92%
<i>4. Impact of implementation will occur within five years.</i>	(\$7,692)	29.44%	(\$7,162)	24.91%

Table 5 shows that:

1. Assuming industry implementation costs are 100% higher results in 32-36% increase in the overall cost.
2. Assuming promulgation costs are 100% higher results in approximately 4% increase in overall cost.
3. Assuming enforcement costs are 50% lower decreases overall cost by about 30%.
4. Reducing the period of calculation from 10 years to 5 years has a large effect, reducing the overall cost by 25-29%.

11. SUMMARY & CONCLUSIONS

The analysis shows that the recommendation in the NIOSH Report to extend the coverage of Hazardous Order No. 14 to embrace a wider range of power-driven saws and cutting and shearing machines is feasible. However, no benefits were identified as arising from the implementation, only costs. The reason is that available data indicate that no lives will be saved and no injuries or illnesses avoided.

The Net Present Value (NPV) of the **cost** of implementing the revised Hazardous Order is **\$9,537,139** at 7% per annum discount rate and **\$10,901,376** at 3% discount rate, both in real (constant dollars) terms. Note, though, that this is an order, which improves the health and safety of the nation's youth.

APPENDIX 1 : NUMBERS EMPLOYED

America's Career InfoNet Occupation Report

SOC No.	Description of Occupation	No. Employed in Year 2000
51-4031	Cutting, Punching, and Press Machine Setters, Operators, and Tenders, Metal and Plastic: Set up, operate, or tend machines to saw, cut, shear, slit, punch, crimp, notch, bend, or straighten metal or plastic.	371,700
51-6062	Textile Cutting Machine Setters, Operators and Tenders: Set up, operate or tend machines that cut textiles.	37,600
51-9032	Cutting and Slicing Machine Setters, Operators and Tenders: Set up, operate, or tend machines that cut or slice materials, such as glass, stone, cork, rubber, tobacco, food, paper or insulating material.	82,700
	TOTAL	492,000

SOC is the US Census 2000 Standard Occupational Classification System. The SOC is the federal government's standard occupational classification system. It groups occupations according to the nature of the work performed, and relates these occupations to others of a similar nature. There are 23 major groups in the SOC and 821 detailed occupations within those groups. This system provides a mechanism for cross-referencing and aggregating occupation-related data collected by social and economic statistical reporting programs. The Census Bureau has adapted the SOC to create the occupation categories used in Census 2000. [US Census 2002]

APPENDIX 2 : DETAILS OF THE CALCULATION OF COSTS & BENEFITS

<i>Without Implementation</i>				TOTAL
Fatalities and Non-fatalities	Promulgation	Implementation/ Surveillance		
Individuals ¹	\$0	\$0	\$0	\$0
Industry ²	\$0	\$0	\$0	\$0
Government ³	\$0	\$0	\$0	\$0
<p>¹ Individual costs are calculated as follows: { \$5,000,000 (VOSL) x 0 (average number of fatalities) } + { 0 (average number of injuries/illnesses) x \$50,000 (WTP injury) }.</p> <p>² Industry costs are calculated as follows: \$12,045 (OSHA "\$afetyPays!" database, "injuries - not specified", direct and indirect costs) x 0 (average number of injuries/illnesses) + { \$25,687 (average cost to industry per fatality, adjusted for inflation) x 0 (average number of fatalities) }</p> <p>³ Government cost includes Medicaid and disability income paid to individuals and their beneficiaries and is calculated as follows: \$10,344 (annual cost of Social Security benefit) x { 0 x .15 (percentage of injuries/illnesses estimated to result in long-term disability) }. As an ongoing government cost, and as new workers are assumed to be added to this burden annually, the base cost is escalated by 10 percent annually.</p>				

<i>With Implementation</i>				TOTAL
	Fatalities and Non-fatalities	Promulgation	Implementation/ Surveillance	
Individuals ¹	\$0	\$0	\$0	\$0
Industry ²	\$0	\$0	\$3,637,600	\$3,637,600
Government ^{3,4}	\$0	\$445,423	\$812,500	\$1,257,923

¹ The assumption is made here that implementing the HO will reduce the injury, illness, and fatality rate to zero.

² Industry costs are calculated using SBA findings for average efficiency cost to industries on implementing federal workplace regulations. The calculation uses an average per-employee cost of FY04\$227.35 x 16,000 (estimated number of youths affected). An alternative approach, not used in this case, is based on 1 percent of industry receipts (\$? billion x 0.3%) and adjusting for the youth population in relation to the total employed, including self employed (factor of 0.0084).

³ Government promulgation costs (federal government cost) is based on the equivalent of 3 GS-13s (\$120,000/annual burdened salary) x 1 year} + \$50,000 (cost to publish the order). State government costs for implementation are based on two legal workers per state (51 states) at an avg. hourly rate of \$43.41 x 16 hours.

⁴ Government enforcement costs (federal government cost) are based on an additional burden of 500 annual investigations @ cost of \$1,625/investigation.

Annual Costs - Without Implementation Saws and Cutting and Shearing Machines HO												
	Fiscal Year											Total
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
Individuals												
Death/Innesses/Injuries	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Promulgation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Implementation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Industry												
Death/Innesses/Injuries	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Promulgation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Implementation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Government												
Death/Innesses/Injuries	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Promulgation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Implementation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
<i>Total</i>	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Annual Costs - With Implementation of Saws and Cutting and Shearing Machines HO												
	Fiscal Year											Total
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	
Individuals												
Death/Innesses/Injuries	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Promulgation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Implementation	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Industry												
Death/Innesses/Injuries	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Promulgation	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Implementation	\$0	\$3,637,600	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$3,637,600
Government												
Death/Innesses/Injuries	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Promulgation	\$222,711	\$222,711	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$445,423
Implementation	\$ -	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 8,125,000
<i>Total</i>	\$222,711	\$4,672,811	\$812,500	\$812,500	\$812,500	\$812,500	\$812,500	\$812,500	\$812,500	\$812,500	\$812,500	\$ 12,208,023

APPENDIX 3 : NET PRESENT VALUE (NPV) CALCULATIONS

NPV CALCULATION COST & BENEFIT ANALYSIS: Overall - Government, Industry & Individual (000's)

Activity		Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Total
Promulgation													
Promulgation - government	Cost	(223)	(223)	0	0	0	0	0	0	0	0	0	(445)
Implementation													
Industry costs	Cost	0	(3,638)										(3,638)
Government costs	Cost	0	0	0	0	0	0	0	0	0	0	0	0
Post-Implementation													
Decrease in fatalities/injuries/illnesses: individual	Benefit	0	0	0	0	0	0	0	0	0	0	0	0
Decrease in fatalities/injuries/illnesses: industry	Benefit	0	0	0	0	0	0	0	0	0	0	0	0
Decrease in fatalities/injuries/illnesses - government	Benefit	0	0	0	0	0	0	0	0	0	0	0	0
Enforcement/Surveillance Costs - government	Benefit	0	(813)	(813)	(813)	(813)	(813)	(813)	(813)	(813)	(813)	(813)	(8,125)
Net (Cost) or Benefit	BY04\$	(223)	(4,673)	(813)	(813)	(813)	(813)	(813)	(813)	(813)	(813)	(813)	(12,208)
Discount Rate (@3%)		1.000	0.971	0.943	0.915	0.888	0.863	0.837	0.813	0.789	0.766	0.744	
Discount Rate (@7%)		1.000	0.935	0.873	0.816	0.763	0.713	0.666	0.623	0.582	0.544	0.508	
NPV @ 3%		(223)	(4,537)	(766)	(744)	(722)	(701)	(680)	(661)	(641)	(623)	(605)	-\$10,901
NPV @ 7%		(223)	(4,367)	(710)	(663)	(620)	(579)	(541)	(506)	(473)	(442)	(413)	-\$9,537

**COST/BENEFIT ANALYSIS NET EFFECT (INCREMENTAL APPROACH)
(@ 3 PERCENT)**

Fiscal Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	TOTAL
Year of Implementation	0	1	2	3	4	5	6	7	8	9	10	
Without Implementation Alternative - Cost to Individuals	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$ -
With Implementation Alternative - Cost to Individuals	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$ -
Without Implementation Alternative - Cost to Industry	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$ -
With Implementation Alternative - Cost to Industry	\$ -	\$ 3,637,600	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,637,600
Without Implementation Alternative - Cost to Government	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$ -
With Implementation Alternative - Cost to Government	\$ 222,711	\$ 1,035,211	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 8,570,423
Net Cost (Cost Savings/Avoidances) - Individual	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Net Cost (Cost Savings/Avoidances) - Industry	\$ -	\$ 3,637,600	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,637,600
Net Cost (Cost Savings/Avoidances) - Government	\$ 222,711	\$ 1,035,211	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 8,570,423
Discount Factor (@ 3%)	1.00	0.971	0.943	0.915	0.888	0.863	0.837	0.813	0.789	0.766	0.744	
Discounted Cost (Cost Savings/Avoidances) - Individual	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Discounted Cost (Cost Savings/Avoidances) - Industry	\$ -	\$ 3,531,650	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,531,650
Discounted Cost (Cost Savings/Avoidances) - Government	\$ 222,711	\$ 1,005,059	\$ 765,859	\$ 743,553	\$ 721,896	\$ 700,870	\$ 680,456	\$ 660,637	\$ 641,395	\$ 622,714	\$ 604,576	\$ 7,369,726
Net Discounted Cost (Cost Savings/Avoidances)	\$ 222,711	\$ 4,536,710	\$ 765,859	\$ 743,553	\$ 721,896	\$ 700,870	\$ 680,456	\$ 660,637	\$ 641,395	\$ 622,714	\$ 604,576	\$ 10,901,376
Cumulative Discounted Costs for Without Implementation Alternative	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Cumulative Discounted Costs for With Implementation Alternative	\$ 222,711	\$ 4,759,421	\$ 5,525,280	\$ 6,268,833	\$ 6,990,729	\$ 7,691,598	\$ 8,372,054	\$ 9,032,691	\$ 9,674,086	\$ 10,296,800	\$ 10,901,376	
Net Present Value (NPV)	\$ 222,711	\$ 4,759,421	\$ 5,525,280	\$ 6,268,833	\$ 6,990,729	\$ 7,691,598	\$ 8,372,054	\$ 9,032,691	\$ 9,674,086	\$ 10,296,800	\$ 10,901,376	
Benefits to Cost Ratio (BCR)												(1.00)

¹ The discount factor is calculated as follows:

$$1/(1 + \text{discount rate})^t \text{ where } t = \text{year of life cycle and the discount rate.}$$

² Assumes no time lag between year of implementation and year cost savings/avoidance begins.

**COST/BENEFIT ANALYSIS NET EFFECT (INCREMENTAL APPROACH)
(@ 7 PERCENT)**

Fiscal Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	TOTAL
Year of Implementation	0	1	2	3	4	5	6	7	8	9	10	
Without Implementation Alternative - Cost to Individuals	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
With Implementation Alternative - Cost to Individuals	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$ -
Without Implementation Alternative - Cost to Industry	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
With Implementation Alternative - Cost to Industry	\$ -	\$ 3,637,600	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,637,600
Without Implementation Alternative - Cost to Government	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$ -
With Implementation Alternative - Cost to Government	\$ 222,711	\$ 1,035,211	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 8,570,423
Net Cost (Cost Savings/Avoidances) - Individual	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Net Cost (Cost Savings/Avoidances) - Industry	\$ -	\$ 3,637,600	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,637,600
Net Cost (Cost Savings/Avoidances) - Government	\$ 222,711	\$ 1,035,211	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 8,570,423
Discount Factor (@ 7%)	1.00	0.935	0.873	0.816	0.763	0.713	0.666	0.623	0.582	0.544	0.508	
Discounted Cost (Cost Savings/Avoidances) - Individual	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Discounted Cost (Cost Savings/Avoidances) - Industry	\$ -	\$ 3,399,626	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,399,626
Discounted Cost (Cost Savings/Avoidances) - Government	\$ 222,711	\$ 967,487	\$ 709,669	\$ 663,242	\$ 619,852	\$ 579,301	\$ 541,403	\$ 505,984	\$ 472,882	\$ 441,946	\$ 413,034	\$ 6,137,513
Net Discounted Cost (Cost Savings/Avoidances)	\$ 222,711	\$ 4,367,113	\$ 709,669	\$ 663,242	\$ 619,852	\$ 579,301	\$ 541,403	\$ 505,984	\$ 472,882	\$ 441,946	\$ 413,034	\$ 9,537,139
Cumulative Discounted Costs for Without Implementation Alternative	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	
Cumulative Discounted Costs for With Implementation Alternative	\$ 222,711	\$ 4,589,825	\$ 5,299,494	\$ 5,962,736	\$ 6,582,588	\$ 7,161,889	\$ 7,703,292	\$ 8,209,276	\$ 8,682,159	\$ 9,124,105	\$ 9,537,139	
Net Present Value (NPV)	\$ 222,711	\$ 4,589,825	\$ 5,299,494	\$ 5,962,736	\$ 6,582,588	\$ 7,161,889	\$ 7,703,292	\$ 8,209,276	\$ 8,682,159	\$ 9,124,105	\$ 9,537,139	
Benefits to Cost Ratio (BCR)												(1.00)

¹ The discount factor is calculated as follows:

$$1/(1 + \text{discount rate})^t \text{ where } t = \text{year of life cycle and the discount rate.}$$

² Assumes no time lag between year of implementation and year cost savings/avoidance begins.

**COST/BENEFIT ANALYSIS (FULL VALUE APPROACH)
(@ 3 PERCENT)**

Fiscal Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	TOTAL
Year of Implementation	0	1	2	3	4	5	6	7	8	9	10	
Without Implementation Alternative - Cost to Individuals	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
With Implementation Alternative - Cost to Individuals	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Without Implementation Alternative - Cost to Industry	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
With Implementation Alternative - Cost to Industry	\$ -	\$ 3,637,600	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,637,600
Without Implementation Alternative - Cost to Government	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
With Implementation Alternative - Cost to Government	\$ 222,711	\$ 1,035,211	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 8,570,423
Discount Factor (@ 3%)	1.00	0.971	0.943	0.915	0.888	0.863	0.837	0.813	0.789	0.766	0.744	
Discounted Without Implementation Alternative - Cost to Individuals	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Discounted With Implementation Alternative - Cost to Individuals	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Discounted Without Implementation Alternative - Cost to Industry	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Discounted With Implementation Alternative - Cost to Industry	\$ -	\$ 3,531,650	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,531,650
Discounted Without Implementation Alternative - Cost to Government	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Discounted With Implementation Alternative - Cost to Government	\$ 222,711	\$ 1,005,059	\$ 765,859	\$ 743,553	\$ 721,896	\$ 700,870	\$ 680,456	\$ 660,637	\$ 641,395	\$ 622,714	\$ 604,576	\$ 7,369,726
Net Present Value (NPV) - Without Implementation Alternative	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Net Present Value (NPV) - With Implementation Alternative	\$ 222,711	\$ 4,536,710	\$ 765,859	\$ 743,553	\$ 721,896	\$ 700,870	\$ 680,456	\$ 660,637	\$ 641,395	\$ 622,714	\$ 604,576	\$ 10,901,376
Benefit to Cost Ratio (BCR) - Without Implementation Alternative												#DIV/0!
Benefit to Cost Ratio (BCR) - With Implementation Alternative												(1.00)

¹ The discount factor is calculated as follows:
 $1/(1 + \text{discount rate})^t$ where t = year of life cycle and the discount rate.

COST/BENEFIT ANALYSIS (FULL VALUE APPROACH)												
(@ 7 PERCENT)												
Fiscal Year	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	TOTAL
Year of Implementation	0	1	2	3	4	5	6	7	8	9	10	
Without Implementation Alternative - Cost to Individuals	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
With Implementation Alternative - Cost to Individuals	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Without Implementation Alternative - Cost to Industry	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$ -
With Implementation Alternative - Cost to Industry	\$ -	\$ 3,637,600	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,637,600
Without Implementation Alternative - Cost to Government	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
With Implementation Alternative - Cost to Government	\$ 222,711	\$ 1,035,211	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 812,500	\$ 8,570,423
Discount Factor (@ 7%)	1.00	0.935	0.873	0.816	0.763	0.713	0.666	0.623	0.582	0.544	0.508	
Discounted Without Implementation Alternative - Cost to Individuals	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Discounted With Implementation Alternative - Cost to Individuals	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Discounted Without Implementation Alternative - Cost to Industry	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Discounted With Implementation Alternative - Cost to Industry	\$ -	\$ 3,399,626	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 3,399,626
Discounted Without Implementation Alternative - Cost to Government	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Discounted With Implementation Alternative - Cost to Government	\$ 222,711	\$ 967,487	\$ 709,669	\$ 663,242	\$ 619,852	\$ 579,301	\$ 541,403	\$ 505,984	\$ 472,882	\$ 441,946	\$ 413,034	\$ 6,137,513
Net Present Value (NPV) - Without Implementation Alternative	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Net Present Value (NPV) - With Implementation Alternative	\$ 222,711	\$ 4,367,113	\$ 709,669	\$ 663,242	\$ 619,852	\$ 579,301	\$ 541,403	\$ 505,984	\$ 472,882	\$ 441,946	\$ 413,034	\$ 9,537,139
Benefit to Cost Ratio (BCR) - Without Implementation Alternative												#DIV/0!
Benefit to Cost Ratio (BCR) - With Implementation Alternative												(1.00)

¹ The discount factor is calculated as follows:
 $1/(1 + \text{discount rate})^t$ where t = year of life cycle and the discount rate.

APPENDIX 4 : QUALITATIVE COSTS & BENEFITS

ISSUE	Qualitative Cost	Qualitative Benefit
1. Promulgating the Rule	<ul style="list-style-type: none"> Public Awareness of the need to have a new HO 	N/A
2. Implementing the Rule	<ul style="list-style-type: none"> Amount of time necessary for establishments to analyze and adjust to new standards 	N/A
3. Post-Implementation Impact		
a. Impact on youth and their families	<ul style="list-style-type: none"> Lost employment opportunity for youth; but there will likely be other employment opportunities for youth 	<ul style="list-style-type: none"> Decrease in pain and suffering due to the fatalities and serious injuries avoided at full compliance
b. Impact on employers and industry (effectiveness, efficiency, and other impacts)	<ul style="list-style-type: none"> Impact of having to hire and train older workers because pipeline will no longer include youth Potential increase in number of youth working illegally after changes are imposed Impact on individual family economics for family owned and operated businesses Impact on small businesses generally 	
c. Impact on U.S. and regional economy	Assumed neutral	Assumed neutral
d. Other impacts	<ul style="list-style-type: none"> Impact on apprenticeship programs 	<ul style="list-style-type: none"> Impact on fairness and equity

APPENDIX 5 : ANALYSIS OF STATE CHILD LABOR LAWS

Purpose

The summaries of the State Child Labor Hazardous Orders Regulations [WHD 2004b] were examined to find references relevant to the Federal Child Labor Hazardous Orders and to determine if the State Laws already include the revisions to the Federal Laws proposed in the NIOSH Report.

There are direct references to Power-driven Circular Saws, Band Saws and Guillotine Shears in the summaries of 15 of the State Laws [WHD 2004b]. Many of the references are clearly prompted by the existing Federal Hazardous Order. Although this analysis records all references to the subject, the aim was to identify State Hazardous Orders which are stricter than the Federal Hazardous Orders. The next step was to compare the additional restrictions imposed by State Laws with the NIOSH recommendations.

Overall Findings

There are very few States that do not have Child Labor Hazardous Orders. In general, they follow the Federal Child Labor Hazardous Orders. There are some States which already have Laws that cover the revisions proposed in the NIOSH Report. However, in most cases, the States merely re-state the Federal Orders but in a less comprehensive way.

There are 15 States that specifically mention Circular Saws, Band Saws and Guillotine Shears and, therefore, are replicating Hazardous Order No. 14. Only two States go further with their own Laws in including some or all of the NIOSH report recommendations. South Carolina prohibits Alligator Shears, Rotary Shears and Squaring Shears. Connecticut prohibits Flame Cutting but this method would not necessarily be prohibited by the revised Hazardous Order No. 14. It might be prohibited under a new Hazardous Order for Welding.

Overall conclusion is that the NIOSH recommendations will strengthen Child Labor Hazardous Orders in most States. Industry in most States will find that they have something to take note of when the revised Hazardous Order comes into effect. The States mentioned above as having some of the NIOSH recommendations already in place do not have the complete recommendations.

Alabama

Although not explicitly stated, the regulations are in line with those of the WHD.

No person under 18 years of age shall be employed or permitted or suffered to work at any of the following occupations, positions, or places: (7) Operating any power-driven woodworking, bakery, or paper-products machinery; (12) Operating any power-driven metal forming, cutting, straightening, drawing, punching, or shearing machines; (15)

Assembling, adjusting, cleaning, oiling, or servicing machinery in motion; (16) Operating any circular saws, band saws, or guillotine shears.

No person under 16 years of age shall be employed, permitted, or suffered to work at any of the following occupations, positions, or places: (1) Operating or assisting in operating any sandpaper or wood polishing machinery, any washing, grinding, or mixing machinery, or commercial laundry equipment; (3) In any work in or about a rolling mill, machine shop, or manufacturing establishment which is hazardous or dangerous to health, limb, or life.

Alaska

Although not explicitly stated, the regulations are closely in line with those of the WHD.

Occupations prohibited to minors under 18: (5) Operation of power-driven woodworking machines (8AAC 05.100); (9) Operation of power-driven metal forming, punching, and shearing machines (8AAC 05.130); (14) Occupations involved in the operation and cleaning of circular saws, band saws and guillotine shears (8AAC 05.180).

Arizona

Although not explicitly stated, the regulations are closely in line with those of the WHD.

A person shall not employ or allow a person under the age of 18 years to work in, about or in connection with: (5) Occupations involving the operation, setup, repair, adjustment, oiling or cleaning of a power-driven woodworking machine; (8) Occupations involving the operation of a power-driven metal working, forming, punching or shearing machine; (13) Occupations involving the operation of a power-driven saw.

Arkansas

Protection is for under 16 year olds only.

11-6-107

(a) No child under sixteen (16) years shall be employed or permitted to work at any of the following occupations:

- (1) Adjusting any belt to any machinery.
- (2) Sewing or lacing machine belts in any workshop or factory.
- (3) Oiling, wiping, or cleaning machinery or assisting therein.
- (4) Operating or assisting in operating any of the following machines: (a) Circular or Band Saws; (1) Metal or paper cutting machines.
- (5) In proximity to any hazardous or unguarded belt, machinery or gearing.

California

Federal Laws are followed plus their own laws but note that protection is for under 16 only.

Prohibited occupations for minors under 16:

No minor under the age of 16 shall be employed or permitted to work in any capacity in: (sec. 1292): (a) Adjusting any belt to any machinery; (b) Sewing or lacing machine belts in any workshop or factory; (c) Oiling, wiping, or cleaning machinery, or assisting therein.

No minor under the age of 16 years shall be employed, or permitted, to work in any capacity in operating or assisting in operating any of the following machines (sec.1293): (a) Circular or band saws; wood shapers; wood-jointers; planers; sandpaper or wood-polishing machinery; wood turning or boring machinery; (c) Printing presses of all kinds; boring or drill presses; stamping machines used in sheet metal and tin ware, in paper and leather manufacturing, or in washer and nut factories; metal or paper-cutting machines; paper-lace machines; (f) Wire or iron straightening or drawing machinery; rolling-mill machinery; power punches or shears; washing, grinding or mixing machinery.

Colorado

Although not explicitly stated, the regulations are closely in line with those of the WHD.

The following occupations are declared to be hazardous for minors under age 18. (Sec. 8-12-110 (2)): (f) Operation of the following power-driven machinery: Woodworking machines; Metal-forming machines; Punching or shearing machines; Shears; Any other power-driven machinery which the director determines to be hazardous.

Connecticut

Although not explicitly stated, the regulations are closely in line with those of the WHD.

The following occupations, in all industries, are declared hazardous and such employment of minors under 18 years of age is prohibited: Abrasive Wheel Operation; Flame Cutting; Operation of Metal Working Machinery, Fixed or Portable; Use of portable Power Driven Machinery; Use of Power Actuated Hand Tools; Presses (Foot, Hand or Power) Operation of Air, Oil, Water Electric, Belt-Driven or Spring Actuated Metal-Forming, Punching and Shearing Machines; Shear, Operator (Hand, Foot, Power); Woodworking Machinery, Fixed or Portable, Operation or Helper.

Delaware

Federal Laws are followed plus their own state laws.

A minor under 16 years of age shall not be employed or permitted to work in, about or in connection with: (3) The operation, cleaning, or adjusting of any power-driven machinery, appliances, or tools, other than office machinery and food or beverage dispensing machines where the moving parts are not exposed to the operator.

District of Columbia

Federal Laws are followed plus their own state laws.

No minor under 16 years shall be employed, permitted, or suffered to work at any of the following occupations: (a) In the operation of any machinery operated by power other than hand or foot power; or (b) In oiling, wiping, or cleaning machinery or assisting therein.

Florida

Although not explicitly stated, the regulations are closely in line with those of the WHD.

(2) No minor under 18 years of age, whether such person's disabilities or nonage have been removed, shall be employed or permitted or suffered to work in any of the following places of employment or in any of the following occupations, provided that the provisions of paragraphs (b), (e), (g), (h), (j), (m), (o), and (q) shall not apply to the employment of student learners under the conditions prescribed in s. 450.161: (e) In the operation of power-driven woodworking machines; (g) In the operation of power-driven metal forming, punching, or shearing machines.

(1) No minor 15 years of age or younger, whether or not such person's disabilities or nonage have been removed by marriage or otherwise, shall be employed or permitted or suffered to work in any of the following occupations: (a) In connection with power-driven machinery, except power mowers with cutting blades 40 inches or less; (b) In any manufacturing that makes or processes a product with the use of industrial machines; (h) In oiling, cleaning, or wiping machinery or shafting or applying belts to pulleys.

Georgia

Although not explicitly stated, the regulations are closely in line with those of the WHD, at least for persons under 16 years of age.

The following occupations, positions and/or locations shall be deemed hazardous and no minor under age of 16 years shall be employed to work at or in the vicinity of or assist in the operation of such hazardous machinery, nor shall a minor under the age of 16 be similarly employed in any other occupation that a reasonable person in good conscience would consider dangerous to the life, limb or injurious to the health and/or morals of such minor. (a) Occupations connected with: (1) Machinery: Power driven machinery or equipment including elevators whether driven by electric or steam or any other energy

but excluding equipment designed to reproduce printed matter, where no electric wiring or connections and/or gears or other moving parts are exposed. (3) Equipment: Any hand or powered portable tools or equipment peculiar to or generally identified with the building and trades industry including pressure contained vessels whether or not portable.

Hawaii

Although not explicitly stated, the regulations are closely in line with those of the WHD.

Occupations declared hazardous for minors less than 18 years of age:

12-25-43: Occupations in operation of power-driven woodworking machines.

12-25-46: Occupations involved in the operation of power-driven metal forming, punching, and shearing machines.

12-25-51: Occupations involved in the operation of circular saws, band saws, and guillotine shears.

12-25-28: Additional hazardous occupations for minors under sixteen. In addition to occupations hereinbefore declared hazardous, the following occupations are declared hazardous for minors under sixteen years of age: (1) Manufacturing or processing occupations, including occupations requiring the performance of any duties in workrooms or workplaces where goods are manufactured or otherwise processed.

Idaho

No mention of Federal Laws or anything connected with this Hazardous Order.

Illinois

Although not explicitly stated, the regulations are closely in line with those of the WHD, at least for persons under 16 years of age.

No minor under 16 years of age shall be employed, permitted or allowed to work: (2) In the oiling, cleaning or wiping of machinery or shafting; (8) In the operation of machinery used in the cold rolling of heavy metal stock, or in the operation of power-driven punching, shearing, stamping, or metal plate bending machines. (10) In the operation of power-driven woodworking machines, or off-bearing from circular saws.

Indiana

Federal Laws are followed. No other law is mentioned.

Iowa

Although not explicitly stated, the regulations are closely in line with those of the WHD.

No person under eighteen years of age shall be employed or permitted to work with or without compensation at any of the following occupations or business establishments: (4) Occupations involved in the operation of power-driven woodworking machines; (7) Occupations involved in the operation of power-driven metal forming, punching, and shearing machines; (13) Occupations involved in the operation of circular saws, band saws and guillotine shears.

Kansas

Federal Laws are followed plus their own state laws.

38-602 No child under the age of 18 shall be employed in any of the occupations declared by the United State Secretary of Labor to be within the hazardous occupation regulations issued pursuant to the child labor provisions of the Fair Labor Standards Act.

Kentucky

Federal Laws are followed plus their own state laws.

Louisiana

Although not explicitly stated, the regulations are in line with those of the WHD.

Minors, except those indentured as apprentices in accordance with Chapter 4 of this Title, shall not be employed, permitted, or suffered to work: (1) In oiling, cleaning, or wiping machinery or shafting, or in applying belts to pulleys; (6) In the operation of machinery used in the cold rolling of heavy metals or in the operation of power-driven machinery for punching, shearing, stamping, bending, or planing metals; (8) In the operation of power-driven woodworking machines, or off-bearing from circular saws.

Maine

Although not explicitly stated, the regulations are in line with those of the WHD.

Minors who are sixteen and seventeen years of age may not be employed in the following occupations: (4) Power-driven woodworking machines; (6) Power-driven metal forming, punching and shearing machines; (10) Power-driven circular saws, band saw, and guillotine shears; (12) Occupations involving the use of power-driven mowers or cutters, including the use of chain saws.

Maryland

Federal Laws are followed plus their own state laws.

Sec. 3-313 (b) Minors under 16 Except as otherwise provided in this subtitle, a minor under the age of 16 may not be employed or allowed to work: (4) in, about or in connection with (vi) the adjustment, cleaning, or operation of power-driven machinery.

Massachusetts

Although not explicitly stated, the regulations are in line with those of the WHD.

No person shall employ a minor under sixteen or permit him to work in operating or assisting in operating any of the following machines: (1) Circular or band saws or ensilage cutters, which shall include any such saw or cutter on a farm, except with respect to a minor under sixteen who is related by blood or marriage to the owner or operator of the farm on which such minor is employed or permitted to work; (10) Metal or paper cutting machines; (17) Power punches or shears.

Michigan

Although not explicitly stated, the regulations are in line with those of the WHD.

Prohibited occupations for minors under 18 years of age: (9) A minor shall not be employed in any occupation involving the operations, setup, repair, adjustment, oiling, or cleaning of any of the following machines: (a) Power-driven woodworking machinery; (b) Power-driven metal-forming, metal-punching, and metal-shearing machines; (e) Power-driven saws.

Minnesota

Although not explicitly stated, the regulations are in line with those of the WHD.

No minor under the age of 18 shall be employed: (I) To operate or to assist in the operation of power-driven machinery, including but not limited to: industrial trucks (forklifts); meat saws and meat grinders; milling machines; punch presses, press brakes, and shears; and woodworking machinery such as circular saws, radial saws, jointers, and shaping machines.

In addition to the restrictions in part 5200.0910 no minor under the age of 16 may be employed: (F) To operate or assist in the operation of machinery, including but not limited to: (4) drill presses, milling machines, grinders, lathes, and such portable power-driven machinery as drills, sanders, and polishing and scrubbing equipment for floor maintenance; (G) In oiling, cleaning, or maintaining any power-driven machinery, either portable or stationary, while in motion or at rest.

Mississippi

No mention of Federal Laws and the few state laws only apply to the under 14 year olds.

Missouri

No mention of Federal Laws but some of their State Laws are similar.

A child under sixteen shall not be employed or permitted to work by any person, firm, or corporation in connection with: (1) Any power driven machinery, except lawn and garden machinery used in domestic service at or around a private residence, provided that, there shall be an agreement between an occupant of the private residence and the child, and by no other person, firm or corporation, other than a parent, legal custodian or guardian of the child, for the performance of such work; (2) The oiling, cleaning, maintenance, or washing of machinery; (8) Any blast furnace, rolling mill, foundry, forging shop, or in any establishment where heating of metals is carried on or where cold rolling, stamping, shearing, punching, of metal stock is carried on.

Montana

Although not explicitly stated, the regulations are in line with those of the WHD.

Unless working as an apprentice or student-learner under the provisions of 41-2-110, a minor 16 or 17 years of age may not be employed in or in connection with any of the following occupations: (3) the operation of power-driven woodworking machines; (6) the operation of a power-driven metal forming, punching, and shearing machine; (12) the operation of a circular saw, band saw, or guillotine shears.

Nebraska

No mention of Federal Laws and only one State law concerning under 16 year olds.

Nevada

No mention of Federal Laws but the State has a number of its own, at least for the under 16 year olds and not related to the Federal Laws.

New Hampshire

Federal Laws are followed plus their own State laws.

New Jersey

Although not explicitly stated, the regulations are in line with those of the WHD.

12-58-4-11: Circular Saws, Band Saws and Guillotine Shears: (a) Minors under 18 years of age shall not be employed, permitted or suffered to work as an operator or helper with circular saws, band saws and guillotine shears; (b) Minors under 18 years of age shall not set-up, adjust, repair, oil, or clean circular saws, band saws and guillotine shears.

34-2-21-17: No minor under 18 years of age shall be employed, permitted or suffered to work in, about, or in connection with the following:

- Operation or helping in the operation of power-driven woodworking machinery; provided, that apprentices operating under conditions of bona fide apprenticeship may operate such machines under competent instruction and supervision.
- Cutting machines having a guillotine action.

12-58-3-2: Minors under 16 years of age shall not be employed, permitted or suffered to work in, about, or in connection with power-driven machinery. "Power driven machinery" shall include: Power tools, including but not limited to, power lawn mowers, power woodworking and metal working tools.

New Mexico

No mention of Federal Laws and their own State Laws are not entirely in line with the Federal Laws.

No child under the age of sixteen years shall be employed or permitted to labor at any of the following occupations or in any of the following positions: power-driven woodworking machines used for cutting, shaping, forming, surfacing, nailing, stapling, wire stitching, fastening or otherwise assembling, processing or printing wood or veneer.

New York

Although not explicitly stated, the regulations are in line with those of the WHD.

UNDER 18 YEARS OF AGE: Art. 4, Section 133 (2) No minor of any age shall be employed in or assist in: (c) operating or using any emery, tripoli, rouge, corundum, stone, silicon carbide, or any abrasive, or emery polishing or buffing wheel, where articles of the baser metals or iridium are manufactured; (e) adjusting belts to machinery or cleaning, oiling or wiping machinery; (m) any occupation involved in the operation of power-driven woodworking, metal-forming, metal-punching, metal-shearing, bakery, and paper products machines; (n) any occupation involved in the operation of circular saws, band saws and guillotine shears.

North Carolina

Federal Laws are followed plus their own state laws which are not in line with Federal Laws.

North Dakota

Federal Laws are followed plus their own state laws which are not in line with Federal Laws.

No minor fourteen or fifteen years of age may be employed or permitted to work in: (1) Any employment involving the use of any power-driven machinery; but this prohibition does not apply to the use of (a) office machines, such as adding machines or typewriters; (b) tagging, pricing, or similar machines used in retail stores; (c) domestic-type machines used in food service operations, such as toasters, coffee grinders, milkshake blenders; (d) machines used in service stations such as those in connection with car cleaning, washing, or polishing, or in the dispensing of gasoline or oil; provided, however, that no work may be done in connection with cars and trucks if such work involves the use of pits, racks, or lifting apparatus, or involving the inflation of any tire mounted on a rim equipped with removable retaining rim; or (e) lawnmowers.

Ohio

Although not explicitly stated, the regulations are in line with those of the WHD.

Occupations prohibited for minors under 18 years of age: 4101:9-2-11 Power-driven metal forming, punching, and shearing machine operations; 4101:9-2-12: Occupations involved in the operation of power-driven circular saws, band saws, and guillotine shears; 4101:9-2-13: Power-driven woodworking machine occupations.

Oklahoma

Federal Laws for under 16 year olds are followed plus their own state laws but these are not in line with Federal Laws.

Oregon

Federal Laws are followed plus their own state laws.

(2) The following occupations and types of work are declared to be hazardous for any minor under 16 years of age when the work is performed in rooms or areas having power-driven machinery: (v) All kinds of work in workshops or any premise, room, or place where power-driven machinery is used for the purpose of adapting articles or goods for sale.

Pennsylvania

Some Federal Laws are followed plus their own state laws.

§11.46: Employment of minors under 18 years of age on power-driven woodworking machinery is prohibited except for apprentices, student learners and graduates of an approved vocational, technical or industrial educational curriculum which prepared them for employment in the specific occupation.

Rhode Island

Some of their State Laws are in line with Federal Laws.

§28-3-9 Employment of minors in hazardous places or occupations. No minor under sixteen (16) years of age shall be employed or permitted to work in operating or assisting in operating any of the following machines: circular or bandsaws, wood shapers, wood jointers, planers, sand paper or wood polishing machinery;; wood turning or boring machinery; stamping machines used in sheet metal or tinware manufacturing or in washer and nut factories; machines used in making corrugated rolls;.....; wire or iron straightening machinery; rolling mill machinery, power punches, shears, or drop presses; washing, grinding, or mixing machinery;.....; or in any place where dangerous belting or gearing is not provided with proper safeguards; or in any work, occupation, place, or process declared by the depart of labor and training to be injurious, dangerous, or hazardous for minors under sixteen (16) years of age.

South Carolina

Many of their State laws are in line with the Federal Laws.

(E) The following occupations involved in the operation of power-driven woodworking machines are particularly hazardous for minors between sixteen and eighteen years of age:

- The occupation of operating power-driven machines, including supervising or controlling the operation of such machines, feeding material into such machines, and helping the operator to feed material into such machines but not including the placing of material on a moving chain or in a hopper or slide for automatic feeding.
- The occupations of setting up, adjusting, repairing, oiling, or cleaning power-driven woodworking machines.
- The occupations of off-bearing from circular saws and from guillotine-action veneer clippers.

(H) The following occupations are particularly hazardous for the employment of minors between sixteen and eighteen years of age: The occupations of operator of or helper on the following power-driven metal forming, punching, and shearing machines:

- All shearing machines, such as guillotine or squaring shears; alligator shears; and rotary shears.

The occupations of setting-up, adjusting, repairing, oiling, or cleaning these machines including those with automatic feed and ejection.

(L) The following occupations are particularly hazardous for the employment of minors between sixteen and eighteen years of age:

- The occupations of operator of or helper on the following power-driven fixed or portable machines except machines equipped with full automatic feed and ejection: Circular Saws, Band Saws and guillotine Shears.
- The occupations of setting-up, adjusting, repairing, oiling, or cleaning circular saws, band saws, and guillotine shears.

South Dakota

No mention of Federal Laws and only a few state laws concerning under 16 year olds which do not relate to Federal Laws.

Tennessee

No mention of Federal Laws but some of their State Laws are in line with Federal Laws.

A minor under age 18 may not be employed in connection with the following: (5) Occupations involved in the operation of power-driven woodworking machines; (8) Occupations involved in the operating of power-driven metal-forming, punching and shearing machines; (14) Occupations involved in the operation of circular saws, band saws and guillotine shears.

Texas

Federal Laws are followed plus their own (limited) state laws.

Utah

Federal Laws are followed and there is no other.

Vermont

Federal Laws are followed and there is no other.

Virginia

No mention of Federal Laws but many of the State Laws are in line with Federal Laws.

No child under eighteen years of age shall be employed, permitted or suffered to work: (2) At operating or assisting to operate any grinding, abrasive, polishing or buffing machine, any power-driven metal forming, punching or shearing machine, power-driven bakery machine, power-driven paper products machine, any circular saw, band saw or guillotine shear, or any power-driven woodworking machine; (3) In oiling or assisting in oiling, wiping and cleaning any such machinery.

Index of Hazardous Occupations: (4) Power-Driven Woodworking Machine Occupations (16VAC15-30-60); (7) Power-Driven Metal Forming, Punching, and Shearing Machine

Occupations (16VAC15-30-90); (13) Occupations Involved in the Operation of Power-Driven Circular Saws, Band Saws, and Guillotine Shears. (16VAC15-30-150)

Washington

Although not specifically mentioned, their State Laws are in line with Federal Laws but the State Laws are much more extensive.

WAC 296-125-030 Prohibited and hazardous employment – All minors. The following employments and occupations as outlined in subsections (1) through (30) of this section, are prohibited for all minors, provided that exemption will be allowed from subsections (5), (8), (9), (11), (13), (15), (16), and (23) of this section when the minor is participating in a bona fide cooperative vocational education program, diversified career experience program, or work experience program certified and monitored by the office of the superintendent of public instruction or the minor employee's school district; further, exemption from the same numbered prohibitions will be allowed for any minor involved in an apprenticeship program registered with the Washington state apprenticeship and training council. The state will not grant variances for employments or occupations prohibited by the United States Department of Labor: (5) Occupations involving operation or repair, oiling, cleaning, adjusting, or setting up of any power-driven wood-working machines; (8) Occupations involving operation or repair, oiling, cleaning, adjusting, or setting up of power-driven metal-forming, punching, and shearing machines; (13) Occupations involving operation or repair, oiling, cleaning, adjusting, or setting up of power-driven circular saws, band saws, and guillotine shears.

WAC 296-125-033 Prohibited and hazardous employment – Special restrictions for minors under the age of 16. Employment of minors under age 16 is subject to the following additional restrictions. They are prohibited from working: (8) In occupations involving operation or repair, oiling, cleaning, adjusting, or setting up of or working in proximity to any power-driven machinery.

West Virginia

Many of their State Laws are in line with Federal Laws.

No child under eighteen years of age may be employed, permitted or suffered to work in, about, or in connection with any of the following occupations: (5) Power-driven woodworking machine occupations; (8) Power-driven metal-forming, punching, and shearing machine occupations; (14) Occupations involved in the operation of power-driven circular saws, band saws, and guillotine shears.

Wisconsin

Many of their State Laws are in line with Federal Laws.

Occupations prohibited for minors under age 18: DWD 270.06 (11) Metal forming, punching and shearing power-driven machines; (17) Circular saws, band saws and guillotine shears; (20) Woodworking, power-driven machines.

Occupations prohibited for minors under age 16: DWD 270.06 (28) Power-driven machinery (light); in the operation of or assisting in the operation of the following machines: DWD 270.06 (28)(b) Machines; drill presses, grinder wheels, lathes and portable power-driven machinery such as drills, sanders and floor maintenance equipment – polishers and scrubbers.

Wyoming

No mention of Federal Laws but a selection of own laws, none of which is relevant to this Hazardous Order.

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