



Investigation Guideline

Product: Grass (String) Trimmers and Edgers
Appendix #: 88
Date amended: July 2004

I. Introduction

NOTE: This guideline is to be used for string trimmers, edgers, and trimmer/brushcutters when the trimmer/brushcutters are being used in the *trimmer* mode. If the trimmer/brushcutter is being used in the *brushcutter* mode, see Investigation Guideline - Appendix No. 89, "Brushcutters".

A. Background Information

String trimmers and edgers were associated with an estimated 12,500 emergency room treated injuries in 2002.

The major hazard patterns for string trimmers are thrown objects and non-metallic string contact. The major hazard patterns for edgers are thrown objects and metallic cutting blade contact. Other hazard patterns include straining/spraining and tripping/slipping. In some cases electric shock and fire can also result from use of string trimmers and edgers.

Based on the special study of string trimmers, edgers, and brushcutters related to incidents between May 1, 2002 and August 1, 2002, the main body part injured was the eyeball, followed by the extremities (i.e., lower leg, finger, foot). The primary diagnoses for injuries to operators were contusions/abrasions and lacerations.

Investigations are needed to determine the effectiveness of the voluntary American National Standard (ANSI-B175.3) for Grass Trimmers and Brushcutters. The purpose is to reduce the hazards, especially thrown objects, associated with the use of string trimmers, edgers and brushcutters.

B. Product Description

Grass (string) trimmers hand-held devices that use a nylon string at the end of a 4 – 5 foot shaft to cut grass and weeds in the areas where lawn mowers cannot generally reach. They may be gasoline or electrically powered (See Figures 1, 2, and 3). Trimmers may have a plastic blade or may use a monofilament line or string. The blades or filament are mounted so that they rotate in the horizontal plane powered by a small 1 or 2 horsepower engine. The spinning action of the monofilament string or line cuts the grass or weeds at the level at

which the operator holds the device. Trimmer blades or the monofilament line usually do not penetrate the turf.

Lawn edgers are wheeled devices that utilize a metallic blade designed to rotate in the vertical plane and cut an edge or groove between the turf and other surfaces (Figure 4 and 5). They are used for edging walkways, garden beds, and driveways. They may be gasoline or electrically powered. These tools have wheels and a long handle. Note that the blade of the unit can be rotated to operate in the horizontal plane so that the product may be used as a trimmer. Some models allow the blade cutter to be replaced by a nylon string.

Trimmer-brushcutters are gasoline-powered and may be equipped with a monofilament line for cutting grass and weeds, or with rigid metal or plastic blades for cutting brush or thin saplings (Figure 6). This guideline pertains to brushcutters being used in the trimmer mode, equipped with a monofilament line (or string).

Figure 1. Gas (25 cc engine) Grass (String) Trimmer



Figure 2. Electric Grass (String) Trimmer - Corded



Figure 3. Electric Grass (String) Trimmer - Cordless



Figure 4. Edger – Gas



Figure 5. Edger – Electric



Figure 6. Gas Brushcutter



C. Specific Items of Interest

- Of particular interest are details about the **shield around the blade assembly**. Indicate the position of the shield relative to the operator of the blade, the size of the shield and whether the shield was on the trimmer at the time of the incident.
- Specify the type of vegetation being cut at the time of the incident.
- Obtain product safety instructions, if available, and describe the information included on product labels: list warnings, date codes, product certification, ratings.
- Details on cutting attachment are important. Features like dimensions, material (i.e. nylon string, metal or plastic), number of teeth, and manufacturer.

D. Headquarters Contacts

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II. Instructions for Collecting Specific Information

A. Free Text Summary

- It is important to describe clearly the sequence of events. Describe what happened immediately before, during, and after the incident. Include location of the victim relative to the grass trimmer, and a detailed description of the parts of the grass trimmer involved in the injury.
- Describe the nature of the injuries (did they result from a rotating blade, or filament/string, thrown object, electric shock, snagging of clothing on the machine, or failure of the product).
- Describe whether the victim is the operator or bystander. Where the incident occurred (home, school, work, etc.).

B. Description of Incident Environment

- Outline the general conditions (i.e., sunny, cloudy, any adverse weather conditions, temperature, wind speed and direction, rain, snow, etc).
- Lighting conditions at the time of the accident.
- Size of the area being cut and type of material being cut.
- Condition of the material surface being cut and vegetation density (i.e., wet, dry, thick, long, etc.). Include the height of the grass or brush being trimmed.
- Ground surface conditions (wet, uneven, rough, slippery, etc.) and slope of terrain.
- Preparation of area being cut (e.g., removing objects that could be thrown by the trimmer or edgers).

C. Description of Victim

1. Indicate victim's age, sex, height, weight and whether the victim was the operator, an assistant, or a bystander.
2. Indicate if operator was tired, rested, distracted, etc. at the time of the incident.
3. Indicate any medication or alcohol consumed by the operator and whether the operator had any physical or competence reducing handicaps or disabilities.

4. Provide a complete description of clothing and safety equipment used by the operator (e.g., gloves, safety shoes, goggles, hard hat, hearing protection).
5. Determine operator's awareness of possible dangers in the cutting activity and any precautions taken to prevent accidents.
6. Describe the accident sequence in detail, indicating the body part injured, the nature of the injury and its severity.
7. Indicate:
 - (a) The victim's knowledge of operating instructions - whether self-taught (by owner's manual) or by an instructor.
 - (b) Previous experience in operating, repair, or adjustment of the trimmer or edger.
 - (c) Previous injuries in using trimmer or edger.
 - (d) Position of operator's hands and feet relative to the trimmer or edger.
 - (e) Operator's awareness of the victim's presence.
 - (f) Victim's awareness of operator's presence.
 - (g) Victim's location in relation to trimming operation.

D. Description of Interaction between Injured Person(s) and Product

- Indicate the degree of user familiarity with product operation, repair, and adjustment.
- For accidents involving contact with a blade or monofilament (string), describe the part of the body injured and how it contacted the blade or filament. Indicate the manner in which product shielding may have been a factor in the accident.
- For accidents involving thrown objects, describe: the object and how it came into contact with the trimmer or edger (whether it ricocheted off another object or came directly off the cutting head); how high and far the object was thrown; how far the victim was standing from the machine, and where the victim was struck.
- For accidents involving electric shock, indicate: the location on the machine or cord where current was transmitted to the victim, the prevailing weather, dampness of the terrain, and the victim's activity. Indicate how the shock occurred (e.g., electric cord cut; contact with power lines; shock through the handle).
- For accidents involving fires, indicate: the sequence of events, the source of fuel and the manner of ignition.

E. Description of Product (Involved in the injury)

Safety Warning: When examining a gasoline powered edger or trimmer, remove the spark plug wire from the spark plug and ground it to the chassis before manual inspection. The act of rotating the blade by hand may cause the engine to start if this is not done. Electrical units should be unplugged before examination.

Provide the following detailed information on the string trimmer:

- Describe the type of machine (trimmer, edger or combination). Indicate the manufacturer, brand, model name and/or number and serial number. Indicate age and whether purchased new/used or rented.
 - (a) If gasoline powered, indicate the following:
 - (1) Horsepower rating, cubic inch displacement
 - (2) Capacity of fuel tank.
 - (3) Location of fuel tank.
 - (4) Leakage in fuel tank, fuel liner, etc., if any.
 - (b) If electric powered, indicate the following:
 - (1) Power cord and gauge (if available)
 - Length
 - Covering (jacketed or parallel conductor construction) and indicate any damage to insulation or conductors
 - If extension cord involved, provide some information requested above for the extension cord.
 - (2) Battery
 - cord amperage
 - voltage
 - if recharging involved in the incident, provide description of the recharger.
- Describe the power source receptacle, its location (indoor, outdoor), and any circuit protection and amperage (fuse, circuit breaker, ground fault interrupter).
- Describe if the unit has been modified or changed. Ask who made the modifications or changes.
- Electric appliance parts description
 - Switch (on/off, lock "on" feature, speed control).
 - Motor
 - Open (wiring, brushes, windings visible)
 - Enclosed

- The blade or filament
 - (1) Type of blade or filament (material , design)
 - (2) Type of cutting edge (e.g. smooth, serrated)
 - (3) Dimensions (length, width, thickness)
 - (4) Clearance between blade tip and housing
- Determine if the cutting head was provided by the manufacturer of the trimmer. If not, what company manufactured the cutting head?
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- Machine adjustment
 - (1) Method of adjustment
 - (2) Number of positions
- Describe the machine shielding including deflectors
- If the device has wheels, describe the wheel construction
 - (1)Material (plastic, steel, etc.)
 - (2)Tires (material, tread width, diameter).
- Indicate the type of handle (Bar, T-style, wheel) and the presence of handgrips.
- Weight and length of trimmer or edger
- Certification labels (OPEI, UL, ANSI)
- Modifications made to the trimmer or edger, if any.

III. Photographs/ Diagrams of Incident Scene

- Take a series of good, clear photographs of the incident scene and the product, simulating the incident sequence.
- Photograph the unit (front, side, rear), the manufacturers' name plate, OPEI certification, UL listings, warning signs, and saefy features such as shielding.
- Provide close-up photos of labels, controls, safety devices or guards, and off-on switches.
- Have victim pose for photo that depicts his/her position in relation to the trimmer at the time of the incident (with power to the unit "off").
- Lay out, in diagram form, the distances between the operator, any objects with which the trimmer or edger made contact, and the victim (if not the operator).

IV. Obtaining samples and documents related to the investigation

- Photocopy the owners' manual and attach it to the report.
- Collect any official records associated with this incident that may be available.
- Document the victim's contacts with the retailer and manufacturer regarding the incident and obtain copies of all correspondence.



DATA RECORD SHEET for String Trimmers and Edgers

1. Task Number _____
2. Incident Date (MM/DD/YYYY) _____
3. What type of product was involved in the accident?
____ Grass trimmer
____ Edger

DESCRIPTION OF INCIDENT ENVIRONMENT

4. Describe the general weather conditions at the time of the incident.

5. What were you (was the operator) trimming at the time of the accident?
(Select as many as applicable)

____ Grass
____ Weed
____ Brush
____ Small tree
____ Other (Specified: _____)

6. What was the condition of the material surface being cut and vegetation density (i.e., wet, dry, thick, long)?

7. Describe whether there were any environmental conditions such as wet grass, uneven surfaces (holes, bumps, rocks, or obstacles), a steep embankment or anything else that may have contributed to the incident?

8. Were objects that could be thrown by the trimmer or edgers removed from the area to be cut prior to using the trimmer or edger?

DESCRIPTION OF VICTIM

9. Was the victim/injured person an operator or bystander?

Operator
 Bystander
 Helper

10. Indicate the victim's age, sex, height, and weight.

Age
 Sex
 Height
 Weight

11. Indicate the operator's level of alertness at the time of the injury (i.e., tired, rested, distracted, etc).

12. Determine whether the operator was ill or under any medication, drug, or alcohol at the time of the accident?

Yes → (Specify: _____)
 No

13. Was the operator wearing protective gear at the time of the accident?
(Select as many as applicable)

Eyeglasses
 Safety goggles

- Gloves
- Steel toe shoes
- Heavy pants
- Other special clothing (Specify:_____)

PRODUCT SHIELDING

14. Was the shield attached to the trimmer or brushcutter at the time of the accident?

- Yes
- No

15. If the shield was attached to the trimmer, ask whether it was damaged, broken, or in good condition?

- Damaged
- Broken
- In good condition

16. If the shield was NOT attached, ask why it was not attached?

- Had broken off
- Had been removed
- Never had one
- Other (Specify:_____)

FOR INCIDENTS INVOLVING THROWN OBJECTS:

17. Describe the thrown object and how it came into contact with the trimmer or edger.

18. Determine whether the object ricocheted off another object or was it thrown directly (in a straight line) from the cutting head?

- Ricochet off another object
- Directly from the cutting head

19. Indicate whether the thrown object was a part of the machine or was it a piece of grass, twig, pebble, etc?

- _____ A part of the machine (Specify: _____)
- _____ A piece of grass, twig, or pebble, etc.
- _____ Other (Specify: _____)

20. How high and far was the object thrown?

21. How far away from the machine was the victim standing?

22. Where was the victim struck?

FOR INCIDENT INVOLVING ELECTRIC SHOCK,

23. Indicate the location of the machine or cord where the current was transmitted to the victim.

24. What was the prevailing weather at the time of the incident? Was the terrain damp?

25. Indicate how the shock occurred (i.e., was the electric cord cut, was there contact with the power lines, shock through handle)?

FOR INCIDENTS INVOLVING FIRE,

26. Indicate the sequence of events, source of the fuel and the manner of ignition.

DESCRIPTION OF PRODUCT

27. Was the trimmer or edger involved in the incident gas or electric?

_____ Gas (What was the engine size? _____)

_____ Electric (Was the product corded or did it use a battery?)

_____ Corded (Please describe the type, length, and gauge of the cord and extension cord. _____).

_____ Battery (Describe voltage, if recharging involved, describe the recharger).

28. Describe the power source receptacle, its location (indoor, outdoor), and any circuit protection and amperage (fuse, circuit breaker, ground fault interrupter).

29. Was the cutting head produced by the manufacturer of the trimmer or was it produced by someone other than the manufacturer?

_____ Manufacturer of trimmer

_____ Other

30. About how old is the trimmer or brushcutter?
(Write down the number of years, months, or days)

_____ Years

_____ Months

_____ Days

_____ Don't know

31. What is the brand name (manufacturer) and model name/number of the trimmer or edger?

Mfr. _____

Model # _____

Serial # _____

Horsepower/Displacement _____

Don't know _____

32. Had the trimmer or edger been changed or modified in any way since you got it?

_____ Yes

_____ No

33. If changed or modified, ASK:

- How was the trimmer or brushcutter changed or modified?

- Who did the modifications?

_____ Victim

_____ Friend

_____ Relative

_____ Other (Specify: _____)

34. Was the motor/engine running at the time of the accident? (Determine if the trimmer or edger had just been turned "on" or "off").

_____ Motor/engine was running.

_____ Motor/engine was not running.

_____ Motor/engine was just turned "on".

_____ Motor/engine was just turned "off".

35. What type of cutting head was being used at the time of the accident and what is the manufacturer of the cutting head?

_____ Non-metallic string

_____ Non-metallic head

_____ Metallic cutting blade

_____ Other (Specify: _____)

36. Determine how long the operator had been working with the trimmer or brushcutter that day before the accident occurred? (Write down the number of hours and/or minutes)

_____ Hours _____ Minutes

37. Determine how often and for what length of time the operator used the trimmer or edger?

38. Determine if the operator remembers any warnings or safety precautions about the operation of the trimmer or brushcutter that were printed in the owner's manual?

39. Describe whether the operator remembers seeing any warnings or safety precautions printed on a label on the trimmer or brushcutter?