Investigation Guideline

Product: Snow Throwers
Appendix #: 71
Date amended: September 2004

I. Introduction

A. Background Information

Snow throwers may be a luxury or a necessity depending upon geography and individual circumstances, but many of the injuries sustained while using machines were relatively serious compared to other outdoor powered equipment. Clogging of the discharge chute with wet and heavy snow and failure to shut the engine off while attempting to clear the discharge chute are the major hazard associated with snow throwers.

Research indicated that when hand skin temperatures are below 60^{o} F there is a predictable deterioration in hand function. Exposure to cold temperatures over time can result in decreased manual dexterity, increased reaction time, and decreased sensitivity. Human performance is also degraded by exposure to the noise and vibration associated with snow thrower operation.

B. Product Descriptions

Both self-contained, walk-behind snow throwers and attachment snow throwers are classified into two types: (1) a single-stage snow thrower that cuts into the snow and simultaneously ejects it through the discharge chute by a single blade (auger) which combines the collecting and impelling functions and (2) a two-stage snow thrower that collects snow (by an auger) which is accelerated through the discharge chute by a separate, second set of smaller impeller blades. In general, most single-stage snow thrower engines range from 2.5 to 6.0 horsepower; some are greater. The two-stage machines generally have larger engines with 4 or more horsepower. Attachment snow throwers are attached to lawn tractors and are operated through the PTO (Powered Take Off) of the lawn tractor.

C. Specific Items of Interest

The product of particular interest to the Commission is walk-behind snow throwers. They can be gasoline or electric-powered, pushed (manually) or self-propelled (powered), and single-stage or two-stage operation.

In single-stage operation, the snow is collected and thrown through a discharge chute by a single device which combines the collecting and impelling functions. This device can be correctly identified as collector/impeller, an auger/impeller, or according to ANSI B71.3, an impeller (See Figure 1).

In a two-stage operation, the collector and impeller functions are separate. Snow is collected by an auger-like device after which it is accelerated through the discharge chute by a separate impeller fan. The impeller can be independently powered (See Figure 2).

Figure 1: Single-Stage

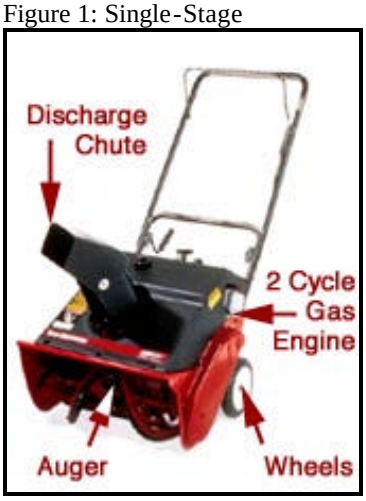
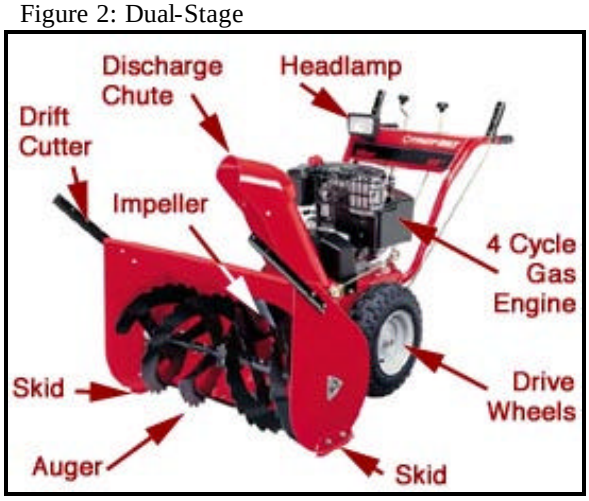


Figure 2: Dual-Stage



D. Headquarters Contacts

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II. Instructions for Collecting Specific Information

A. Synopsis

A complete description of the conditions under which the snow thrower was being used is necessary to determine the cause of the injury. Of special concern to the Commission are injuries which occur when the operator places his/her hand into the discharge chute when the impeller has stopped, and by releasing packed snow/ice allows the impeller blade to "spring back" or "recoil", trapping the operator's hand.

When product-related factors, environmental factors, and human factors are all likely to be involved, it is important to establish a clear sequence of events when investigating the accident. Accidents can involve the operator, or bystander, or both. The investigator is not limited to the topics below. Each topic can be approached in an open-ended fashion.

Note: For data retrieval from the computer, please make sure that the following key words are used in the synopsis as appropriate: **walk-behind, riding, gasoline, electric, impeller, auger, collector, recoil, deadman, hand, single-stage, two-stage, blade.**

B. Description of Incident Environment

- Indicate weather conditions at the time of the accident (windy, snow, clear, etc.).
- Indicate air temperature, wind, wind chill index. (contact with weather service may be required)
- Indicate lighting conditions at the time of the accident.
- Indicate time of day.
- Indicate surface being cleared of snow (gravel driveway, concrete, etc.), presence of debris.
- Indicated amount (in inches/feet) and type (wet, dry and powdery) of snow.
- Indicated presence of ice on ground.
- Indicate ground conditions (slippery, wet, muddy, icy, slushy).
- Specify degree of slope if machine was used on an incline.

- Indicate if salt was used on snow prior to removal.
- Indicate if noise from snow thrower, or other source, was distracting or disorienting to operator.

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

- Operator/Victim description:
    - Height, weight, age
    - Body build (e.g., small or slight, medium, large or heavy set)
    - Competence reduction factors (e.g., impaired vision, medication, physical disabilities, etc.)
    - Experience with and knowledge of product performance.
    - Familiarity with snow thrower operating instructions and warnings (operator's manual)
    - Victim's clothing at the time of the accident, indicating type, materials, loose or snug fit, use of gloves or mittens, type of footwear and sole (slip-resistant) and degree of protection or contribution to the accident because of entanglement in the snow thrower.
- Indicate the operating status of the snow thrower (i.e., engine running and impeller engaged; engine shut off and impeller disengaged, etc.)
- Indicate whether the victim was cleaning the discharge chute of snow/ice; specify hand positioning, protection (gloves, type and material), and use of implement (stick, etc.).
- Indicate whether the victim's vision was blocked while cleaning the discharge chute (hand-eye coordination).
- Indicate the amount of time the operator worked prior to the accident. (Temperature and wind chill index are critical to operator endurance.)
- Specify if the victim's clothing became entangled in the machine.
- Specify if the victim was struck with an object thrown by the snow thrower or by part of the machine itself.
- Indicate if the victim slipped or fell while operating or attending to the snow thrower.
- Specify if the victim was filling the tank with gasoline.
- Specify if the victim was making repairs or adjustments to the machine.

D. Description of Product

- Identify product type, dimensions, manufacturer, brand, model, and serial number.
- Specify snow thrower dimensions (especially discharge chute opening if involved in accident e.g., radius, length, width, distance to impeller).
- Identify product labeling, including product certification (type and year).
- Identify power source (gasoline engine or electric motor), engine/motor capacity (horsepower, cubic inch displacement, amperage).
- Identify propulsion source (push or self-propelled).
- Identify whether single-stage or two-stage design; indicate type, number, and operation of snow thrower controls.
- Indicate the method by which the snow thrower was acquired, i.e., bought new or used, borrowed or rented; specify product age.
- Describe the mechanical condition of the snow thrower, including previous repairs, modifications, malfunctions, abuse of the machine, component failure, or lack of maintenance.
- Characterize any safety devices, especially operator present (safety interlock, deadman) control and discharge chute guard, and whether the safety devices had any effect on the injury.
- Characterize any accessory devices in place or being used at the time of the accident and whether these accessories had any effect on the accident.
- Specify if all guards, shields, deflectors, and housings were in place.

- Describe the power transmission mechanism (clutches, belt drives, chain drives, etc.)
- Specify if the snow thrower overturned during operation.
- For electrically-operated snow throwers, indicate whether the electric cord was properly grounded and if and extension cord was being used.

III. Photographs/ Diagrams of Incident Scene

Photograph or diagram the accident scene to show the product dimensions, as well as site conditions and location of the product and operator/victim at the time of the accident. For hand injuries, indicate hand positions in detail.

Photograph the discharge chute, the inside of the collector housing and impeller blade. Provide dimensions, especially discharge chute opening if involved in hand injury, i.e., radius, length, width, distance to impeller.

Photograph any safety tags or labeling on the machine.

IV. Obtaining samples and documents related to the investigation

Obtain operator's instruction manual, if available. Obtain copy of any safety tags, instructions, or certification labels and dates.

(DATA RECORD SHEET – Attached)

DATA RECORD SHEET
Investigation Guideline

PRODUCT: Snow Throwers

TASK NUMBER _____ INCIDENT DATE _____

1. Describe the general weather conditions at the time of the incident. (windy, snowing, clear, etc.) Also record the air temperature, wind, wind chill index.

   h
   h
   h

2. Record the time of day of the accident and lighting conditions.

   h
   h
   h

3. What was the surface being cleared (gravel driveway, concrete, etc.), presence of debris, amount (in inches/feet) of snow on ground, type of snow (wet, dry and powdery), and general ground conditions (slippery, wet, muddy, icy, slushy).

   h
   h
   h

4. Was there ice on the ground?

   _✔_ Yes
   _✔_ No
   _✔_ Don't know

5. Specify degree of slope if machine was used on an incline.

   g
   g

6. Was salt used on snow prior to removal?

   _✔_ Yes
   _✔_ No
   _✔_ Don't know

7. Was noise from snow thrower or another source distracting or disorienting to the operator?

   _✔_ Yes, explain: g
   _✔_ No
   _✔_ Don't know

8. Record victim's age, sex, height, and weight.

   _____ Age

   _____ Sex

   _____ Height

   _____ Weight

9. Was the victim ill or under any medication, drug or alcohol at the time of the accident? Does the victim have any vision impairment, physical disability, etc.?

10. What was the victim's experience with and knowledge of product performance?

11. What clothing was the victim wearing at the time of accident? Indicate type, materials, and fit. We are especially interested in the use of gloves or mittens, type of footwear and sole, and degree of protection or contribution to the accident because of entanglement in the snow thrower.

12. Record the operating status of the snow thrower at the time of the accident.

13. What caused the injury to the victim?

   _____ Injured on impeller while clearing discharge chute of snow/ice
   Specify hand positioning, protection, and use of an implement.

   _____

   _____

   _____ Injured by an object thrown by the snow thrower
   _____ Victim slipped or fell while operating or attending to the snow thrower
   _____ Victim was filling the tank with gasoline
   _____ Victim was making repairs or adjustments to the machine
   _____ Other, explain:

   _____

   _____

14. Record the amount of time the operator had been using the snow thrower immediately prior to the accident.

15. Did the victim's clothing become entangled in the machine?

    _____ Yes, explain: _____
    _____ No
    _____ Don't know

16. Product type (check all that apply):

    _____ Single-stage
    _____ Dual-stage
    _____ Manual
    _____ Electric
    _____ Gas powered
    _____ Attachment to lawn tractor
    _____ Pushed
    _____ Self-propelled

17. Manufacturer _____

18. Brand _____

19. Model _____

20. Serial number _____

21. Product labeling, certification (type and year) _____

_____

_____

_____

_____

22. If powered, record the engine/motor capacity (horsepower, displacement, amperage).

23. Was the snow thrower purchased new or used, borrowed or rented. Specify product age.

    _____ Purchased new
    _____ Purchased used
    _____ Borrowed, from whom? _____
    _____ Rented, from where? _____

    If known, product age _____

24. Describe mechanical condition of the snow thrower.

25. Record any safety devices present on the snow thrower.

26. Record any accessory devices in place or being used at the time of the accident and whether these accessories had any effect on the accident.

27. Were all guards, shield deflectors, and housings in place?

28. Describe the power transmission mechanisms (clutches, belt drives, chain drives, etc.).

29. Did the snow thrower overturn?

30. For electrically-operated snow throwers - was the electric cord properly grounded, was an extension cord being used?