

MEMORANDUM

February 10, 1995

To: Dan Barnes
Through: Terry Deforest
From: Marilyn K Schuster

SUBJECT: CRAFTSMAN RADIAL ARM SAW,
Model #s 113.196221, 113.196321, 113.196421

Bob Thiessen has been in contact with Emersons special products division in Hazelwood, Missouri the manufacturer of the above listed Craftsman radial arm saws. Greg Dix, the Product Safety Engineer that has responsibility for these types of issues, has responded with a letter of explanation that you will find attached. This letter explains the rationale behind the design and includes a copy of UL std 987, Stationary and Fixed Electric Tools that allows a mechanical means for raising and lowering the lower blade guard. Also you will find attached OSHA P.D. #100-92 which allows manually adjusted guards provided that they are used in accordance with the manufacturers instructions.

If we can be of any further assistance please contact Bob Thiessen at 378-327 2.

searsb/bt

January 11, 1995

Oregon OSHA Technical Section
Labor & Industries Building
Salem, Oregon 97310

Attn: Bob Thiessen

Dear Mr. Thiessen:

This letter is in response to your proposed HAZARD ALERT on the SEARS, Craftsman Radial Arm Saw Model 113.196221, 113.196321, and 113.196421.

My first comment needs to be the acknowledgment that your interpretation of the OSHA standards is accurate. In crosscut the lower guard is not work actuated and we do not recommend it being lowered to maintain contact with the top surface of the workpiece.

My next comment is that after reviewing the proposed HAZARD ALERT you may not be unaware of hazards associated with the use of lower blade guards in general. Since you addressed the Hazard Alert to crosscutting, I will restrict my comments to the same.

The instructions proposed are in my opinion, unsafe. These very instructions were considered when the original owners manual for the subject radial saw was written, and they were rejected for reasons that may not be obvious. Consider first that, when actually in the operation of cutting, both operator's hands are occupied in a safe manner; one hand is on the handle of the saw, the other is at a safe distance from the blade stabilizing the workpiece. It is only what happens before and after the cut that causes accidents, and there are many possible scenarios.

(1)Contact with the side of the blade (Axial Contact).

Generally a left hand injury, the operator moves his/her hand from left to right striking the side of the blade. The saw can be parked partially in front of the fence or with a portion of it just above the fence, or, less frequently in terms of accident potential, it can be parked fully behind the fence. This motion is most often associated with the act of positioning a workpiece from side to side to perform a cut. The workpiece is moved sideways by the hand and the hand contacts the blade from the side. One or both hands are no longer safely occupied in the cutting process and it is this free movement that allows the contact with the blade.

In any event, contact with the side of the blade would result in contusions, abrasions or minor lacerations. Major injury should not be expected in blade side contact. This is the only injury receiving a demonstrable benefit from the OSHA required "automatically" adjustable lower blade guard.

(2)Contact with the teeth of the blade (Radial Contact).

Any movement of the hand toward the edge of the blade can result in serious, permanent injury, including amputations of fingers, hands or arms.

As with side contact, it is the free movement of the hand which allows the contact. The OSHA guard is of no benefit to this injury, but the new Craftsman guard can prevent it. More explicitly any hand movement into the blade from a front approach will raise the OSHA guard and allow contact with the blade teeth. This is specifically prevented with the Craftsman guard.

The first question to be considered is, "Will the guard be up or down when needed for protection of the operator?" I believe it will be down and here is why. In those circumstances where free movement of hands is possible, the operator is encouraged by design to release the trigger handle, thereby lowering the guard. It is purposely uncomfortable to hold the trigger and keep the guard raised for extended periods. It is also awkward to hold the handle with the right hand while moving the workpiece with the left (or visa versa). Thus, it can be expected that the guard will be down at those times when the hands are free to move about. It is also most likely the saw will be pushed behind the fence and the guard will drop to the table and prevent the saws forward movement until the guard is raised by the lever actuation.

The second question, and the one addressed in your HAZARD ALERT instructions is "Should the cut be performed with the guard raised or lowered? Without question, the answer is, "Raised." When crosscutting on a radial saw (including miter cuts), lower guards can become jammed in fence kerfs and small cutoff pieces can become jammed between the guard and blade. Both situations may cause the operator to act in an unpredictable, unsafe manner to resolve the problem. With the guard raised, the problems never occur.

Finally, it is unsafe to pull the saw too far beyond the cut before returning it to the rear. This can result in the cutoff piece being caught on the return trip and thrown by the saw. With lower guards that remain down, operator visibility is reduced and the operator may not know the saw has been pulled too far. Further, the pressure placed on the cutoff piece by the guard itself can create the very situation.

Simply stated, there is no compelling safety argument for operating a radial arm saw with the guard down on the workpiece. The OSHA requirements, which were adopted from the 1958 ASA (now ANSI) O1.1 standard, were written in such a way that the operator would not be required to take some action in order for the guard to be down when needed. Having the guard down during the cut was not the intent; having the guard down when needed was. Clearly, it is when the saw is running and no cutting is being performed that guarding of this type is of benefit. The new guard fulfills this task in the best possible manner.

Had it not been for Emerson Electric Co.'s continuous efforts over the past several decade, and the consequences of those efforts, it would not have been apparent that the OSHA standard was a hindrance to advancement of the state of the art. While Emerson made a conscious decision not to comply with the letter of the regulations, a careful, competent analysis will demonstrate they did meet the intent of the standard. Any attempt to retreat from the guarding system or its accompanying instructions can be seen as detrimental to the safety of the operator.

As to what actions may be taken by OSHA in the future, one can only speculate. During the development of the new guard, OSHA was contacted for the express purpose of determining how they would interpret the standards when faced with this guarding system. They declined, more than once. Emerson was left with the difficult decision of proceeding without certain knowledge. The decision speaks highly of our commitment to customer safety even when it would have been easier to hide behind the regulation and do nothing. Other standards bodies, UL and CSA, have performed the careful review required and have accepted the new design, even though it meant rewriting their standards. Given the proper amount of time and review, it is likely that OSHA will do the same.

To support the fact that OSHA has in the past looked at new guarding systems and issued a Field Information Memorandum I am attaching #77-5. It provides guidance on the very section we are discussing. The alternate design OSHA is accepting is not of Emerson's design and I present it only as an example of exceptions to the regulations.

I am also attaching sections from an OSHA approved testing facility, Underwriters Laboratories, Inc., Standard for Safety; UL 987, **Stationary and Fixed Electric Tools**. The exception to section 38.11 was added to accommodate our new guarding system after their review of its merits.

A final point of clarification to item #1 on your HAZARD ALERT. The Accessory Lower Guard, 19-29010, is provided with each saw.

Regards,

Gregory L. Dix
Product Safety Engineer

Attachments cc: K. Baumgartner

February 17, 1977

OSHA FIELD INFORMATION MEMORANDUM #77-5

TO: REGIONAL ADMINISTRATORS/OSHA

Subject: 29 CER 1910.213(g) (1) and (h) (1), Woodworking Machinery Guarding Requirements

1. Purpose

To provide further guidance in the application of 29 CrR 1910.213 by specifying the application of paragraphs (g) (1) and (h) (1) to swing cutoff saws and radial saws.

2. Documentation Affected

This memorandum cancels and supersedes OSHA Program Directive #100-45 dated January 23, 1976.

3. Action

a. In those instances where fixed enclosures, fixed barrier guards, or manually adjusted guards that provide the equivalent protection of automatically adjusted guards are used, thereby preventing employee exposure to the saw blade, no citation shall be issued.

b. Accordingly, when a fixed enclosure, fixed barrier, or manually adjusted guard is used instead of an automatic guard, a de minimis notice shall be issued. That is, provided the guards are used in accord with manufacturer's instructions and under sufficient supervision to insure consistent compliance with these instructions.

4. THIS FIM IS EFFECTIVE IMMEDIATELY AND WILL REMAIN IN EFFECT UNTIL SUPERSEDED OR CANCELED.

5. Effective Date

This memorandum is effective immediately and will remain in effect until canceled or superseded.

Richard P. Wilson
Deputy Director, Federal Compliance
and State Programs

37.7 An insert shall be firmly held in place and prevented from rotating.

38 Radial-Arm Saws

38-1 These requirements cover radial-arm saws equipped with blade guards and accessories for such saws.

38.2 A radial-arm saw shall be:

- a) Provided with automatic or manual arbor braking such that a 104nch (254-mm) or smaller blade will stop within 15 seconds and a larger blade will stop within 25 seconds; or
- b) Constructed so that inherent friction losses, such as from gearing, preclude coasting of the saw blade beyond the limits specified in 38.2(a).

38.3 A blade guard shall be provided as a part of a radial-arm saw. The guard shall completely enclose the upper half of the blade and at least 50 percent of the end of the arbor.

Exception: The guard may have an opening for the ejection of sawdust provided.

- a) *The opening is located beyond the outer circumference of the blade; or*
- b) *A 112-inch (12.7-mm) diameter probe cannot be made to contact the blade when inserted 2-1/2 inches (63.5 mm) into the opening.*

38.4 For a saw intended for ripping, antikickback means shall be provided on both sides of the saw blade of the outfeed side. When properly adjusted, the means shall:

- a) Reduce the likelihood of wrong-way feed; and
- b) Reduce the risk of kickback -the blade hurling the workpiece out the infeed side when ripping.

The means shall be functional for bevel angles of 45 degrees or less and shall provide holding power to prevent infeed removal of soft-pine having a thickness within the capacity of the saw.

38.5 A hold-down device shall be provided on a saw intended for ripping. The device shall be designed to prevent the blade from lifting the workpiece off the table.

38.6 The unguarded portion of the blade shall not extend beyond the table or mounting frame when the carriage is at any position on the arm at any miter angle from 30 degrees left to 45 degrees right The blade shall be over the table when:

- a) The saw is set for outtrip;
- b) The carriage is at the end of the arm; and
- c) The miter angle is set at 0 degrees.

38.7 Permanently attached, fixed - not drop leaf - table extensions and carriage stops that cannot be adjusted beyond the point to which the blade extends beyond the table are acceptable means of complying with the requirements in 38.6 if such extensions and stops are standard equipment for the assembly.

38.8 Provision shall be incorporated in a radial-arm saw so that the arm cannot be positioned to the rear of a position parallel to the back edge of the table.

38.9 A saw blade shall be furnished with a saw.

38.10 The construction and size of a blade guard or other fixed nonremovable stop shall be such as to limit the size of the blade that can be installed on the arbor. The maximum size shall be tested in the assembly.

38.11 The manufacturer shall make available a lower blade guard that will:

- a) Cover both sides of the teeth of the blade not covered by the upper guard when the blade and lower guard are clear of the workpiece and table;

Exception: A one-piece combination upper and lower blade guard may have a 1-1/4-inch (31.8 mm) side slot on the motor side, extending from the motor-shaft to the bottom of the guard, for motor-shaft clearance.

- b) Cover the teeth of the blade to their full depth;
- c) For miter and bevel angles of 45 degrees and less, comply with (a) and (b) in a radial direction, and (d); and
- d) Automatically slide over the workpiece and return to the original position upon leaving the workpiece.

Exception: A mechanical means may be provided to raise and lower the lower guard during crosscutting.

38.12 The manufacturer shall make a spreader available for a saw used for ripping. When in use, the spreader shall be aligned with the saw blade.

38.13 A spreader, if provided, shall move automatically with the arbor when the saw is set for bevel cuts.

38.14 The arbor shall have a nominal diameter not less than 1/2 inch (12.7 mm) for a blade having a diameter less than 8 inches (203 mm) and not less than 5/8 inch (15.9 mm) for a blade having a diameter of 8 inches or more.

38.15 The thread for the blade-retaining nut shall have such direction that the nut is tightened by being rotated in the direction opposite to normal rotation of the blade.

38.16 Normal rotation of the arbor shall be clockwise when viewed from the left of the position normally assumed by the operator when the saw is in the 90-degree cutoff position.

38.17 A diameter of a saw-blade supporting collar shall be at least 1-3/8 inches (34.9 mm) for a 7-inch (178-mm) diameter blade and shall be increased 1/8 inch (3.2 mm) for each 1-inch (25.4-mm) increase in blade diameter.

OSHA PROGRAM DIRECTIVE #100-92

TO: REGIONAL ADMINISTRATORS/OSHA

THRU: DONALD E. MACKENZIE
Field Coordinator

03/13/90 - 1910.213 (h) (1)

Subject: 29 CFR 1910.213(c)(1) and (h)(1), Woodworking Machinery Guarding Requirements

03/13/90 1916.213(h)(1)

1. Purpose

The purpose of this directive is to provide guidance in the application of 29 CFR 1910.213 by specifying the application of paragraph (c) (1) to hand-fed rip saws and paragraphs (g) (1) and (h) (1) to swing cutoff saws and radial saws.

03/13/90 1910.213(h)(1)

2. Documentation Affected

This directive supersedes and cancels OSHA Program Directive #100745 dated January 23, 1976, and OSHA Field Information Memorandums #76-2A dated January 28, 1976, and #77-5 dated February 17, 1977.

03/13/90 - 1910.213(h)(1)

3. Background

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This directive was developed to inform field personnel of the alternate methods of meeting the intent of 29 CFR 1910.213(c)(1), (g)(1) and (h)(1) to eliminate employee exposure to point of operation hazards.

03/13/90 - 1910.213.(h)(1)

4. Action

- a. In those instances where fixed enclosures, fixed barrier guards or manually adjusted guards are used that provide protection equivalent to the protection of automatically adjusted guards, thereby preventing employee exposure to the saw blade, no citation shall be issued.
- b. Accordingly, a fixed enclosure, fixed barrier, or manually adjusted guard is used instead of an automatic guard, it shall be considered de minimis. That is, provided the guards are used in accord with manufacturer's instructions and under sufficient supervision to insure consistent compliance with these instructions.

03/13/9p - 1910.213 (h) (1)

5. Effective Date

This directive is effective immediately and will remain in effect until canceled or superseded.

03/13/90 - 1910.213 (h) (1)

Richard P. Wilson Deputy Director, Federal Compliance
and State Programs

DISTRIBUTION:

03/13/90 - 1910.213 (h) (1)

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03/13/90 - 1910.213 (h) (1)

(Originator: OCCS)