NORTH CAROLINA DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH DIVISION

Raleigh, North Carolina

July 29, 1975

Operational Procedure Notice 3

TO: All OSHA Division Directors, Consultants, Supervisors, Safety Officers, and Industrial Hygienists

SUBJECT: 1910.95(b)(1), Feasible Engineering Controls for Woodworking Equipment

A. 1910.95(b)(1)

When Employees are subjected to sound exceeding those listed in Table G-16, feasible administrative or engineering controls shall be utilized.

B. Discussion

The following pages are to be used by the Safety Officer or Industrial Hygienist to determine if the employer has implemented all feasible engineering controls on woodworking equipment.

C. Policy interpretation

These controls are considered to be feasible and should be implemented by the employer in order to be in compliance. This list of controls will be updated when additional engineering controls are available.

(Signed on Original (Signed on Original)
L. A. Weaver R. P. Boylston
Standards Engineer OSHA Director

Woodworking Equipment - Engineering Noise Controls

I. Noise levels have increased over the years in the woodworking industry because of:

A. Added horsepower
B. Accelerated cutterhead speeds
C. Increased mechanization
D. In general, a stepped up production tempo

II. Machinery noised caused by:

A. Rotating tool noise

1. Noise results from the chopping of air by cutting knives, teeth, and other whirling projections on the cutterhead.
2. Surfaces located near cutters can often produce a siren type effect.
3. Saw blades can be excited to vibrate by this chopping of air, resulting in a screaming noise in addition to pure rotational noise.
4. Rotating tool noise usually dominates the noise produced when machines are idling.

B. Cutter-wood interaction noise

1. Produced by a combination of vibrations including the cutting tool and wood stock in the immediate vicinity of the tool.
2. The noise source is concentrated near the tool.
3. Typical of many special operation machines such as routers and mortisers and many saws.

C. Vibration of the material being cut

1. Significant in most machines which dress lumber such as planers and molders.
2. The noise is produced by the vibration of the whole workpiece which is set into motion by the impact of cutting knives or teeth on the wood.

D. Machine component vibration

1. Produced by machines that are in poor repair.
2. Examples are dust hoods, panels, and beds

E. High frequency electric motors

F. Each of the above listed sources of noise can contribute to the total noise radiated by a particular machine. However, in most cases only one or two of these sources govern the overall noise level produced.

III. Feasible engineering controls

A. Rotational noise - if noise levels are fairly constant when cutting and idling, then rotational noise important.

1. Noise levels can be reduced by:

(a) special cutters or blades designed to reduce air chopping which includes helical type heads and craged tooth saw blades - can be used on molders, planers, tenoners, and circular saws.

(b) Acoustic enclosures covering the vicinity of the tool - enclosures can be used on molders, planers, tenoners, and circular saws

B. Cutter-wood interaction noise - if the machine is noticeably larger when cutting, and the size of wood being cut doesn't affect the sound level, then cutter-wood interaction noise is present.

1. Noise level can be reduced by:

(a) using shear type cutter heads and staggered saw teeth blades which remove or cut the in a continuous fashion - this eliminates impact and thus reduces vibration and noise - can be used on molders, planers, and circular saws

(b) damping the cutting tool or wood stock - this may include hold down pads and damping of saw blades - can be used on molders, planers, tenoners, and circular saws

(c) acoustic enclosure covering the vicinity of the cutting tool - can be used on molders, planers, tenoners, and circular saws.

C. Material vibration noise - this type of noise is present when the machine operates significantly louder when cutting as opposed to idling and the dimensions of the material directly affect the noise output.

1. Noise levels can be reduced by:

(a) helical or shear type cutter heads
(b) sharpness of the cutting tool
(c) acoustic enclosure - provided that most of the vibrating work is enclosed
(d) can be used on molders, planers, tenoners, and circular saws

D. Machine vibration noise - can be caused by any components which are loose or rattle - the floor may also be vibrating.

1. Noise levels can be reduced by:

(a) rubber mounts or pads
(b) damping materials

2. can be used on any equipment that has machine vibration noise

IV. Case Studies

A. Planer and molder noise solutions

1. Helical cutterheads will reduce noise levels on planers by 10 to 15 dB(A)
2. Enclosures built into the machine itself will produce 15 to 20 dB(A) reduction provided the material being planed is within the enclosure
3. Large rooms enclosing the planer can provide significant noise reduction of 15 to 20 dB(A)
4. Enclosure of infeed and outfeed conveyor
5. Leaded vinyl for minimizing openings left for feeding purposes
6. Machine vibration noise reduction

B. Saw noise solutions

1. Siren noise - if the frequency of the noise changes continuously as the blade coasts to a stop, siren noise is present.

(a) reduced by:

(1) increasing the number of teeth and using smaller gullets
(2) swaged or staggered tooth arrangements
(3) acoustic enclosures

2. Blade vibration noise

(a) reduced by:

(1) stiffening (damping) collars
(2) changing the mass or stiffness of the blade
(3) acoustic enclosures
(4) laminated plate blades

(a) provides damping of saw blade - reduces noise level 5 to 10 dB(A)

(5) conventional guards can be treated with acoustical damping and absorbing material.

(6) additional housing to keep entire saw blade guarded when not cutting (for radial saws, sliding cutoff saws, and swing cutoff saws)

C. Double surfacer

1. Reduced by:
(a) special cutting heads
(b) enclosure of infeed and outfeed tables
(c) seal off areas beneath the feed tables and machine casting
(d) acoustically treat dust hood
(e) complete enclosure
(f) machine vibration noise reduction
D. Tenoners

1. Reduced by:

(a) acoustical barriers and baffles providing an "acoustical shadow" area for the operator
(b) items listed under IV.A and IV.B

E. Automatic shapers

1. Reduced by:

(a) combination dust and noise abatement hood
(b) in some cases machine casting and table vibrations must be damped

F. Hard shapers

1. Reduced by:

(a) in many cases sealing underside of table to reduce bearing and transmission noise
(b) in many cases table must be damped

G. Routers - noise problems most commonly result from machine vibration due to imbalance of the head assembly

1. Reduced by:

(a) close fitting acoustic enclosures when properly isolated from the machine and floor.

NORTH CAROLINA DEPARTMENT OF LABOR
OCCUPATIONAL SAFETY AND HEALTH DIVISION
RALEIGH, NORTH CAROLINA

January 1, 1977

Addendum to Procedure Notice 3

TO: All OSHA Division Directors, Consultants, Supervisors, Safety Officers, and Industrial Hygienists

SUBJECT: 1910.95(b)(1) Feasible Engineering Controls for Some Specific Woodworking Equipment.

A. 1910.95(b)(1)

When employees are subjected to levels exceeding those listed in Table G-16, feasible administrative or engineering controls shall be utilized.

B. This addendum is provided to show specific engineering controls which are available and have been utilized in industry.

C. These controls are further examples of feasible engineering controls and should be implemented by the employer in order to be in compliance. Further specific examples of controls will be forwarded when additional engineering controls become available. This addendum is to be attached to Operational Procedure Notice 3 dated July 29, 1975.

(Signed on Original)
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Standards Engineer

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R. P. Boylston
OSHA Director