

State of California  
Department of Industrial Relations  
Division of Occupational Safety and Health  
**Memorandum**



To: Marley Hart, Executive Officer  
Occupational Safety and Health Standards Board  
2520 Venture Oaks Way, Suite 350  
Sacramento, CA 95833

Date: May 27, 2016

From: Juliann Sum, Chief  
Division of Occupational Safety and Health  
Department of Industrial Relations

**Re: Division evaluation of Petition No. 555 to amend Title 8 Section 4307(b), filed by Colton Swingle**

## **1.0 INTRODUCTION AND BACKGROUND**

On March 3, 2016, the Division of Occupational Safety and Health (Cal/OSHA) received Petition 555, filed by Colton Swingle, to amend Title 8 section 4307(b) regarding the guarding of portable power-driven circular hand saws.

## **2.0 REQUESTED PETITION**

The petitioner requests amendment of Title 8 subsections 4307(b)(1) and (b)(2). Subsection (b)(1) requires telescoping guards of portable power-driven circular hand saws to be equipped with a lifting lug or lever, remote from the blade teeth, that will permit the operator to safely shift the guard for starting unusual cuts such as plunge and compound cuts. Subsection (b)(2) requires saws with hinged guards to have two handles located to preclude exposure of the operator's hands from the saw blade. This subsection also requires one of these handles to be located on the hinged guard itself.

The proposed amendment to subsection (b)(1) would require that telescoping saw guards be capable of being opened with a device that does not require the operator to apply force directly to the saw guard lifting lug or lever. In addition, the petitioner proposes removing subsection (b)(2) in its entirety.

### 3.0 PROPOSED REGULATORY LANGUAGE

Below is the change in regulatory language of Title 8 section 4307(b) proposed by the petitioner. The underline-strikeout format shows the amendments requested by the petitioner.

California Code of Regulation Title 8 section 4703. Portable Power Driven Circular Hand Saws

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*(1) Telescopic guards shall be equipped with a ~~lifting lug or lever~~ hands free safe lifting device, remote from the blade teeth that will permit the operator to safely shift the guard for starting unusual cuts without touching the lifting lug or lever.*

*(2) ~~Saws with hinged guards shall be equipped with 2 handles so arranged that neither hand is exposed to the hazard of the rotating blade. One handle shall be on the hinged guard, and of such design that its use will avoid exposure of the hand or fingers between the retracted guard and the blade.~~*

### 4.0 HAZARDS TO EMPLOYEES USING PORTABLE POWER-DRIVEN CIRCULAR HAND SAWS

Hazards to employees operating power-driven circular hand saws are well documented within the Cal/OSHA's investigative history. Injuries commonly occur when the saw guard is pinned or wedged open or malfunctions and the saw kicks back when encountering a knot or other hard portion of the work piece. Employees may also be injured if the placement of their hands or other body parts is misjudged while performing cuts. Control of the saw can also be lost while holding the saw with one hand in order to hold a work piece or hold the saw guard open to perform unusual cuts. Due to the high power of the worm-drive saw motors powering sharp saws blades, serious injuries will likely occur in the event that a moving saw blade is contacted. Potential injuries include:

1. Amputations
2. Lacerations
3. Abrasions
4. Fractures

### 5.0 EXISTING TITLE 8 REGULATIONS

Additional language in Title 8 subsection 4307(b), which went into effect after Petition 555 was filed, is shown in underline format in Section 5.2, below. No language was deleted from the regulation.

## 5.1 Title 8 Section 4307 language at the time of petition submittal (March 3, 2016)

Title 8 CCR General Industry Safety Orders  
Article 59. Woodworking Machines and Equipment

§4307. Portable Power Driven Circular Hand Saws.

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(b) The lower half (point of operation) of the saw blade shall be guarded to the root of the teeth with a telescopic or hinged guard that, for normal operation, opens up as the saw is fed into the cut and automatically returns to the position covering the saw teeth when removed from the cut.

EXCEPTION: The guard described in subsection (b) is not required on hand-held portable powered cut-off saws used by fire/rescue personnel for rescue procedures and/or roof ventilation for smoke removal provided the operator is wearing appropriate eye, face, head and body protection as specified in Articles 10 and 10.1 of the General Industry Safety Orders. This exception also applies to qualified persons (e.g. instructors) wearing personal protective equipment as described herein to instruct personnel in safe roof ventilation/rescue techniques.

(1) Telescopic guards shall be equipped with a lifting lug or lever, remote from the blade teeth, that will permit the operator to safely shift the guard for starting unusual cuts.

(2) Saws with hinged guards shall be equipped with 2 handles so arranged that neither hand is exposed to the hazard of the rotating blade. One handle shall be on the hinged guard, and of such design that its use will avoid exposure of the hand or fingers between the retracted guard and the blade.

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## 5.2 Title 8 Section 4307(b) language operative March 7, 2016

§4307. Portable Power Driven Circular Hand Saws.

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(b) The lower half (point of operation) of the saw blade shall be guarded to the root of the teeth with a telescopic or hinged guard that, for normal operation, opens up as the saw is fed into the cut and automatically returns to the position covering the saw teeth when removed from the cut. When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to the covering position.

EXCEPTION: No. 1: The guard described in subsection (b) is not required on hand-held portable powered cut-off saws used by fire/rescue personnel for rescue procedures and/or roof ventilation for smoke removal provided the operator is wearing appropriate eye, face, head and body protection as specified in Articles 10 and 10.1 of the General Industry Safety Orders. This exception also applies to qualified persons (e.g. instructors) wearing personal protective equipment as

described herein to instruct personnel in safe roof ventilation/rescue techniques.

EXCEPTION: No. 2: The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work.

(1) Telescopic guards shall be equipped with a lifting lug or lever, remote from the blade teeth, that will permit the operator to safely shift the guard for starting unusual cuts.

(2) Saws with hinged guards shall be equipped with 2 handles so arranged that neither hand is exposed to the hazard of the rotating blade. One handle shall be on the hinged guard, and of such design that its use will avoid exposure of the hand or fingers between the retracted guard and the blade.

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## 6.0 APPLICABLE FEDERAL OSHA REGULATIONS

Federal OSHA addresses the guarding requirements for portable power-driven circular hand saws within Federal Code of Regulations Title 29 section 1926.304(d) under subpart I of the Construction Safety Orders for hand and power operated woodworking tools.

1926.304(d)

Guarding. All portable, power-driven circular saws shall be equipped with guards above and below the base plate or shoe. The upper guard shall cover the saw to the depth of the teeth, except for the minimum arc required to permit the base to be tilted for bevel cuts. The lower guard shall cover the saw to the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to the covering position.

## 7.0 APPLICABLE CONSENSUS STANDARDS

The American National Standards Institute (ANSI) addresses the guarding of portable power-driven circular saws within ANSI 01.1 under section 6.1.10. The ANSI 01.1 standard is not incorporated by referenced in Title 8 regulations.

ANSI 01.1 - 1971 Safety Requirements for Woodworking Machinery

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Section 6.1.10 Portable Circular Saws. All portable, power-driven saws shall be equipped with guards above and below the base plate or shoe. The upper guard shall cover the blade to the depth of the teeth, except for the minimum arc required to permit the base to tilt for bevel cuts. The lower guard shall cover the blade to

the depth of the teeth, except for the minimum arc required to allow proper retraction and contact with the work. When the tool is withdrawn from the work, the lower guard shall automatically and instantly return to covering position.

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Underwriters Laboratory (UL) has published the 60745 safety standard pertaining to hand-held motor-operated electric tools. Part 2-5 of this standard describes safety requirements particular to circular saws and is included in this evaluation as Attachment 1. Below are sections 19.101 and 19.102 of the 2012 revision of Part 2-5 that specifically address guarding of the circular saw blades. The UL 60745 standard is not incorporated by reference in Title 8 regulations.

UL 60745-2-5 - March 20, 2012

Hand-Held Motor-Operated Electric Tools - Safety - Part 2-5: Particular Requirements for Circular Saws

19.101 Guarding above the base plate

19.101.1 The blade above the base plate shall be guarded by the upper guard. Compliance is checked by inspection.

19.101.2 Apertures in the guarding system above the base plate, unless otherwise specified in 19.101.2.1 to 19.101.2.4, shall be designed to prevent contact with the cutting edge zone of any specified blade.

Compliance is checked with the test probe "a" of Figure 105, which is inserted at any angle and to the depth possible. The test is performed with the saw set for 90° and maximum depth of cut.

19.101.2.1 On the motor side of the upper guard, adjacent to the cutting edge zone at the front of the blade an aperture may be provided for viewing the line of the cut. This viewing aperture shall either meet the requirements of 19.101.2, as illustrated in Figure 106, or it shall be limited by proximity and height restrictions.

- Proximity restriction

A minimum straight line distance of 120 mm shall be achieved between the cutting edge zone of any specified blade and the designated measuring points of the following grasping areas:

- the auxiliary handle, if provided;
- if no auxiliary handle is provided:
  - the motor casing, if the motor casing is designed as grasping area;
  - the switch trigger grasping surface, if the motor casing is not designed as grasping area.

Compliance is checked by the following measurements, which shall be conducted with the base plate set to maximum depth of cut and 90°.

- a) To establish the measuring points on the auxiliary handle or the motor casing (as shown in Figure 107), follow the procedure outlined below.

Establish the closest (A) and the most distant (B) points on the auxiliary handle or motor casing defined grasping surface from the blade. For the motor casing, the closest (A) point to the blade is assumed to be in the plane of the main handle farthest from the blade. Equidistant between points (A) and (B), but not more than 45 mm away from point (A), draw the vertical intersecting line of the

plane parallel with the blade and the surface of the auxiliary handle or motor casing, as applicable.

Then establish the closest (C) and the most distant (D) point from the plane of the base plate on the auxiliary handle or motor casing defined grasping surface. Equidistant between points (C) and (D), draw the horizontal intersecting line of the plane parallel with the base plate and the surface of the auxiliary handle or motor casing, as applicable.

The intersection of the vertical and horizontal lines drawn on the applicable surface is the defined measuring point.

Then measure from this defined point to the cutting edge zone.

b) For the switch grasping area:

Measure the distance from the cutting edge zone to the geometric centre of the switch trigger grasping surface with the switch in the "off" position.

- Height restriction

The height of the viewing aperture (H) measured from the bottom plane of the base plate, as shown in Figure 108A), is limited to the point where the line of sight, from the ordinary operator's head position to the tip of the saw blade cutting the wood, is intersecting the outer surface of the upper guard.

The maximum permissible height H, in millimetres, is given by the formula

$$H = 848U / (205 + S)$$

Where

U is the maximum distance, in millimetres, from the cutting edge zone to the outer surface of the upper guard at the top end of the viewing aperture, measured perpendicularly to the plane of the saw blade (see Figure 108B);

S is the distance, in millimetres, from the plane of the saw blade to a parallel center plane of the switch handle (see Figure 108C).

Compliance is checked by measurement, which shall be conducted with the base plate set to maximum depth of cut and 90°.

19.101.2.2 The perpendicular projection of the upper guard on to the blade shall cover at least the smallest specified blade-cutting edge zone. The space between the upper guard and the blade shall be designed to prevent contact with the saw blade teeth tips of the specified blade.

Compliance is checked with the test probe "a" of Figure 105, which is inserted at any angle and to the depth possible, as illustrated in Figure 106. The test is performed with the saw set for 90° and maximum depth of cut.

19.101.2.3 For saws having an inclinable base plate, the distance X between the base plate and the edge of the lateral side of the upper guard on the side opposite to the motor and adjacent to the front cutting edge zone of the blade, as shown in Figure 109, shall not exceed:

a) 38 mm for circular saws with a blade diameter less than 265 mm;

- b) 45 mm for circular saws with blade diameter equal or greater than 265 mm;
- c) 55 mm for circular saws with blade diameter equal or greater than 265 mm and where the lower guard is not provided with any retracting handle and the only means for operating the lower guard is remotely from the motor side of the upper guard.

Compliance is checked by measurement of the distance X along the lines perpendicular to the plane of the base plate, as shown in Figure 109.

For all saws where the depth of the cut setting is achieved by pivoting the base plate front of the blade, the measurements shall be conducted with the base plate set for the 90° setting and to maximum depth of cut.

For saws where the depth of the cut setting is achieved by pivoting the base plate at the rear of the blade or where the base plate at minimum and maximum depth are parallel, the measurements shall be conducted with the base plate set for the 90° setting and to any depth of cut.

19.101.2.4 The cutting edge zone of the blade above the base plate shall not be accessible from the front of the saw.

Compliance is checked with the rigid test probe <sup>2</sup>b<sup>2</sup> of Figure 110 which shall not contact the blade when the saw is set for a 90° cut and any depth of cut and the probe 'b' is centered with the blade then advanced in any single plane perpendicular to the blade and parallel to the base plate, as illustrated in Figure 111.

The test is repeated with probe <sup>2</sup>b<sup>2</sup> offset 13 mm to the right of the blade centre and then offset 13 mm to the left of the blade centre.

19.101.3 Saws using a guarding system as shown in Figure 104 shall be equipped with an upper guard into which any specified blade shall automatically retract when not in use and the time required for the blade to retract into upper guard shall be in accordance with 19.102.2. The upper guard shall lock the blade automatically in the closed position, when the movement of the base plate is not obstructed by the work piece.

Compliance is checked by inspection and measurement. The measurement is carried out with the saw held by the handles and the base plate, initially in the horizontal plane and set to maximum depth of cut and 90°, is released to the blade covering position.

The saw is then placed on a horizontal workpiece with the base plate at bottom. The saw is pressed by the handles downwards to the maximum cutting depth. After releasing the handles, the saw-unit with the saw-blade shall move upwards and lock automatically in the closed position.

The opening in the upper guard for the passage of the blade and riving knife, if any, shall comply with 19.101.2, as illustrated in Figure 106.

Compliance is checked by inspection and application of the test probe <sup>2</sup>a<sup>2</sup> of Figure 105.

The opening in the upper guard to allow the plunging movement of the motor shall be as small as possible.

Compliance is checked by inspection.

#### 19.102 Guarding below the base plate

19.102.1 For saws using a guarding system as shown in Figures 101, 102 and 103, the perpendicular projection of the lower guard on to the blade shall cover at least the cutting edge zone of the smallest specified blade, except for the blade exposure specified in 19.102.3.

Compliance is checked by inspection.

19.102.2 For saws having a blade with a diameter less than 210 mm, the closing time of the lower guard shall not exceed 0,2 s. For saws having a blade diameter 210 mm and above, the closing time of the lower guard in seconds, shall be less than the numerical equivalent of the largest specified blade diameter, expressed in meters, but not more than 0,3 s.

Compliance is checked by measurements. The measurement is carried out at maximum depth of cut and 90°. The saw is held with the base plate in horizontal position, the lower guard being at bottom. The lower guard is retracted fully and then allowed to close.

19.102.3 For saws using a guarding system as shown in Figures 101 and 102, when the base plate is not inclined and is set for maximum depth of cut, and the lower guard is in the closed position, the angle  $\angle ACB$  of blade exposure, as specified in Figure 112, shall not exceed

- 0°, if the outboard section of the base plate does not enclose the blade on the side opposite the motor or the principal dimension H of the base plate, as specified in Figure 113, is less than 0,10 D;
- 10°, if the outboard section of the base plate encloses the blade on the side opposite the motor and the principal dimension H of the base plate as specified in Figure 113, is 0,10 D to 0,15 D;
- 25°, if the outboard section of the base plate encloses the blade on the side opposite the motor and the principal dimension H of the base plate, as specified in Figure 113, is greater than 0,15 D.

Compliance is checked by inspection and by measurement.

19.102.4 For saws using a guarding system as shown in Figure 103, the lower guard shall automatically lock in the closed position when the movement of the lower guard is not obstructed by the work piece and allowed to close.

Compliance is checked by manual test.

19.102.5 For saws using a guarding system as shown in Figures 102 and 103 equipped with a riving knife, the lower guard of which needs to allow for the passage of the blade, riving knife and its holder, the apertures in the lower guard shall be kept as small as possible.

Compliance is checked with the test probe 2a2 of Figure 105 when inserted at any angle and to the depth possible as illustrated in Figure 106. It shall not be able to contact the cutting edge zone of the largest specified blade.

## 8.0 BACKGROUND ON PETITIONER AND DESCRIPTION OF THE SAW GUARD DOG AND OTHER SYSTEMS

### 8.1 Petitioner's background

The petitioner is currently a high school student who has taken an interest in circular saw safety based on personal the experience of his father, Charles Swingle. Mr. Swingle is the owner of a concrete construction company and has purchased the rights to the 'Saw Guard Dog' system described in section 8.2 of this evaluation. The petitioner assisted his father in the adaptation of the of the Saw Guard Dog system to different saw makes and models. He has also obtained a provisional patent for the device which is marketed under the company New Tools, Incorporated, of which his father is part owner.

### 8.2 Saw Guard Dog system



Figure 1. Saw Guard Dog

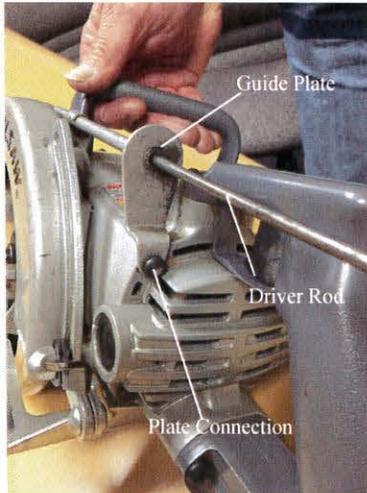


Figure 2. Guide Plate Connection



Figure 3. Guide Clip Connection

The Saw Guard Dog (Figure 1) is a device for portable power-driven circular hand saws that retracts the telescoping guard for the purpose of starting unusual cuts. This system comprises four major components and is sold as an aftermarket addition to portable power-driven circular hand saws. The four components of the system include a steel driver with a push knob, an aluminum driver bar guide with mounting plate, an aluminum guide clip and an aluminum connecting link attached to the driver bar with a threaded connection. All components of the system are connected to the saw utilizing original screws of the equipment. The driver rod mounting plate and securing clip are secured with case screws located at the back (operator's side) and top of the saw respectively as shown in Figures 2 and 3. The connecting link is attached by removing the telescoping guard lifting lug and attaching the bar with the original guard lug screw as shown in Figure 4.

Once installed, the system functions by the operator pushing the driver rod forward (away from the operator). This action transmits a tension force to the connecting link attached to the saw's guard, retracting the guard and exposing the blade. When the driver rod is released, the telescoping guard and driver rod return to their initial positions. The system does not contain any springs and relies on the force produced by the springs of the saw guard to operate. By eliminating the need to push directly on the guard lug or lever, the petitioner contends that the Saw Dog Guard affords the operator a "hands free" option to retract the guard.

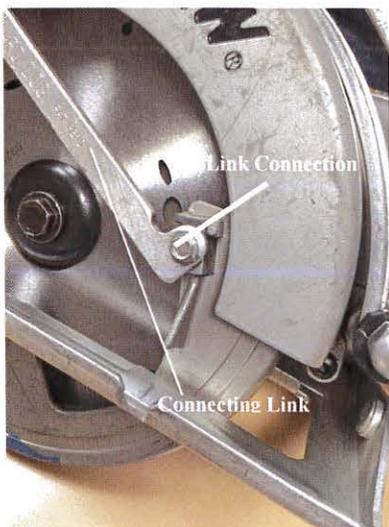


Figure 4. Connecting Link

Currently, the Saw Guard Dog system has been adapted to function on several models of Skil, Bosch and Craftsman portable circular hand saws and additional designs have been drafted for Makita and Dewalt model saws as well.



<http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO1&Sect2=HITOFF&d=PALL&p=1&u=%2Fnetahtml%2FPTO%2Fsrchnum.htm&r=1&f=G&l=50&s1=3441067.PN.&OS=PN/3441067&RS=PN/3441067>

### **8.3.4 Patent US 3441067**

The design of this device is similar to that in the patent described in section 8.3.1 of this evaluation and consists of a crank with an actuating lever located to the left (from operator's position) of the upper fixed saw guard. A second lever on the other end of the crank shaft connects to a connecting link that is curved at one end around the motor housing of the saw. The end of the link connects with a pin to the telescoping saw guard as well as a return spring for the device. The other end of the return spring terminates in the saw's upper guard. When the actuating lever of the device is pulled toward the operator, the crank shaft lever transmits tension to the connecting link retracting the telescoping guard. This device also incorporates a disengagement feature for the retraction lever. When the telescoping guard of the saw contacts the work piece, the crank shaft disconnects the shaft from the ratcheting mechanism of the actuating lever allowing it to turn freely the saw guard to return to the closed position regardless of the position of the actuating lever. This patent was filed on December 15, 1972, and is available at:

<http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO1&Sect2=HITOFF&d=PALL&p=1&u=%2Fnetahtml%2FPTO%2Fsrchnum.htm&r=1&f=G&l=50&s1=3787973.PN.&OS=PN/3787973&RS=PN/3787973>

### **8.3.5 Patent US5832614**

This device is similar to that described in section 8.3.4 of this evaluation. An actuating lever connected to a crank shaft turns a lever that is connected to a link with a slotted connection. The link is connected to the lower telescoping guard of the saw as well as return spring. The primary difference between this patent and that in section 8.3.4 is the direction that force is applied to the actuating lever. The lever of this device is pushed away rather than pulled toward the operator. This allows the device to be operated while holding the saw's secondary handle. This patent was filed on May 20, 1997, and is available at:

<http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO1&Sect2=HITOFF&d=PALL&p=1&u=%2Fnetahtml%2FPTO%2Fsrchnum.htm&r=1&f=G&l=50&s1=5832614.PN.&OS=PN/5832614&RS=PN/5832614>

### **8.3.6 Saw Guard Pro Patent US7426787**

This device consists of an actuating lever and guard retracting arm mounted on a pivoting assembly. The actuating lever is located on the left (from the operator's position) of the primary handle of the saw such that it can be pushed with the operator's thumb. The arm of the device is connected to the telescoping guard of the saw via a grooved roller and mounting bracket. The grooved roller allows the lifting arm to slide as it moves to through its motion to retract the guard. Operation of the device is achieved by pushing downward

on the actuating lever thereby pivoting the arm upwards and retracting the guard. The patent for this device was filed on June 15, 2006, and is available at:

<http://patft.uspto.gov/netacgi/nph-Parser?Sect1=PTO2&Sect2=HITOFF&p=1&u=%2Fnetacgi%2FPTO%2Fsearch-bool.html&r=16&f=G&l=50&co1=AND&d=PTXT&s1=retractor.TI.&s2=saw&OS=TTL/retractor+AND+saw&RS=TTL/retractor+AND+saw>

## **9.0 PETITIONER'S BASIS FOR NEW REGULATION**

The petitioner states that the current language in Title 8 section 4307(b) does not adequately protect workers while operating saws to perform unusual cuts. He believes, based on the personal experience of his father who owns a concrete construction company and has used portable handsaws extensively, that the requirements in section 4307(b)(1) allow worker contact with the spinning saw blade as well as loss of control of the saw.

During a meeting on March 22, 2016, the petitioner's father demonstrated how the injuries described above can occur. He pointed out that when the telescoping saw guard is lifted, it is often held open by placing the thumb on the lifting lug or lever while placing the index finger on the bottom of the baseplate. This action, according to Mr. Swingle, places the operator's fingers within inches of the saw blade, does not allow the operator to use the secondary handle usually located at the top of the saw, and thus creates a significant potential for injury due to the close proximity of the operator's fingers to the spinning blade compounded by reduced control of the saw when acted upon by a the torque of the motor or a kickback event. By requiring a "hands free" way to retract the guard, the petitioner believes that these hazards can be avoided by maintaining a greater distance between the operators hand and the saw blade and affording the ability to partially grasp the secondary handle.

The petitioner also believes that the requirements described in the current language of Title 8 section 4307(b)(2), creates potential hazards based on the design of modern saws. The telescoping guards of modern saws, the petitioner points out, are not equipped with handles as described in section 4307(b)(2), but rather small lugs or levers. Due to small size of the lug or lever located on the guard and exposure to the above mentioned hazards, the petitioner argues that workers are more likely to pin or wedge the saw guard open while starting unusual cuts which is expressly prohibited by Title 8 section 4307(c).

## **10.0 EVALUATION OF THE SAW GUARD DOG SYSTEM**

On March 22, 2016, an evaluation of the Saw Guard Dog system was conducted at the Cal/OSHA Research and Standards Occupational Safety Unit office located in Santa Ana, CA. The functionality of the system was discussed with the petitioner and his father as well as the specifics of what the petitioner wished to accomplish with the petition request. Measurements, photographs and videos were also taken of the system and components.

Additionally, a performance evaluation of the Saw Guard Dog was also conducted. The system was installed per the manufacturer's instructions on a Skil SHD77 portable hand saw. According to the petitioner's father, the system had been installed and operated on the subject saw for approximately six months prior to the evaluation. Functionality of the system was demonstrated and observations made to identify any effects the device may have on the functioning of the saw's telescoping guard. Several tests were performed which consisted of pushing the driver rod until fully depressed and allowing it to return to its initial position. For comparison, the guard of the saw was also tested with the Saw Guard Dog removed. During these tests, the guard was retracted to the same position attained by the device and allowed to return to the closed position.

The device was found to allow for a range of motion of the telescoping saw guard that completely exposed the saw blade as well as allowing the guard to return to the fully closed position. The speed at which the saw guard traveled with the device installed was observed to be slightly slower than when removed. It was not possible, however, to measure the difference in time that the guard took close between the two test conditions. The connecting link was observed to rub against a small portion of the saw's upper guard during the evaluation. Although an attempt was made to adjust the position of the bar, it continued to rub against the upper guard during all tests.

## **11.0 ANALYSIS**

### **11.1 Benefits of the proposed amendment of section 4307(b)(1)**

The changes proposed by the petitioner to Title 8 section 4307(b)(1) do have the potential to allow a worker to maintain a greater distance between his/her hand and the uncovered portion of the saw blade when using a device such as the Saw Guard Dog when starting unusual cuts. This would be the case particularly when the guard is held open as described by Mr. Swingle in section 8 of this evaluation.

Retracting and securing a telescoping guard in this manner, however, is not the only method to expose the blade when starting unusual cuts. Additionally, securing the telescoping guard of a circular saw by placing opposing finger(s) under the base plate is not the procedure recommended by portable circular the saw manufacturers (Skil, Bosch and Craftsman), for which the Saw Guard Dog has been designed. The procedure for starting unusual cuts described by these manufacturers recommends placing the foot of the base plate flat on the work piece with the hand used to retract the guard on top of or held above the base plate of the saw rather than underneath it. This procedure allows the operator's hand to remain above the upper half of the blade that is completely covered by the fixed guard and lends stability to the saw by placing pressure on the base plate. Depending on the design of the saw, the operator may also be able to hold the secondary handle of the saw employing the procedure discussed above.

### 11.3 Disadvantages of Saw Guard Dog and similar systems

Despite the potential benefits described in section 11.1 of this evaluation, the Saw Guard Dog and similar systems also present disadvantages that could present potential hazards to operators of portable circular hand saws. The addition of any such system introduces added mass and frictional forces to the telescoping guard mechanism of a circular saw for which it was not originally designed. As described in section 10 of this evaluation, the connecting link was observed to rub against the upper guard of the saw creating friction within the system. An additional frictional force is created as the driver rod slides through the guide tube. This introduces additional loading on the return spring of the saw guard which can affect its operation and result in the guard returning to its protective position slower than without the Saw Guard Dog.

As described in section 10 of this evaluation, the Saw Guard Dog was observed to increase the time that the telescoping guard took to close when compared to that with device removed. Although a specific reaction time for a circular saw guard is not included within Title 8 section 4307(b), the recently revised language requires that the guard “return automatically and instantly to the covered position.” The term “instantly” is not defined within Article 59 of Title 8 regulations, however, Part 2-5 of UL 60745 could be used for reference which requires telescoping circular saw guards to close within 0.2 seconds for saws with blades less than 210 mm (8.27 in.) and 0.3 seconds for saws with blades greater than 210 mm (8.27 in.). Although it was not possible to determine the closing time of the saw guard during the March 22<sup>nd</sup> evaluation, it is conceivable that, if the device was not properly maintained, the closing time of the saw guard could be affected to the extent of preventing it from closing instantly.

The additional components of devices such as the Saw Guard Dog could also be susceptible to damage in the field. Circular saws are most commonly used on construction sites which, by their very nature, expose equipment to a significant amount of physical abuse. In the event that a component such as the driver rod or connecting link became deformed, the device and thereby the telescoping guard would not function properly. Such a situation may encourage the operator to pin or wedge the guard open rather than remove the device.

The components of the devices such as the Saw Guard Dog could also present catch hazards to the saw operator. This is particularly the case with the driver rod of the device which protrudes approximately four inches beyond the mounting plate. The position of the rod places the push knob within close proximity of the back of the saw handle where it could be caught by a piece of personal protective equipment or article of clothing such as a shirt sleeve. This could result in interference with the saw during operation or the saw being pushed off of a table or ledge.

Finally, the addition of aftermarket equipment can be contrary to manufacturer’s recommendations. The Saw Guard Dog reuses several screws including those that secure the saw housings together. Due to the addition of the device mounting hardware, these screws are not all allowed to seat with to their depth of thread which could affect the integrity of the saw. The Power Tool Institute which is comprised of representatives of circular saw manufacturers and other interested parties have raised concerns that such

devices would be contrary to manufacturer's recommendations and would void their warranties as well as approvals for the equipment such as UL, CSA and ETL listings.

#### **11.4 Amendment of section 4307(b)(2)**

The proposed deletion of the language in Title 8 section 4307(b)(2) will not enhance worker safety. The petitioner's argument that the lifting lug or lever common to the design of modern saws creates a hazard by placing the saw operator's hand in close proximity to the saw blade does not have merit. During the March 22<sup>nd</sup> meeting, it was discerned that this argument was directed at circular saws equipped with telescoping guards. Section 4307(b)(2), however, pertains to saws equipped with hinged guards. Hinged saw guards are of a different design than telescoping guards and pivot toward the back of the saw rather than retract inside the upper fixed guard. The petitioner's basis for the removal of section 4307(b)(2) is therefore not relevant.

### **11.0 Conclusion**

Cal/OSHA has reviewed the pertinent information regarding the petition for including the requirement of a "hands free" device for retracting the guards of portable power driven circular hand saws under Title 8 subsection 4307(b)(1) as well the removal in its entirety, the language within subsection 4307(b)(2). This included information provided by the petitioner as to what would be accomplished by the petition, how the "hands free" device could be employed on circular saws, and the benefit the new regulation would provide for employee safety. Manufacturers' specifications and operating instructions for circular hand saws from several manufacturers were reviewed, as well as applicable consensus standards. In addition, representatives of saw manufacturers and end users including members of the Power Tool Institute and Carpenters Training Committee were contacted regarding the potential benefits and disadvantages of the proposed petition.

The requirement for a "hands free" method of retracting the telescoping guard of portable power-driven circular hand saws could, in some instances, allow a saw operator to maintain a greater distance from the equipment's point of operation. However, because of the potential disadvantages of such devices, employing the methods for starting unusual cuts recommended by circular saw manufacturers would better ensure the safety of workers. The proposed amendments to Title 8 sections 4307(b)(1) and (b)(2) are thus unnecessary, and the petition should be denied.