

**North Carolina Department of Labor
Occupational Safety and Health Division**

Raleigh, North Carolina

Field Information System

Operational Procedure Notice 149A

Subject: Special Emphasis Program for Amputations

A. Purpose and Scope.

This Operational Procedure Notice (OPN) establishes and implements the North Carolina Department of Labor (NCDOL) Occupational Safety and Health (OSH) Division's Special Emphasis Program (SEP) for safety and health inspections where employees may be exposed to amputation hazards on machinery due to lack of guarding and/or the failure to utilize energy control procedures. This SEP is intended to reduce occupational exposures to amputations by focusing on employers' lockout/tagout program and use of machine guarding. This instruction applies statewide to establishments under OSH Division jurisdiction.

This OPN also provides guidance to compliance safety and health officers (CSHOs) for conducting amputation SEP inspections. This document supplements procedures beyond the standard inspection protocol set forth in the NC Field Operations Manual (FOM).

B. Special Emphasis Program History.

An analysis of the accidents and referrals reported to the OSH Division from January 1, 2015 to May 29, 2018 revealed 576 separate incidents where at least a portion of a single digit had been amputated. 29 CFR 1904.39(b)(11)–Reporting Fatalities, Hospitalizations, Amputations, and Losses of an Eye as a Result of a Work-Related Incident to OSHA defines an amputation as, "... the traumatic loss of a limb or other external body part." "Amputations include a part, such as a limb or appendage, that has been severed, cut off, amputated (either completely or partially); fingertip amputations with or without bone loss; medical amputations resulting from irreparable damage; amputations of body parts that have since been reattached. Amputations do not include avulsions, enucleations, deglovings, scalplings, severed ears, or broken or chipped teeth."

In response to this information, the Amputations SEP was added to the OSH Division's five-year Strategic Management Plan (SMP) for federal fiscal years (FFY) 2019-2023. The first year, FFY 2019, was designed as a planning year. During that time, the SEP committee researched different ways to reduce workplace amputations. Formal SEP activity was implemented beginning in FFY 2020 of the 2019-2023 SMP, which was on October 1, 2019. This included the Amputations targeting schedule outlined in paragraph E.2. – Programmed Inspections. The initial targeting schedule utilized data from January 1, 2015, through December 31, 2018, to identify those North American Industry Classification System (NAICS) codes with the highest rate of amputation and pulled into machinery events in North Carolina. Assignments for programmed planned inspections were randomly pulled from those NAICS codes. In October 2022, the targeting schedule was updated utilizing data from January 1, 2018, through December 31, 2021.

C. **Background.**

The operation of machinery and equipment in the workplace can be extremely dangerous (Reference Appendix B for examples of machinery and equipment that can cause amputations). North Carolina employers have increasingly updated their processes and machinery to keep up with the demand to be efficient and cost-effective. This requires employers to automate processes, causing employees to work in close proximity to complicated high speed equipment, which are powered by multiple sources of energy. The demand for this type of equipment brings with it a greater need for proper machine maintenance and machine guarding. Employee exposures to unguarded or inadequately guarded machinery are addressed in 29 CFR 1910.212–General Requirements for all Machines, 1910.213–Woodworking Machinery Requirements, 1910.217–Mechanical Power Presses, and 1910.219–Mechanical Power-Transmission Apparatus. Likewise, OSHA standards pertaining to employee exposures during servicing and maintenance activities can be found in 29 CFR 1910.147–The Control of Hazardous Energy (Lockout/Tagout).

The goal of this SEP is to reduce amputations statewide by a total of 10%, 2.5% for each of the remaining four years of the Strategic Management Plan. The numbers will be run from the OSHA Express (OE) “Serious/Fatal (UPA) Report” by selecting entries noted as either “Amputation-Digit” or “Amputation-Limb.” The baseline will be the average number of amputations from FFY 2016, 2017, and 2018, which was 168 (166, 167, and 170, respectively, for each of the three years). The goal for each year is as follows:

FFY	Yearly Goal	Cumulative Goal	Baseline	Goal
2020	2.5%	2.5%	168	163
2021	2.5%	5.0%	168	159
2022	2.5%	7.5%	168	155
2023	2.5%	10%	168	151

D. **Training.**

1. Due to the technical and specific nature of these inspections and machinery encountered, Compliance Safety and Health Officers (CSHO) who conduct these inspections must have adequate training and/or experience with both general and specific machine guarding concepts, as well as a thorough understanding of hazardous energy control (lockout/tagout) program requirements.
2. In late summer 2019, a two-day class covering machine guarding and lockout/tagout was taught by experienced members of NCDOL staff in both the eastern and western portions of the state. This class was designed to ensure Compliance, Consultation, and Education, Training and Technical Assistance (ETTA) staff have comprehensive knowledge of both machine guarding and energy control procedures. All NCDOL employees expected to work within the scope of the Amputations SEP were required to attend.
3. Copies of the slides from this initial class were submitted to ETTA so that employees hired afterwards can review them via the OSH One Stop Shop. Additionally, the sections on machine guarding and lockout/tagout in the OSH 105 Safety Standards course taken by new CSHOs were expanded and updated.

4. Refresher training opportunities covering one or more topics under this SEP will be offered at least every two to three years, such as the half-day course on lockout/tagout taught during OSH periodic training in November 2022.

E. **Targeting/Selection.**

Amputations SEP inspections will be generated through accidents, complaints, referrals, and general industry NAICS-specific programmed criteria. Inspections can occur in both construction and general industry. Assignments will have priority based upon the schedule in FOM Chapter II–Compliance Programming, paragraph E – Inspection Priorities.

1. **Unprogrammed Inspections.**

- a. Reports of imminent danger, fatality/catastrophe reports, employer-reported referrals, formal and non-formal complaints, and safety and health referrals from other federal, state, county and city agencies, media reports, reports from physicians, other medical clinics, and the public will be investigated by the respective field office.
- b. The CSHO will follow the guidance for making referrals and expanding the scope under FOM Chapter IX–Complaints, Referrals, and Accidents.

In case of denial of entry, the field office will maintain documentation of the event leading up to the denial.

2. **Programmed Inspections.**

- a. OSH Compliance will utilize historical data to identify the NAICS codes with multiple amputations and a high rate of amputation injuries per 1,000 employees in NC. The Planning, Statistics and Information Management (PSIM) Bureau will randomly select establishments within those NAICS codes for inspection and create assignment lists for each OSH Compliance district. The targeting methodology will include the following:
 - i. OE data will be compiled for the period of January 1, 2018 through December 31, 2021.
 - ii. The “Serious/Fatal (UPA) Report” will be used to identify the NAICS codes for all events classified as “Amputation-Digit,” “Amputation-Limb,” and “Pulled into Machinery.”
 - iii. PSIM will provide data regarding the number of NC employers and employees in each of those NAICS codes.
 - iv. The data from OE and PSIM will be used to calculate the number of amputation/pulled into machinery events per 1,000 NC employees for each NAICS code.
 - v. NAICS codes with three or more “Amputation-Digit,” “Amputation-Limb,” or “Pulled into Machinery” events ($n \geq 3$) and an event rate

greater than or equal to 1.5 per 1,000 NC employees over the four-year data period (calendar years 2018-2021) will be included in the current targeting schedule.

- vi. The compiled data, sorted by NAICS code, is shown in Appendix A. The NAICS codes matching the targeting criteria in paragraph E.2.a.v. above are shown in bold and brought to the top of the table in Appendix A. There were 42 NAICS codes that met the targeting criteria and 216 NAICS codes with at least one amputation event that did NOT meet the targeting criteria.
- vii. From the list of establishments in the 42 targeted NAICS codes, PSIM will randomly select 25 assignments for each OSH Compliance district.
- b. PSIM will review the generated assignment lists to eliminate sites that have received a comprehensive safety or health inspection within the last three years, as well as inactive and duplicate sites. Additional assignments will be pulled as needed by the Compliance district at the request of the Compliance bureau chief or supervisor.
- c. OSH Compliance supervisors will use their professional judgement and may delete establishments based on local knowledge that the facility is not likely to have the targeted machinery or is out of business. CSHOs will proceed with the programmed inspection where it has been determined that a new business is using the same plant equipment of the previous business.

Please note: Employers that have received a comprehensive safety or health inspection within the last three years may still inadvertently be included on the lists provided by PSIM and should be deleted by the district supervisor if this error is found.
- d. All assignments will be inspected or deleted from the targeting schedule per paragraph E.2.c. prior to requesting another list from PSIM. Justification for deletion of an inspection assignment will be documented on the OSH Targeting System.

F. **Compliance Inspection Procedures.**

1. **General.**

- a. If a complaint, referral, or accident inspection is conducted in an establishment covered by this OPN, CSHOs will follow guidance listed below and in FOM Chapter IX–Complaints, Referrals and Accidents.
- b. If a fatality or catastrophe investigation is conducted in an establishment covered by this OPN, CSHOs will follow guidance listed below and in FOM Chapter VIII–Fatality and Catastrophe Investigations.

2. Pre-Inspection Preparation.

- a. CSHOs assigned to conduct programmed, partial-scope inspections under this SEP must review the site listing on the OSH Division Targeting System to determine if a deferral has been issued for the employer/site by the Consultative Services Bureau (e.g., consultative assistance, SHARP), ETTA (Carolina Star Program) or through an OSH Partnership. If the site has a deferral, the CSHO will refer to FOM Chapter III–Inspection Procedures, paragraph D.3.h., Exemptions from Compliance Programmed Planned Inspections, for guidance.
- b. CSHOs assigned to conduct a site inspection under this SEP will familiarize themselves with the following documents as appropriate:
 - i. NC Field Operations Manual
 - ii. CPL 02-00-147–Control of Hazardous Energy
 - iii. CPL 02-01-025–Power Press Brakes
 - iv. CPL 02-01-043–Slide-Locks
 - v. 29 CFR 1910.147–The Control of Hazardous Energy
 - vi. 29 CFR 1910.212–General Requirements for All Machines
 - vii. 29 CFR 1910.213–Woodworking Machinery Requirements
 - viii. 29 CFR 1910.217–Mechanical Power Presses
 - ix. 29 CFR 1910.219–Mechanical Power-Transmission Apparatus
 - x. Industry Data Reports (IDRs) for industries covered under this OPN. The IDRs describe the industry-specific processes and identify the common hazards. They are accessible under the Field Information System (FIS) link on the OSH One Stop Shop.
 - xi. Related ANSI /ASME Standards (Reference Appendix C for a list of consensus standards associated with hazardous machinery and equipment).

3. Inspection Process.

- a. Unprogrammed assignments (e.g., complaints, employer-reported referrals) will be handled in accordance with FOM Chapter IX–Complaints, Referrals, and Accidents. CSHOs should specifically review paragraph A.9. regarding the inspection scope (partial) and the circumstances when it may be expanded to machinery or equipment not included in the original complaint or referral. Paragraph A.9.e.ii. of FOM Chapter IX applies for industries within a NAICS code that is targeted per section E.2.a. above.

- b. For program planned inspections, CSHOs will indicate during the opening conference that an SEP programmed inspection is being conducted for amputation hazards. The inspection will be partial in scope and involve evaluating onsite machinery for machine guarding hazards, reviewing the employer's lockout/tagout policies/procedures, and addressing any serious hazards in plain view. After obtaining the employer's consent to continue with the inspection, the CSHO will proceed with the partial inspection by utilizing the inspection guidelines as outlined in FOM Chapter III–Inspection Procedures.
- c. OSHA 300 logs and 301 incident reports for the prior three years (including the current year) will be evaluated during the inspection to identify recorded amputations, severe lacerations, and/or crush injuries created by machinery and equipment. CSHOs should ensure those pieces of equipment are thoroughly evaluated during the walk-through portion of the inspection.
- d. CSHOs will establish/document the types of machinery and equipment present at the workplace and evaluate each one, with a focus on machinery, actions, and processes that could result in an amputation such as, but not limited to: ingoing nip points, pinch points, rotating parts, as well as shear points, cutting actions and other point of operation hazards. *Note: Some examples of machinery and equipment that can cause amputations are found in Appendix B.* CSHO should evaluate actual and potential (i.e., accidental, inadvertent) exposures during normal production operations and address any hazards under Subpart O–Machinery and Machine Guarding of 29 CFR 1910 or the General Duty Clause.
- e. CSHOs shall also evaluate potential exposures to amputation hazards during servicing and/or maintenance activities, particularly for machine operators. Those activities may include: setup/threading/preparation, clearing jams, making adjustments, cleaning of the machine, oiling or greasing of the machine, and scheduled/unscheduled maintenance. CSHOs shall conduct a comprehensive review of the employer's lockout/tagout program, including but not limited to: the written and unwritten energy control procedures to ensure compliance with 1910.147(c)(4)(i) and (ii)–The Control of Hazardous Energy; the lockout/tagout training program content and documentation and to confirm employees received the correct level of training (i.e., affected or authorized) based on their specific job duties; the periodic inspection program and documentation; and the group lockout procedures if multiple employees are involved with servicing and/or maintenance activities. All CSHOs conducting inspections under the Amputations SEP must read and understand all the information in CPL 02-00-147–The Control of Hazardous Energy - Enforcement Policy and Inspection Procedures, dated February 11, 2008.
- f. CSHOs are required to interview management officials and employees associated with machinery and equipment to determine if factors such as, but not limited to, are present: amputation hazards, a violation of the standard, employee exposure; and/or management could have been aware of the hazard.

5. Citation Guidance.

- a. Refer to the FOM and other appropriate reference documents (such as CPLs) prior to proceeding with citation issuance.

G. **Recording and Tracking.**

1. **Strategic Plan Coding.**

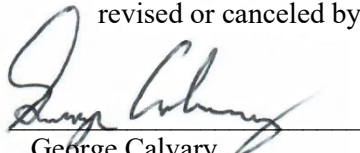
- a. For all unprogrammed inspection activity covered under this SEP, the code “Amputations SEP” shall be marked under the Emphasis/Initiatives tab in OE from the “Strategic Plan Activity Description” pull-down menu. From paragraph A above, this SEP covers inspections “where employees may be exposed to amputation hazards on machinery due to lack of guarding and/or the failure to utilize energy control procedures.” Inspections resulting from any unprogrammed activity involving those hazards must have the “Amputations SEP” Strategic Plan code. Examples include the following:
 - i. Complaints/referrals with one or more allegations related to machine guarding or the failure to properly control hazardous energy during servicing and/or maintenance activities.
 - ii. Employer-reported referrals involving an amputation or other traumatic injuries from machinery (e.g., fractured finger or wrist).
 - iii. Follow-up inspections where citations for machine guarding and/or lockout/tagout violations were issued on the original inspections.
- b. All programmed inspections targeted under paragraph E.2. – Programmed Inspections, of this OPN shall be marked with the “Amputations SEP” Strategic Plan code. Programmed inspections from other OSH Compliance targeting schedules (e.g., general schedule, Site-Specific Targeting, etc.) shall NOT be coded as an “Amputations SEP” inspection, even if machine guarding and/or lockout/tagout hazards are identified and cited. The targeting schedule under this OPN is different from others in that it uses NC-specific event and employment data. Limiting the coding to only those programmed planned inspections generated under paragraph E.2. allows us to properly evaluate the effectiveness of this targeting schedule.
- c. Inspections covered under this SEP that result in a program improvement will be coded as “Program Improvements” under the Emphasis/Initiatives Tab in OE under “Strategic Plan Activity.”

H. **Outreach Activity.**

As outlined in the goals set forth in the most current Strategic Management Plan, ETTA and the Consultative Services Bureau will provide outreach that support this SEP such as developing publications, providing training and conducting consultative surveys.

I. **Effective Date.**

OPN 149 is cancelled. This OPN is effective on the date of signature. It will remain in effect until revised or canceled by the director.


George Calvary
SEP Team Leader


Jennifer Haigwood
OSH Director

04/21/2023
Date of Signature

Appendix A: Industry Type and NAICS Tables
NC Amputation Data by NAICS Code

- Event data from January 1, 2018 – December 31, 2021 includes “Amputation-Digit,” “Amputation-Limb,” and “Pulled into Machinery”.
- NAICS codes with zero amputation events were removed.
- NAICS codes with no data for the # of NC employers and employees are marked “ND.” An amputation injury rate per 1,000 employees could not be calculated for those NAICS codes, so they were not included in this targeting schedule.
- NAICS codes with 3+ amputation events AND with an “amputation injuries per 1,000 NC employees” rate equal to or greater than 1.5 are included in the targeting schedule. Those NAICS codes are sorted to the top of the table, in bold text, and marked “Yes” in the far-right column.

NAICS	Other Included NAICS Codes	NAICS Title	NC Amputations 1/18 - 12/21	# of NC Employers	# of NC Employees	Amputation Injuries per 1,000 Employees	Targeted?
311421		Fruit and Vegetable Canning	3	22	1884	1.6	Yes
311612		Meat Processed from Carcasses	4	42	1731	2.3	Yes
311613		Rendering and Meat Byproduct Processing	3	8	735	4.1	Yes
311615		Poultry Processing	37	42	22424	1.7	Yes
311813		Frozen Cakes, Pies, and Other Pastries Manufacturing	4	4	557	7.2	Yes
311821		Cookie and Cracker Manufacturing	7	15	2243	3.1	Yes
311919		Other Snack Food Manufacturing	3	24	1637	1.8	Yes
313110	313111, 313112, 313113	Fiber, Yarn, and Thread Mills. Also includes events in expired NAICS codes 313111 (17), 313112 (1), and 313113 (2)	24	66	7785	3.1	Yes
313210		Broadwoven Fabric Mills	7	53	4127	1.7	Yes
313230		Nonwoven Fabric Mills	12	48	3630	3.3	Yes
314120	314129	Curtain and Linen Mills. Also includes events in expired NAICS code 314129 (2).	3	57	898	3.3	Yes

NAICS	Other Included NAICS Codes	NAICS Title	NC Amputations 1/18 - 12/21	# of NC Employers	# of NC Employees	Amputation Injuries per 1,000 Employees	Targeted?
315990	315999	Apparel Accessories and Other Apparel Manufacturing. Also includes events in expired NAICS code 315999 (3).	3	19	393	7.6	Yes
321113		Sawmills	12	125	3555	3.4	Yes
321214		Truss Manufacturing	3	30	1468	2.0	Yes
321918		Other Millwork (Including Flooring)	3	56	1772	1.7	Yes
321920		Wood Container and Pallet Manufacturing	10	96	3048	3.3	Yes
321992		Prefabricated Wood Building Manufacturing	3	25	320	9.4	Yes
322121		Paper Mills	4	19	2553	1.6	Yes
322211		Corrugated and Solid Fiber Box Manufacturing	7	60	3742	1.9	Yes
322220	322221, 322222, 322225	Paper Bag and Coated and Treated Paper Manufacturing. Also includes events in expired NAICS 322221 (4), 322222 (1), and 322225 (1).	7	46	3142	2.2	Yes
322299		All Other Converted Paper Product Manufacturing (Employment data is the average from the 4 Quarters of QCEW data for 2021, since annual data was not available).	4	23	1837	2.2	Yes
325211		Plastic Material and Resin Manufacturing	4	54	1614	2.5	Yes
325991		Custom Compounding of Purchased Resins	4	13	537	7.4	Yes
326113		Unlaminated Plastics Film and Sheet (Except Packaging) Manufacturing	4	13	1593	2.5	Yes
326122		Plastics Pipe and Pipe Fitting Manufacturing	4	10	1430	2.8	Yes
326160		Plastics Bottle Manufacturing	3	14	1016	3.0	Yes
327331		Concrete Block and Brick Manufacturing	3	29	1219	2.5	Yes

NAICS	Other Included NAICS Codes	NAICS Title	NC Amputations 1/18 - 12/21	# of NC Employers	# of NC Employees	Amputation Injuries per 1,000 Employees	Targeted?
327390		Other Concrete Product Manufacturing	5	59	1375	3.6	Yes
331511	331513	Iron Foundries. Also includes events in Steel Foundries (2).	3	8	872	3.4	Yes
332119	332115, 332116	Metal Crown, Closure, and Other Metal Stamping (Except Automotive). Also includes events in expired NACIS 332115 (1) and 332116 (3).	4	20	773	5.2	Yes
332312		Fabricated Structural Metal Manufacturing	5	129	3397	1.5	Yes
332321		Metal Window and Door Manufacturing	3	33	1553	1.9	Yes
332510		Hardware Manufacturing	3	15	1478	2.0	Yes
332812		Metal Coating, Engraving and Allied Services	3	75	1221	2.5	Yes
332991		Ball and Roller Bearing Manufacturing	3	9	1166	2.6	Yes
332999		All Other Miscellaneous Fabricated Metal Product Manufacturing	3	51	1402	2.1	Yes
335910	335911, 335912	Battery Manufacturing (5-digit 33591 - 13 ER's with 1,263 EE's). Also includes events from expired NAICS 335911 (2) and 335912 (2).	4	13	1263	3.2	Yes
337122		Nonupholstered Wood Household Furniture Manufacturing	6	104	2215	2.7	Yes
423390		Other Construction Materials Merchant Wholesalers	3	205	1904	1.6	Yes
423510		Metal Service Centers and Other Metal Merchant Wholesalers	5	725	2924	1.7	Yes
424130		Industrial and Personal Service Paper Merchant Wholesalers	4	187	1849	2.2	Yes
488991		Packing and Crating	4	48	1276	3.1	Yes

NAICS	Other Included NAICS Codes	NAICS Title	NC Amputations 1/18 - 12/21	# of NC Employers	# of NC Employees	Amputation Injuries per 1,000 Employees	Targeted?
311211		Flour Milling	2	17	916	2.2	No
311412		Frozen Specialty Food Manufacturing	1	10	380	2.6	No
311422		Specialty Canning	2	*ND	*ND	N/A	No
311511		Fluid Milk Manufacturing	2	8	375	5.3	No
311611		Animal (Except Poultry) Slaughtering	4	46	7760	0.5	No
311811		Retail Bakeries	3	306	2371	1.3	No
311812		Commercial Bakeries	1	103	3561	0.3	No
311824		Dry Pasta, Dough and Flour Mixes	1	*ND	*ND	N/A	No
311830		Tortilla Manufacturing	1	*ND	*ND	N/A	No
311911		Roasted Nuts and Peanut Butter Manufacturing	2	7	602	3.3	No
311991		Perishable Prepared Food Manufacturing	2	13	1891	1.1	No
311999		All Other Miscellaneous Food Manufacturing	1	20	959	1.0	No
312112		Bottled Water Manufacturing	1	11	162	6.2	No
312230		Tobacco Manufacturing	3	40	3583	0.8	No
313240	313241	Knit Fabric Mills. Also included events in expired NAICS code 313241 (1).	1	51	2413	0.4	No
313310	313311, 313312	Textile and Fabric Finishing Mills. Also includes events in expired NAICS codes 313311 (1) and 313312 (3).	4	107	4626	0.9	No
313320		Fabric Coating Mills	1	10	551	1.8	No
314994	314991	Rope, Cordage, Twine, Tire Cord, and Tire Fabric Mills. Also includes events in expired NAICS code 314991 (2).	2	12	652	3.1	No
314999		Misc. Textile Product Mills	3	117	2343	1.3	No
315120	315119	Apparel Knitting Mills Also includes events in expired NAICS 315119 (1). (5-digit 31511 - 59 ER's with 2,703 EE's)	1	None	None	N/A	No

NAICS	Other Included NAICS Codes	NAICS Title	NC Amputations 1/18 - 12/21	# of NC Employers	# of NC Employees	Amputation Injuries per 1,000 Employees	Targeted?
321211		Hardwood Veneer and Plywood Manufacturing	1	27	986	1.0	No
321213		Engineered Wood Member Manufacturing	1	*ND	*ND	N/A	No
321219		Reconstituted Wood Product Manufacturing	2	10	946	2.1	No
321911		Wood Window and Door Manufacturing	2	27	1688	1.2	No
321912		Cut Stock, Resawing Lumber, and Planing	2	28	472	4.2	No
321991		Mobile Home Manufacturing	2	10	1363	1.5	No
321999		All Other Misc. Wood Product Manufacturing	2	76	1483	1.3	No
322130		Paperboard Mills	1	10	1190	0.8	No
322212		Folding Paperboard Box Manufacturing	3	22	2659	1.1	No
322219	322214	Other Paperboard Container Manufacturing (From 322214). Also includes events in expired NAICS 322214 (1).	1	*ND	*ND	N/A	No
322291		Sanitary Paper Product Manufacturing (Employment data is the average from the 4 Quarters of QCEW data for 2021, since annual data was not available).	2	18	1499	1.3	No
323110		N/A (2007 Commercial Lithographic Printing) (5-digit 32311 - 804 ER's with 10,763 EE's)	1	804	10763	0.1	No
323111		Commercial Printing (Except Screen and Books)	5	574	8832	0.6	No
323113		Commercial Screen Printing	1	214	1562	0.6	No
325220		Artificial & Synthetic Fibers/Filaments Mfr.	2	28	2138	0.9	No
325311		Nitrogenous Fertilizer Manufacturing	1	*ND	*ND	N/A	No
325314		Fertilizer Manufacturing (Mixing only)	1	11	185	5.4	No
325411		Medicinal and Botanical Manufacturing	2	*ND	*ND	N/A	No

NAICS	Other Included NAICS Codes	NAICS Title	NC Amputations 1/18 - 12/21	# of NC Employers	# of NC Employees	Amputation Injuries per 1,000 Employees	Targeted?
325412		Pharmaceutical Preparation Manufacturing	4	98	18334	0.2	No
325510		Paint and Coating Manufacturing	1	32	1514	0.7	No
325620		Toilet Preparation Manufacturing	1	30	2441	0.4	No
326111		Plastics Bag and Pouch Manufacturing	1	8	381	2.6	No
326112		Plastics Packaging Film and Sheet (Including Laminated) Manufacturing	2	16	1903	1.1	No
326121		Unlaminated Plastics Profile Shape Mfr.	2	16	716	2.8	No
326140		Polystyrene Foam Product Manufacturing	4	28	3531	1.1	No
326150		Urethane and Other Foam Product (Except Polystyrene) Manufacturing	5	55	4013	1.2	No
326199		All Other Plastics Manufacturing	12	149	11848	1.0	No
326211		Tire Manufacturing	2	8	4508	0.4	No
326212		Tire Retreading	2	16	556	3.6	No
326220		Rubber and Plastic Hoses and Belting Manufacturing	1	23	778	1.3	No
327120		Clay Building Material and Refractories Manufacturing. Also includes events in expired NAICS 327121 (1) and 327125 (1).	2	26	1187	1.7	No
327211		Flat Glass Manufacturing	2	6	706	2.8	No
327212		Other Pressed and Blown Glass and Glassware Mfr.	1	27	2714	0.4	No
327215		Glass Product Manufacturing Made of Purchased Glass	2	32	1293	1.5	No
327313		Glass Container Manufacturing	2	4	817	2.4	No
327320		Ready-Mix Concrete Manufacturing	3	190	3234	0.9	No
327332		Concrete Pipe Manufacturing	1	18	368	2.7	No
327420		Gypsum Product Manufacturing	1	8	164	6.1	No

NAICS	Other Included NAICS Codes	NAICS Title	NC Amputations 1/18 - 12/21	# of NC Employers	# of NC Employees	Amputation Injuries per 1,000 Employees	Targeted?
327910		Abrasive Product Manufacturing	1	11	309	3.2	No
327991		Cut Stone and Stone Product Manufacturing	2	101	1323	1.5	No
327999		All Other Misc. Nonmetallic Mineral Product Manufacturing	1	10	337	3.0	No
331110	331111	Iron and Steel Mills and Ferroalloy Manufacturing. Also includes events in expired NAICS 331111 (1).	1	20	1150	0.9	No
331523	331521	Nonferrous Metal Die-casting Foundries. Also includes events in expired NAICS 331521 (1).	1	7	1055	0.9	No
332117		Powder Metallurgy Part Manufacturing	1	3	201	5.0	No
332313		Plate Work Manufacturing	2	57	1813	1.1	No
332410		Power Boiler and Heat Exchanger Manufacturing	1	*ND	*ND	N/A	No
332420		Metal Tank (Heavy Gauge) Manufacturing	1	23	633	1.6	No
332431		Metal Can Manufacturing	1	*ND	*ND	N/A	No
332439		Other Metal Container Manufacturing	2	*ND	*ND	N/A	No
332613	332612	Spring Manufacturing. Also includes events in expired NAICS 332612 (1).	1	13	319	3.1	No
332618		Other Fabricated Wire Product Manufacturing	1	19	511	2.0	No
332710		Machine Shops	1	546	6189	0.2	No
332722		Bolt, Nut, Screw, Rivet, and Washer Manufacturing	1	9	162	6.2	No
332813		Electroplating, Plating, Polishing, Anodizing, and Coloring	1	38	548	1.8	No
332911		Industrial Valve Manufacturing	2	21	1296	1.5	No
332912		Fluid Power Valve and Hose Fitting Manufacturing	2	19	873	2.3	No

NAICS	Other Included NAICS Codes	NAICS Title	NC Amputations 1/18 - 12/21	# of NC Employers	# of NC Employees	Amputation Injuries per 1,000 Employees	Targeted?
332919		Other Metal Valve and Pipe Fitting Mechanisms	2	7	557	3.6	No
332994		Small Arms, Ordnance, and Ordnance Accessories Manufacturing	1	17	1321	0.8	No
332996		Fabricated Pipe and Pipe Fitting Manufacturing	1	23	676	1.5	No
333112		Lawn and Garden Tractor and Home Lawn and Garden Equipment Manufacturing	1	*ND	*ND	N/A	No
333120		Construction Machinery Manufacturing	8	41	5763	1.4	No
333241	333294	Food Product Machinery Manufacturing. Also includes events in expired NAICS 333294 (1).	1	16	519	1.9	No
333413	333411	Industrial and Commercial Fan and Blower Manufacturing. Also includes events in expired NAICS 333411 (2).	3	38	2509	1.2	No
333414		Heating Equipment Manufacturing	2	19	688	2.9	No
333415		Air Conditioning and Industrial Refrigeration Eq. Mfr.	3	45	3125	1.0	No
333618		Other Engine Equipment Manufacturing	2	*ND	*ND	N/A	No
333924		Industrial Truck, Tractor, and Stacker Machinery Mfr.	1	10	1064	0.9	No
333991		Power-driven Handtool Manufacturing	1	22	821	1.2	No
334413		Semiconductor and Related Device Manufacturing	1	36	5532	0.2	No
334416		Capacitor, Resistor, and Other Inductor Manufacturing	2	9	317	6.3	No
334514		Totalizing Fluid Meter and Counting Device Manufacturing	1	*ND	*ND	N/A	No

NAICS	Other Included NAICS Codes	NAICS Title	NC Amputations 1/18 - 12/21	# of NC Employers	# of NC Employees	Amputation Injuries per 1,000 Employees	Targeted?
335220	335228	Major Household Appliance Manufacturing. Also includes events from expired NAICS 335228 (2).	2	9	3082	0.6	No
335311		Power, Distribution, and Specialty Transformer Mfr.	2	13	743	2.7	No
335312		Motor and Generator Manufacturing	2	25	2583	0.8	No
335313		Switchgear and Switchboard Apparatus Mfr.	1	22	1369	0.7	No
335929		Other Communication and Energy Wire Manufacturing	1	6	922	1.1	No
335931		Current Carrying Wiring Device Manufacturing	3	29	2805	1.1	No
335999		All Other Misc. Electrical Equipment and Component Manufacturing	1	25	668	1.5	No
336120		Heavy Duty Truck Manufacturing	4	3	3946	1.0	No
336211		Motor Vehicle Body Manufacturing	4	36	3208	1.2	No
336212		Truck Trailer Manufacturing	1	7	188	5.3	No
336214		Travel Trailer and Camper Manufacturing	1	24	476	2.1	No
336330		Motor Vehicle Steering and Suspension Components	1	11	262	3.8	No
336340		Motor Vehicle Brake System Manufacturing	1	11	1199	0.8	No
336350		Motor Vehicle Transmission & Power Train Parts	3	25	5341	0.6	No
336360		Motor Vehicle Seating and Interior Trim Manufacturing	1	12	240	4.2	No
336390	336399	Other Motor Vehicle Parts Manufacturing. Also includes events in expired NAICS 336399 (9).	10	45	8185	1.2	No
336612		Boat Building	1	*ND	*ND	N/A	No

NAICS	Other Included NAICS Codes	NAICS Title	NC Amputations 1/18 - 12/21	# of NC Employers	# of NC Employees	Amputation Injuries per 1,000 Employees	Targeted?
337110		Wood Kitchen Cabinet and Countertop Manufacturing	2	256	4873	0.4	No
337121		Upholstered Household Furniture Manufacturing	15	185	17989	0.8	No
337127		Institutional Furniture Manufacturing	2	35	885	2.3	No
337215		Showcase, Partition, Shelving, and Locker Mfr.	2	98	2756	0.7	No
337910		Mattress Manufacturing	2	27	1969	1.0	No
339112		Surgical and Medical Instrument Manufacturing	2	41	2819	0.7	No
339991		Gasket, Packing, and Sealing Device Manufacturing	1	10	434	2.3	No
339994		Broom, Brush, and Mop Manufacturing	1	6	393	2.5	No
339999		All Other Misc. Manufacturing	3	73	2144	1.4	No
423210		Furniture Merchant Wholesalers	1	334	3557	0.3	No
423220		Home Furnishing Merchant Wholesalers	2	257	2365	0.8	No
423310		Lumber, Plywood, Millwork, and Wood Panel Merchant wholesalers	3	404	5588	0.5	No
423320		Brick, Stone, and Related Construction Wholesalers	1	207	1737	0.6	No
423330		Roofing, Siding, and Insulation Materials Wholesalers	1	146	1595	0.6	No
423420		Office Equipment Merchant Wholesalers	1	177	2207	0.5	No
423450		Medical, Dental, and Hospital Equipment Wholesalers	1	372	10786	0.1	No
423690		Other Electronic Parts and Equipment Wholesalers	1	280	3221	0.3	No
423730		Warm Air Heating and AC Equipment Supplies Wholesalers	1	147	3537	0.3	No
423810		Construction and Mining Equipment Wholesalers	2	147	3023	0.7	No

NAICS	Other Included NAICS Codes	NAICS Title	NC Amputations 1/18 - 12/21	# of NC Employers	# of NC Employees	Amputation Injuries per 1,000 Employees	Targeted?
423830		Industrial Machinery and Equipment Merchant Wholesalers	5	1663	13341	0.4	No
423840		Industrial Supplies Merchant Wholesalers	2	521	3414	0.6	No
423920		Toy and Hobby Goods and Supplies Wholesalers	1	75	276	3.6	No
423930		Recyclable Material Merchant Wholesalers	2	22	2441	0.8	No
424310		Piece Goods, Notions, and Other Dry Goods Wholesalers	1	221	1847	0.5	No
424410		General Line Grocery Merchant Wholesalers	2	181	8028	0.2	No
424470		Meat and Meat Product Merchant Wholesalers	2	88	1115	1.8	No
424480		Fresh Fruit and Vegetable Wholesalers	1	131	1463	0.7	No
424510		Grain and Field Bean Merchant Wholesalers	1	24	188	5.3	No
424590		Other Farm Product Raw Material Merchant Wholesalers	1	45	656	1.5	No
424690		Other Chemical and Allied Products Merchant Wholesalers	1	619	4262	0.2	No
424720		Petroleum Products Merchant Wholesalers	1	173	1563	0.6	No
424820		Wine and Distilled Alcoholic Beverage Wholesalers	1	169	2782	0.4	No
424910		Farm Supplies Merchant Wholesalers	2	412	3236	0.6	No
424990		Other Misc. Nondurable Goods Wholesalers	1	336	2659	0.4	No
425120		Wholesale Trade Agents and Brokers	1	3510	17166	0.1	No
441110		New Car Dealers	3	678	35196	0.1	No
441310		N/A - Absorbed into 441330. No data for 441330.	2	1435	16406	0.1	No
441320		N/A - Absorbed into 441340. No data for 441340.	2	861	6947	0.3	No
441330		Automotive Parts and Accessories Retailers	0	None	None	N/A	No

NAICS	Other Included NAICS Codes	NAICS Title	NC Amputations 1/18 - 12/21	# of NC Employers	# of NC Employees	Amputation Injuries per 1,000 Employees	Targeted?
442110		Furniture Stores - Ended in 2017	2	961	8856	0.2	No
442210		Floor Covering Stores - Ended in 2017	2	324	1890	1.1	No
444110		Home Centers	3	324	29610	0.1	No
444190		Other Building Materials Dealers	7	750	8290	0.8	No
445110		Supermarkets and Other Grocery Stores	20	1835	94349	0.2	No
445299		All Other Specialty Food Stores	1	145	1313	0.8	No
446110		Pharmacies and Drug Stores	1	1910	22955	0.0	No
447190		Other Gasoline Stations	1	252	2142	0.5	No
451130		Sewing, Needle, and Piece Goods Stores	2	128	839	2.4	No
452111		N/A - Department Stores (Except Discount Department Stores) ended in 2012. Merged into 455110.	4	None	None	N/A	No
453910		Pet and Pet Supplies Stores	1	316	3659	0.3	No
453991		Tobacco Stores	2	647	1743	1.1	No
454310		Fuel Dealers	1	386	3263	0.3	No
454312		N/A - Liquefied Petroleum Gas (Bottled Gas) Dealers - Ended in 2007. Merged into 454310.	1	386	3263	0.3	No
481111		Scheduled Passenger Air Transportation	1	35	14995	0.1	No
484121		General Freight Trucking, Long-Distance, Truckload	1	2126	17052	0.1	No
484122		General Freight Trucking, Long-Distance, Less Than Truckload	1	296	10228	0.1	No
484220		Specialized Freight (Except Used Goods) Trucking, Local	1	765	6080	0.2	No
484230		Specialized Freight (Except Used Goods) Trucking, Long-Distance	3	225	2791	1.1	No
485210		Interurban and Rural Bus Transportation	1	12	1124	0.9	No
488119		Other Airport Operations	2	71	2708	0.7	No

NAICS	Other Included NAICS Codes	NAICS Title	NC Amputations 1/18 - 12/21	# of NC Employers	# of NC Employees	Amputation Injuries per 1,000 Employees	Targeted?
488210		Support Activities for Rail Transportation	1	36	333	3.0	No
492110		Couriers and Express Delivery Services	1	439	28272	0.0	No
493110		General Warehousing and Storage	4	462	53551	0.1	No
511110		Newspaper Publishers	1	183	2216	0.5	No
531311		Residential Property Managers	1	2609	14786	0.1	No
532412		Construction, Mining, and Forestry Machinery Rental	2	162	2010	1.0	No
541330		Engineering Services	5	2748	29406	0.2	No
541611		Administrative Management and General Management Consulting Services	1	6974	27726	0.0	No
541870		Advertising Material Distribution Services	1	583	885	1.1	No
561110		Office Administrative Services	1	2772	18500	0.1	No
561210		Facilities Support Services	1	192	4694	0.2	No
561320		Temporary Help Services	1	2645	108695	0.0	No
561330		Professional Employer Organizations	1	999	18393	0.1	No
561710		Exterminating and Pest Control Services	2	548	6360	0.3	No
561720		Janitorial Services	6	2745	30468	0.2	No
561730		Landscaping Services	6	4334	31249	0.2	No
561910		Packaging and Labeling Services	1	120	1599	0.6	No
561990		All Other Support Services	1	1538	13095	0.1	No
562111		Solid Waste Collection	2	394	6444	0.3	No
562910		Remediation Services	1	214	1979	0.5	No
562920		Materials Recovery Facilities	2	52	689	2.9	No
611110		Elementary and Secondary Schools	3	3342	219751	0.0	No
611310		Colleges, Universities, and Professional Schools	7	313	97889	0.1	No
621511		Medical Laboratories	1	1597	12440	0.1	No
621610		Home Health Care Services	1	1242	41804	0.0	No
622110		General and Medical Surgical Hospitals	4	489	214399	0.0	No

NAICS	Other Included NAICS Codes	NAICS Title	NC Amputations 1/18 - 12/21	# of NC Employers	# of NC Employees	Amputation Injuries per 1,000 Employees	Targeted?
623110		Nursing Care Facilities (Skilled Nursing Facilities)	2	513	35451	0.1	No
623210		Residential Intellectual and Developmental Disability Facilities	1	507	13377	0.1	No
623312		Assisted Living Facilities for the Elderly	1	575	16714	0.1	No
624190		Other Individual and Family Services	1	1467	12335	0.1	No
713910		Golf Courses and Country Clubs	1	390	14560	0.1	No
722110		N/A (Full-service restaurants), expired after 2007 - Now absorbed into 722511.	2	8483	155657	0.0	No
722310		Food Service Contractors	2	1016	14117	0.1	No
722511		Full-Service Restaurants	1	8483	155657	0.0	No
722515		Snack and Nonalcoholic Beverage Bars	1	1830	22026	0.0	No
811111		General Automotive Repair	1	2866	13142	0.1	No
811191		Automotive Oil Change and Lubrication Shops	1	319	2822	0.4	No
811192		Car Washes	1	603	5553	0.2	No
811310		Commercial and Industrial Machinery and Equipment (Except Automotive and Electronic) Repair and Maintenance	1	954	6309	0.2	No
811412		Appliance Repair and Maintenance	2	196	853	2.3	No
921120		Legislative Bodies	5	3	770	6.5	No
921140		Executive and Legislative Offices, Combined	3	628	133896	0.0	No
921190		Other General Government Support	3	72	11460	0.3	No
922140		Correctional Institutions	1	107	22841	0.0	No
922160		Fire Protection	2	8	102	19.6	No
924110		Administration of Air and Water Resource and Solid Waste Management Programs	5	24	1786	2.8	No
924120		Admin of Conservative Programs	1	283	5035	0.2	No

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NAICS	Other Included NAICS Codes	NAICS Title	NC Amputations 1/18 - 12/21	# of NC Employers	# of NC Employees	Amputation Injuries per 1,000 Employees	Targeted?
926120		Regulation and Administration of Transportation Programs	3	127	11580	0.3	No

Appendix B: Examples of Machinery and Equipment That Can Cause Amputations

Note: This list is not inclusive of all machinery/equipment that can cause amputations.

1. Bailers
2. Aerial Lift Platforms
3. Benders, Rollers and Shapers
4. Cranes (Unspecified)
5. Casting Machinery
6. Conveyors – Belt, Chain, Live Roller, and Auger Screw
7. Heating and Cooking Machinery and Appliances
8. Drills – Stationary
9. Extruding Machinery
10. Food and Beverage Processing
11. Grinders, Abraders, and Meat Grinders
12. Material and Personnel Handling Machinery
13. Metal, Woodworking, and Special Material Machinery
14. Milling Machines
15. Mowing Machinery
16. Mixers, Blenders, Whippers, Slicers, and Food Beverage Processing Equipment
17. Packing, Wrapping, Bundling Machinery
18. Plastic Injection Molding Machinery
19. Press Brakes (All Types)
20. Presses (Mechanical, Hydraulic, and Pneumatic)
21. Printing Presses
22. Sawing Machinery – (Band, Table, Radial Arm Saws)
23. Shears (All Types)

Appendix C: Related ANSI /ASME Standards

Note: This appendix is not an inclusive list of all ANSI and ASME standards that are associated with hazardous machinery and equipment.

1. ANSI B11.1 – Mechanical Power Presses
2. ANSI B11.2 – Hydraulic Power Presses
3. ANSI B11.3 – Power Press Brakes
4. ANSI B11.4 – Shears
5. ANSI B11.5 – Ironworkers
6. ANSI B11.6 – Lathes
7. ANSI B11.7 – Cold Headers and Cold Formers
8. ANSI B11.8 – Drilling, Milling, and Boring Machines
9. ANSI B11.9 – Grinding Machinery
10. ANSI B11.10 – Metal Sawing Machines
11. ANSI B11.11 – Gear Cutting Machines
12. ANSI B11.12 – Roll-Forming and Roll-Bending Machines
13. ANSI B11.14 – Coil-Slitting Machines
14. ANSI B11.15 – Pipe, Tube, and Shape Bending Machines
15. ANSI B11.16 – Metal Powder Compacting Presses
16. ANSI B11.17 – Horizontal Hydraulic Extrusion Presses
17. ANSI B11.18 – Machinery and Machine Systems for Processing Strip, Sheet, or Plate From Coiled Configuration
18. ANSI B11.19 – Safeguarding When Referenced by the Other B11 Machine Tool Safety Standards
19. ANSI B5.37 – External Cylindrical Grinding Machines (Centerless)
20. ANSI B5.42 – External Cylindrical Grinding Machines (Universal)
21. ANSI B65.1 – Printing Press Systems
22. ANSI B65.2 – Safety Standard – Binding and Finishing Systems
23. ANSI B65.3 – Safety Standard for Guillotine Paper Cutters
24. ANSI B7.1 – Use, Care, and Protection of Abrasive Wheels
25. ANSI B151.5 – Plastic Film and Sheet Winding Equipment
26. ANSI B151.20 – Plastic Sheet Production Machinery
27. ANSI B155.1 – Packaging Machinery and Packaging-Related Converting Machinery
28. ANSI B177.1 – Three Roller Printing Ink Mills
29. ANSI O1.1 – Woodworking Machinery
30. ANSI Z244.1 – Control of Hazardous Energy – Lockout/Tagout and Alternative Methods
31. ASME B5.52M – Mechanical Power Presses, General Purpose Single Point
32. ASME B15.1 – Mechanical Power Transmission Apparatus
33. ASME B15.1A – Addenda to B15.1
34. ASME BL5.1B – Addenda to B15.1
35. ASME B20.1 – Conveyors and Related Equipment, with Interpretations A and B
36. ASME B20.1A and B20.1B – Addenda to B20.1
37. ASME/CEMA 350 – Screw Conveyors
38. ASME/CEMA 401 – Unit Handling Conveyors – Roller Conveyors – Non-Powered
39. ASME/CEMA 402 – Unit Handling Conveyors – Belt Conveyors
40. ASME/CEMA 403 – Unit Handling Conveyors – Belt Driven Live Roller Conveyors
41. ASME/CEMA 404 – Unit Handling Conveyors – Chain Driven Live Roller Conveyors
42. ASME/CEMA 405 – Packaging Handling Conveyors – Slant Conveyors