



U.S. CONSUMER PRODUCT SAFETY COMMISSION
WASHINGTON, D.C. 20207

Record of Commission Action
Commission Meeting of February 5, 1979

1111 18th Street, N.W.
Washington, D.C.

Presiding: Chairman King

Present : Commissioner Franklin
Commissioner Pittle
Commissioner Sloan
Commissioner Zagoria

ITEM

Final Safety Standard for Walk-Behind Power Lawn Mowers

(Briefing material transmitted by the Office of the
Secretary on January 16 and February 2, 1979.)

DECISION

At the Commission meeting of February 5, 1979, the Commission voted unanimously to approve a Federal Register notice issuing the final safety standard for walk-behind power lawn mowers. Attached is a copy of the final standard published in the Federal Register of February 15, 1979, along with the proposed certification rule, which the Commission approved by unanimous vote at its meeting of January 25, 1979.

VOTE

Concurring: Chairman King

Susan B. King

Commissioner Franklin

Barbara H. Franklin

Commissioner Pittle

R. David Pittle

Commissioner Sloan

Edith Barksdale Sloan

Commissioner Zagoria

Sam Zagoria

THURSDAY, FEBRUARY 15, 1979

PART V



CONSUMER PRODUCT SAFETY COMMISSION

SAFETY STANDARD FOR WALK-BEHIND POWER LAWN MOWERS

Final Standard and Proposed
Certification Rule

Consumer Product Safety Commission
Final Standard and Proposed
Certification Rule

[6355-01-M]

Title 16—Commercial Practices

CHAPTER II—CONSUMER PRODUCT
SAFETY COMMISSIONPART 1205—SAFETY STANDARD FOR
WALK-BEHIND POWER LAWN
MOWERS

Subpart A—The Standard

AGENCY: Consumer Product Safety Commission.

ACTION: Final rule.

SUMMARY: The Commission adopts a consumer product safety standard containing performance requirements intended to reduce injuries from contact with the rotating blades of rotary walk-behind power lawn mowers having a rigid or semi-rigid blade, the type consumers usually use. The standard also requires a label warning of the danger of blade contact on both reel-type and rotary walk-behind power lawn mowers. In order to reduce injuries to the operator's hands and feet, the standard requires that rotary walk-behind power mowers have a blade control system that will stop the mower blade within 3 seconds after the operator's hands leave the normal operating position. If the manufacturer chooses to stop the blade by stopping the engine, the mower must be equipped with a power start mechanism. If the mower has only manual start, stopping the blade by stopping the engine is not allowed by the standard. In order to reduce injuries to the operator's feet, the standard also requires that if the rear periphery and discharge chute of a mower is probed with a specified foot probe, neither the probe nor any part of the mower shall enter the path of the blade.

DATES: The performance requirements of the standard apply to all of the subject rotary power lawn mowers manufactured after December 31, 1981. The labeling requirement is applicable to both rotary and reel-type power mowers manufactured after December 31, 1979. The promulgation of the standard will be 12:00 noon, Eastern Standard Time, on February 26, 1979.

FOR FURTHER INFORMATION
CONTACT:

(1) Concerning the enforcement of the standard: Phyllis Buxbaum, Compliance and Enforcement, (301) 492-6626. (2) Concerning the development of the standard: William F. Kitzes, Office of Program Management, (301) 492-6557. Consumer Product Safety Commission, Washington, D.C. 20207.

SUPPLEMENTARY INFORMATION:

A. THE PROBLEM AND THE SOLUTION

The CPSC estimates that there are approximately 77,000 persons injured each year by contacting the moving blades of walk-behind power lawn mowers. Of these, approximately 9,900 incidents involve the amputation of at least one finger or toe. The remaining injuries consist of about 11,400 fractures, 2400 avulsions (the tearing of flesh or a body part), 2300 contusions, and 51,400 lacerations. Not counting any monetary compensation for pain and suffering or loss of use of amputated fingers or toes, these 77,000 blade contact injuries result in injury costs of about \$253 million each year.

For the most part, these injuries do not occur because the injured persons intentionally put their hand or foot under the blade housing. Usually, the contact with the blade occurs inadvertently while the person is performing some task in the vicinity of the mower.

For example, an elderly woman stopped mowing to pull some weeds beside the mower. After she had pulled the weeds, she turned back toward the mower and her foot was cut when it accidentally went under the housing.

In another case, a 35 year old teacher was emptying the contents of the grass catcher on his mower when some clippings fell out of the bag. When the operator bent down to remove the clippings, his hand inadvertently went under the housing and his fingers were cut.

Other cases that have been reported to the Commission include a 37 year old man who was attempting to clean the drive mechanism of a self-propelled mower, located under the mower housing, when the rotating blade cut his fingers. Also, a 60 year old printer was attempting to flick grass off the end of the discharge chute of his mower when he amputated a third of two of his fingers.

It may help to understand the ease with which the blade of a typical rotary mower may be reached if one realizes that the blade of such a mower may be only $\frac{1}{8}$ in. above the edge of the housing and only $\frac{1}{4}$ in. from the inner surface of the housing. Thus, with presently produced mowers, the slightest intrusion of a hand or foot under the blade housing carries with it a severe risk of injury.

The purpose of this document is to issue 16 CFR Part 1205, a consumer product safety standard for walk-behind power lawn mowers. This standard was developed under the "offeror" procedures provided for in the Consumer Product Safety Act ("the CPSA" or "the act", 15 U.S.C. 2051-2081). A more detailed discussion of the development process is given in the "BACKGROUND" section of this

notice. The final standard is based on a recommended standard that was developed by Consumers Union as the offeror. Certain modifications were made to that standard as a result of the analysis by the Commission's staff and in response to comments that were received on the standard that was initially proposed by the Commission.

The standard will reduce the risk of injury from blade contact with rotary power lawn mowers by mandating 2 main performance requirements. First, in order to reduce injuries to the hand of the operator, the standard requires that the mower have a blade control that will stop the blade within 3 seconds of the time that the operator releases the handle of the mower. This is intended to insure that when the operator's hands leave the handle, the blade will stop before the operator can put his or her hands in the vicinity of the blade. This requirement will also have the effect of reducing foot injuries that occur when the operator is working or moving around the mower and is not holding on to the handle.

In order to further reduce foot injuries, the standard requires that areas of the mower that can be reached by the operator's feet while he or she is holding the handle to be constructed so that a specified probe that approximates the human foot cannot be brought into contact with the blade from these areas.

The requirements that are being mandated by the Commission will result in a significant increase in the retail price of rotary power lawn mowers. However, as will be explained below in more detail, the cost of these requirements bears a reasonable relationship to the safety benefits expected from the standard. In addition, there is no other way that has been developed up to this time to provide a comparable degree of safety to the user.

The standard also provides for a warning label to be on rotary and reel-type walk-behind power lawn mowers to warn of the hazard of contacting the blade.

The following sections of this notice contain an explanation of the background of the standard development proceeding, a description of the provisions of the final standard that is being issued, the Commission's response to comments that were received on the proposal, an explanation of the changes that were made from the proposal, and discussions of other issues relevant to the issuance of the final standard.

B. BACKGROUND

On August 15, 1973, the Outdoor Power Equipment Institute (OPEI) petitioned the Consumer Product Safety

Commission, pursuant to section 10 of the Consumer Product Safety Act ("the act"), 15 U.S.C. 2059, to begin a proceeding for the development of a consumer product safety standard for power lawn mowers. In its petition, OPEI asked the Commission to publish a voluntary standard, ANSI B71.1-1972, "Safety Specifications for Power Lawn Mowers, Lawn and Garden Tractors, and Lawn Tractors," with amendments and a compliance program, as a proposed consumer product safety standard. (ANSI standards are approved by, published by, and available from the American National Standards Institute, Inc., 1430 Broadway, New York, New York 10018.)

The information about the injuries associated with power mowers that indicated a need for remedial action and that was considered in conjunction with the petition included the following:

1. Hazard analysis of in-depth investigations conducted originally by the Food and Drug Administration and later by the Consumer Product Safety Commission, from June 1, 1964, through September 30, 1973.

2. National Electronic Injury Surveillance System (NEISS) data reported from January 1, 1973, through December 31, 1973. For this period, it is estimated that over 64,000 injuries involving walk-behind power mowers were treated in all hospital emergency rooms in the United States.

3. Hearings of the National Commission on Product Safety, 1968-1970: Volume 5 (pp. 63-274), Supplement II (pp. 499-509), and Final Report (pp. 28-30).

4. Substantial product hazard notifications made to the Commission pursuant to section 15(b) of the act (15 U.S.C. 2064(b)).

After considering the available information concerning injuries and the injury potential associated with power mowers, the Commission preliminarily determined that the following hazards were associated with power lawn mowers and presented unreasonable risks of death or injury to consumers:

1. Lacerations, amputations, avulsions, and other injuries resulting from contact with the rotating mower blade.

2. Lacerations, punctures, and other injuries caused by objects propelled by the mower blade.

3. Lacerations, contusions, abrasions, and other injuries resulting from the rolling, slipping, or overturning of power lawn mowers or from failure of power lawn mower brakes or steering mechanisms.

4. Burns and other injuries resulting from direct contact with exposed heated surfaces of power mowers or from fires caused by ignition of liquids used as fuel for power mowers.

5. Injuries caused by electric shock from electrically powered lawn mowers or from electrical ignition systems.

6. Hearing loss and nonauditory trauma caused by exposure to excessive noise.

Accordingly, on November 16, 1973, the Commission granted the portion of the OPEI petition which requested that the Commission commence a proceeding to develop a consumer product safety standard for power lawn mowers. The Commission, however, denied the OPEI request to publish ANSI B71.1-1972, with amendments, as a proposed consumer product safety standard. This portion of the petition was denied because the Commission believed it should solicit offers to develop a standard and allow interested persons or organizations to submit previously issued or adopted standards as a recommended consumer product safety standard (section 7(b) of the act, 15 U.S.C. 2056(b)).

The Commission began the proceeding to develop a consumer product safety standard applicable to power lawn mowers by publishing a notice of proceeding in the FEDERAL REGISTER of July 22, 1974 (39 FR 26662). Interested persons were invited to submit an existing standard as a proposed consumer product safety standard or to submit an offer to develop a recommended safety standard. The notice of proceeding contains a more detailed discussion of the information about injuries associated with power lawn mowers that indicated a need for remedial action and discusses the provisions and adequacy of existing standards as they relate to the unreasonable risks of death or injury that the Commission had preliminarily determined to be associated with power lawn mowers. In response to the notice of proceeding, the Commission received one existing standard and an Invitation for Bid issued by the General Services Administration, which was referred to as an existing standard, for consideration as proposed consumer product safety standards. The Commission also received four offers to develop a standard for power lawn mowers.

The Commission subsequently accepted the offer of Consumers Union of United States, Inc. (CU), 256 Washington Street, Mount Vernon, New York 10550, to develop a consumer product safety standard applicable to power lawn mowers (39 FR 37803, October 24, 1974). CU, as the offeror, gave representatives of industry, consumers, and other interests the opportunity to participate fully in the development of a recommended standard. CU submitted the recommended standard to the Commission on July 17, 1975. This recommended standard

was, in fact, a comprehensive standard that addressed all types of lawn mowers and virtually all lawn mower injuries. The CU recommended standard would have applied to all walk-behind and riding reel and rotary type mowers, including garden tractors and lawn and garden tractors, with either an integral or attached cutting mechanism. The recommended standard contained requirements relating to human contact with the rotating blade, thrown objects propelled by the mower blade, noise, fuel, electrical energy (battery or household current), operating controls, brakes, drive train, stability, hot surfaces, structural integrity, labeling, and instructions. The Commission exhaustively analyzed the recommended standard and, on May 5, 1977, published a proposed power lawn mower safety standard in the FEDERAL REGISTER for public comment (42 FR 23052). The proposed standard for power lawn mowers also was a comprehensive standard addressing unreasonable risks of injury associated with both walk-behind and riding mowers. The proposal addressed not only blade contact injuries but also injuries caused by objects propelled by the mower blade (thrown objects); injuries due to lawn mowers rolling, slipping, or overturning, or to failure of lawn mower brakes or steering mechanisms; injuries due to burns resulting from direct contact with exposed heated surfaces of mowers or from fires caused by ignition of liquids used as fuel for power mowers; and injuries caused by electric shock from electrically powered lawn mowers or from electrical ignition systems (42 FR 23052).

The proposed standard did not contain requirements addressing noise, which the Commission had preliminarily found presented an unreasonable risk of injury. The Commission decided to defer regulations in that area to the Environmental Protection Agency (EPA) because EPA had begun the development of a noise standard for power lawn mowers under the Noise Control Act of 1972 (42 U.S.C. 4903(c)). In addition, the proposal did not contain a number of the provisions that had been recommended by CU. The reasons for not including those provisions and for modifying other provisions recommended by CU are discussed in detail in the FEDERAL REGISTER notice that proposed the standard (42 FR 23052; May 5, 1977). More than 100 comments were received on the proposal.

On June 7, 1978, the Commission published a notice in the FEDERAL REGISTER (43 FR 24697) announcing that it would issue separately the requirements addressing injuries due to blade contact with walk-behind mowers and requirements addressing injuries asso-

ciated with thrown objects, fuel and electrical hazards, and riding mowers. The Commission in issuing that notice determined it would be a more effective and efficient method of addressing the unreasonable risks of injury associated with power lawn mowers to first issue requirements that address the most numerous injuries and then to do the additional work that would be required to issue requirements addressing other risks of injury.

Approximately 50% of all lawn mower injuries are due to blade contact with walk-behind mowers. The Commission estimates that a standard addressing blade contact injuries with walk-behind mowers would eliminate or reduce the severity of over 38% of all power lawn mower injuries and 77% of all blade contact injuries associated with walk-behind mowers (NEISS Power Mower Baseline Study, July-September 1977). (The 23% of blade contact injuries that are not addressed by the standard include situations such as those where the mower is physically lifted so that the blade can contact the victim.) Therefore, the Commission decided to first issue requirements addressing blade contact injuries with walk-behind lawn mowers and subsequently to issue requirements, as needed, to address other risks of injury, including risks of injury associated with riding mowers, thrown objects, fuel and electrical hazards, and braking and steering mechanisms. Part 1205, Subpart A, which is being promulgated at 12:00 noon, Eastern Standard Time, on February 26, 1979 applies only to blade contact injuries with walk-behind mowers. Requirements addressing other risks of injury will be issued as Subparts to the standard as appropriate.

C. HOW PROPOSED STANDARD ADDRESSED BLADE CONTACT INJURIES

The Commission estimates that about 150,000 injuries associated with all types of power lawn mowers occur each year and that about 60,000 of these are treated in hospital emergency rooms. Of the injuries treated in emergency rooms, approximately 47,000 involve walk-behind mowers, and 30,000 involve contact with the rotating blade. The CPSC estimates that including the injuries that are not treated in emergency rooms, there are approximately 77,000 blade contact injuries each year involving walk-behind mowers. The remaining injuries with walk-behind mowers are due to a number of different causes including contact with thrown objects, inadvertent fuel ignition, and maintenance activities. Approximately 13% of the blade contact injuries associated with walk-behind mowers involve amputation of a body part, usually fingers or toes, 15% involve fracture, crushing or

dislocation of a body part, and 70% involve laceration or avulsions (the tearing of flesh or a body part). A relatively high proportion of persons injured by lawn mowers are hospitalized. The average rate of hospitalization for all National Electronic Injury Surveillance System (NEISS) products is less than 4%. However, over 10% of persons injured by walk-behind power mowers are hospitalized (NEISS Power Mower Baseline Study, July-September, 1977).

The Commission addressed some blade contact injuries by including in the proposed standard a requirement for a blade control system. This system would (1) prevent operation of the blade unless the control is actuated by the operator, (2) require that the operator be in continuous contact with the control in order for the blade to continue to be driven, and (3) cause the blade to stop within a specified time upon release of the control by the operator. The effect of these requirements is that if the operator leaves the normal operating position, the blade will stop before the operator can contact the blade with his or her hands or feet. The requirement also provides additional protection against blade contact with the foot when the operator is not in the normal operating position.

The proposal also addressed other blade contact foot injuries by requirements and tests involving a foot probe designed to determine if the operator's foot could contact the mower blade during commonly occurring conditions associated with mower use on level ground and on the transition to a slope. The foot probe test in the proposal consisted of inserting a specified foot probe as far as possible under all points of the bottom edge of the blade housing and shields and then pivoting the toe of the foot probe upward around the heel as much as possible as the probe was withdrawn. In order for the mower to meet the requirements of the proposal, the probe could not enter the path of the blade or cause any part of the mower to enter the path of the blade. To assure that shields used to reduce foot injuries provided the intended level of protection without interfering with mower utility and performance, the proposal included a shield strength test and a test to insure the shields would not prevent the mower from traversing typical obstructions. There was also a provision that shields could not be removed without tools. The proposal also included handle strength requirements and a requirement for an upstop for the handle to help prevent the operator from coming too close to the mower during mowing.

The proposal also included labeling requirements intended to warn of the

danger presented by contact with the blade. The size and content of the label were selected with the intent that the label would be conspicuous to the user and would adequately warn of the hazard.

The proposed standard consisted of 14 sections. However, since the requirements that are issued at this time are applicable only to blade contact injuries associated with walk-behind mowers, Part 1205 includes only 8 sections covering the following subject matter: § 1205.1, Scope of the standard (proposed § 1205.1); § 1205.2, Effective date (proposed § 1205.1); § 1205.3, Definitions (proposed § 1205.2); § 1205.4, Walk-behind rotary power mower protective shields (proposed § 1205.3); § 1205.5, Walk-behind rotary power mower controls (proposed § 1205.5); § 1205.6, Warning labels (proposed § 1205.12); § 1205.7, Prohibited stockpiling (proposed § 1205.13); and § 1205.8, Findings (proposed § 1205.14).

In a number of instances, the Commission has not included in the final mandatory standard provisions that appeared in the proposal and that also appear in the voluntary industry standard (ANSI B71.1-1972, B71.1a-1974, B71.1b-1977) because virtually all power mower manufacturers conform to the provisions of the voluntary standard. (These instances are noted below in the discussion of the Commission's response to the comments received on the proposal.) However, the Commission will continue to monitor mower injuries, and if significant numbers of injuries are demonstrated to occur because of non-compliance with the voluntary standard, insufficiency of the voluntary standard requirements, or other reasons, the Commission will consider amending the mandatory standard as appropriate.

The following are the voluntary standard requirements relating to the risk of injury from blade contact.

1. A rear protective shield (trailing shield) extending across 90% of the cutting width.
2. A rear protective shield strength test.
3. Except for the discharge or other openings, the housing shall extend $\frac{1}{8}$ in. below the lowest blade position.
4. Structural integrity test for housing and shields, consisting of the injection of 100½ in. diameter steel balls, one at a time, under the housing of the running mower.
5. Requirements limiting the height of the highest point of the bottom edge of the front of the housing.
6. Requirements for arrangement of the starting mechanism and for mower stabilization.
7. Foot probe test of discharge opening.

8. Shields or guards cannot be removed without the use of tools.
9. Protection against unintentional uncoupling of the handle.
10. Upstop for mower handle.
11. Strength test for handle and handle supporting structure.
12. Swingover handles must automatically lock back into operating-position.
13. If a handle storage position is provided, the handle shall automatically or manually lock into operating position when the handle is moved into this position.
14. After declutching or shutting off drive power from maximum speed, the blade shall stop rotating within 7 seconds.
15. A shut off control which must be manually activated to restart the mower.
16. For self-propelled mowers:
 - a. Engine cannot start while drive is engaged.
 - b. Except for deadman controls, drive controls shall disengage in direction opposite to mower travel. Such controls shall be on handle in the operator zone.
 - c. Handle mounted engine controls shall move forward for fast and rearward for slow or stop.
 - d. Cautionary label to start only in neutral.
17. Very quiet mowers shall have an indication of blade rotation.
18. Label stating "CAUTION" or "DANGER" near discharge opening.
19. Label durability requirements.
20. Safety instructions with the equipment.

D. DESCRIPTION OF THE FINAL STANDARD

The final standard being issued below as Part 1205 applies to walk-behind rotary and reel-type power lawn mowers having a minimum cutting width of 12 in and having a rigid or semi-rigid blade. The minimum cutting width was established in order to distinguish the mowers intended to be covered by the standard from edgers and trimmers to which the standard does not apply. The limitation to rigid and semi-rigid blades was included so that the standard would not apply to mowers with blades of monofilament line which may not present the same risk of injury as do mowers with more rigid blades.

Mowers that have all of the following characteristics are also excluded from the coverage of the standard: a cutting width of 30 in or more; a weight of 200 lb or more; and, if powered by an engine (as opposed to an electric motor), 8 or more hp. This exclusion is to narrow the scope of the standard to the smaller mowers usually used by consumers. If a mower has only 1 or 2 of these features, it is covered by the standard.

Reel-type mowers are exempt from the performance requirements of the standard but are subject to the labeling requirements of § 1205.6.

Effective date. The performance requirements of the standard apply to mowers within the scope of the standard that are manufactured after December 31, 1981. The labeling requirements apply to such mowers that are manufactured after December 31, 1979.

Foot probe test. The standard specifies a foot probe that is intended to represent actions typical of those that can be achieved by the human foot in normal mowing situations. The foot probe is inserted within the area of the discharge chute and the area at the rear of the mower within 60° of either side of the centerline of the mower. These areas were selected because they are the areas where foot contact injuries are known to occur while the operator is holding the handle. Foot contact injuries that occur while the operator is not holding the handle will be addressed by the blade control described below.

In the foot probe test, the probe is inserted with an insertion force that does not exceed 4 lb or lift the mower housing. After the foot probe is inserted as far as possible, the probe is withdrawn and, at the same time, is pivoted upward about the "heel" of the probe as far as possible without lifting the mower. In order for the mower to pass the test, the foot probe must not enter the path of the blade or cause any part of the mower to enter the path of the blade.

Obstruction test. An obstruction test is also provided which consists of passing the mower back and forth over a test fixture with a level surface having (1) a 0.99 in deep depression with a 5.90 in radius of curvature lined with a 16- to 36-grit abrasive and (2) a raised obstacle 0.60 in square, each extending the full width of the fixture. The depression and obstacle are located a sufficient distance apart that the mower contacts only one at a time. The test fixture may be relieved only to prevent interference with any blade retaining device. The speed of the mower across the fixture may not exceed 2.2 ft per sec in order to limit any tendency of the mower to bounce as it crosses the fixture.

During this test, the mower shall not stop as a result of contact with the raised obstacle, no more than one wheel at a time shall be lifted from the fixture surface, and no shield shall enter the path of the blade.

The obstructions in this test are designed to simulate irregularities in the surface over which the mower may pass in normal use. The requirement that not more than one wheel shall lift is intended to insure that the pro-

TECTIVE shields of the mower do not lift excessively during use, thus exposing the blade. The requirement that the obstacle not stop the mower is to protect against the possibility that users would be tempted to remove the protective shielding if the mower would "hang up" on irregularities during normal use. This requirement is also intended to protect against a known injury pattern in which sudden stopping of the mower causes the mower to lift and/or the operator to stumble, whereupon the operator's foot contacts the blade. The requirement that the shield not enter the path of the blade addresses the user's potential temptation to remove the shield and prevents the pieces of the shields from becoming a thrown objects hazard if they are knocked off by the blade.

The requirement that the depression is lined with the specified rough surface helps insure that the mower will not slip as it rolls into the depression, thereby making the test results more repeatable.

Shield strength test. The standard requires that any shield located within the areas to be foot probed shall not permanently separate, crack, or deform when subjected to a 50 lb static tensile force uniformly distributed over not less than half the length of the shield. This force is intended to insure that the shield is sufficiently strong to maintain its structural integrity and remain attached under conditions of use, thus retaining its ability to protect the operator. The force is to be applied for a period of 10 seconds in order to provide an adequate opportunity for deformations, separations, or cracks to occur. This test does not apply to the mower housing or grass catchers.

Movable shields. In order to insure that the protection of the foot probe test is not negated, shields that are movable for the purpose of attaching auxiliary equipment must, when moved, either automatically return to the normal position when the attached equipment is not present or prevent the operation of the blade unless the attached equipment is present or the shield is returned to its normal position.

Blade control system. Walk-behind rotary power mowers must have a blade control system that will (1) prevent the blade from operating unless the operator actuates the control, (2) require continuous contact with the control in order for the blade to continue to be driven, and (3) cause the blade to stop within 3 seconds after release of the control. As explained above, the effect of this requirement is that the blade will stop between the time the operator removes his or her hands from the control and the time

the operator could contact the blade with his or her hand.

Unless the mower has a power restart capability, the control must stop the blade without stopping the engine. This is to prevent the operator from being unduly tempted to disable the blade control as a result of the inconvenience of having to manually restart the engine each time the handle is released.

In order to prevent inadvertent starting of the blade by accidental contact with the blade control described above, the standard requires a second means that must be manually actuated before the operator can restart the stopped blade.

Starting control location. In order to insure that the operator is in a position that is protected by the foot probe requirement when the mower is started, mowers with blades that begin operation when the power source starts must have their starting means located within the operating control zone, which is defined as a horizontal cylinder whose axis is tangent to the rear of the handle and that has a 15 in radius. In the Commission's judgment, an operator using starting controls located within this area will be behind the handle and will not be required to stand at the side of the mower while starting the mower, as would be required if the starting controls were located on the engine as are some currently produced power restart controls.

Warning label. Rotary mowers are required to bear a specified warning label near the discharge chute, and reel-type mowers are required to bear the label as near as possible to the center of the cutting width. The location requirements are intended to insure that the labels will be seen by the operator, and for that reason a minimum size for the label is prescribed.

Stockpiling. Section 9(d) of the CPSA states that consumer product safety standards shall be applicable only to consumer products manufactured after the effective date of the standard. In order to prevent a manufacturer from circumventing the purpose of the standard, section 9(d) authorizes the Commission to issue a rule prohibiting stockpiling of the product covered by the consumer product safety standard. "Stockpiling" is defined as the manufacturing or importing of the product, between the issuance of the standard and its effective date, at a rate that is significantly greater than the rate at which the product was produced during a base period prescribed in the stockpiling rule. The Commission will issue a stockpiling rule in connection with the walk-behind power lawn mower standard. This rule prohibits production of

mowers at a rate that exceeds by 20% the rate at which a person subject to the standard manufactured or imported mowers during their most productive 365 day period between September 1, 1971, and August 31, 1978. The Commission believes that the lengthy base period is sufficient to allow for variations in sales that may have affected any particular business, and the 20% allowance should allow for normal changes in market shares or expansion of sales between the issuance of Part 1205 and its effective date. Any manufacturer or importer whose business may exceed these limits because of unusual circumstances, and not because of stockpiling intended to circumvent the purpose of the standard, may apply to the Commission for a limited exemption from this stockpiling rule. Such a request should be supported by data showing the unusual circumstances relied upon.

English units. The requirements of the standard are stated in English units of measurement, since the Commission is informed that these units are commonly used by the power lawn mower industry. However, for convenience, the metric equivalents are also given.

E. STATUTORY FINDINGS

In order to issue a rule such as Part 1205, the CPSA requires the Commission to consider and make appropriate findings with respect to a number of topics. These findings are discussed below.

(1) *The degree and nature of the risk of injury Part 1205 is designed to eliminate or reduce.* The Commission estimates that there are approximately 77,000 injuries to consumers each year caused by contact with the blades of walk-behind power lawn mowers. From 1977 data, the Commission estimates that each year there are approximately 7,300 finger amputations, 2,600 toe amputations, 2,400 avulsions, 11,450 fractures, 51,400 lacerations, and 2,300 contusions. Among the lacerations and avulsions, 35,800 were to hands and fingers and 18,000 were to toes and feet. The estimated costs (such as medical expenses and lost wages) caused by these injuries are \$253 million, not counting any monetary damages for pain and suffering. These injuries are caused when consumers accidentally contact the blade, either inadvertently while in the vicinity of the mower, or while intentionally performing some tasks which they erroneously believe will not bring their hand or foot into the path of the blade.

Part 1205 is expected to eliminate or reduce the severity of about 60,000 blade contact injuries per year, or 77% of all such injuries. The Commission

estimates that if all mowers had been in compliance with the standard in 1977, about 6,800 finger amputations, 1,500 toe amputations, 11,000 fractures, 1,800 avulsions, 38,400 lacerations, and several hundred contusions would not have occurred. Of the lacerations and avulsions, 28,300 finger injuries and 9,400 toe injuries would have been prevented. The Commission estimates that \$211 million in injury costs would have been prevented.

(2) *Consumer products subjects to the rule.* The products subject to this standard are walk-behind power lawn mowers with a cutting width of at least 12 in. Rotary power mowers with rigid or semi-rigid rotary blades are subject to all the provisions of the standard while reel-type and rotary mowers are subject to the labeling requirements. Mowers that have engines of 8 hp or greater, weigh 200 lb or more, and have a cutting width of 30 in. or more are excluded from the standard. The Commission estimates that at least 98% of the total annual market (by unit volume) for walk-behind mowers will be affected by the standard. The Commission estimates that in 1978 this market was 5.4 million units.

(3) *Need of the public for the products subject to the rule.* The Commission finds that the public need for walk-behind power mowers, which provide a relatively quick and effective way to cut grass, is substantial. Riding mowers, lawn and garden tractors, hand reel mowers, trimmers and edgers, and sickle-bar mowers also provide grass-cutting services, but walk-behind power rotary mowers are by far the most commonly used devices for maintaining household lawns. There are no devices that can completely substitute for walk-behind power mowers as a group, since they have applications for which other products are not as suitable. Each type of walk-behind power mower has individual properties which meet public needs, although one type of walk-behind is often an acceptable substitute for another. The newly developed monofilament line mower is not included within the scope of the standard and could be a substitute for mowers using rigid or semi-rigid blades under some conditions.

(4) *Probable effect of the rule upon the utility of the product.* The Commission finds that the probable overall effect of the standard should be to increase the utility of mowers. In the first place, consumers are likely to experience an increased sense of security from having a safer mower. A study of brake-clutch mowers conducted by the Federal Supply Service (GSA) shows that almost all users appreciated the safety features on brake-clutch mowers. In addition, by releasing the

blade control and stopping the blade, the operator can then travel over gravel or other surfaces without fear of thrown objects or of the blade striking objects that might damage the mower. Brake-clutch type mowers would also give an increase in utility by enabling the operator to use the clutch to prevent stalling when the mower bogs down in heavy grass.

On the other hand, there may be some minor adverse effects on utility caused by some aspects of complying mowers. For example, in very heavy mowing conditions, there may be some difficulty in engaging the blade in a blade-clutch mower. (However, mowers that are currently on the market that are not equipped with a blade clutch may have difficulty when starting the engine in heavy grass.)

Complying mowers may require slightly more time and a few additional actions to operate. Since complying mowers may have more electrical and mechanical parts than current mowers, they may weigh more and require more maintenance than current mowers. No significant increase in mowing time is expected if a brake-clutch device is used to comply with the standard since each engagement of the blade would require only a few seconds. The amount of additional time and expense required for maintenance, if any, will be dependent on the design solution the manufacturer uses. Such disutilities are expected to be slight and to be more than balanced by the increases in utility described above.

During the development of the rule, questions were raised about whether changes in the shields necessitated by the foot probe requirements would adversely affect utility by causing mowers to be hard to push in grass or to be unable to mow close to walls. At the time of issuance of this rule, mowers are available that will pass a 360° foot probe test, and there are others that will pass rear and side foot probing without any significant loss of utility caused by shielding. Therefore, the Commission concludes that this requirement will not adversely affect the utility of mowers. Mowers with swing-over handles, however, may be more difficult to design in this regard, since 120° at each end of the mower, plus the discharge chute, are subject to the foot probe requirement. However, since mowers meeting this requirement have already been built without apparent loss of utility, the Commission concludes that shielding can be designed so that there should be no loss of utility even for mowers with swing-over handles.

As required by section 9(b) of the CPSCA, the Commission, in considering the issues involved in issuing a power lawn mower safety standard, has considered and taken into account the

special needs of elderly and handicapped persons to determine the extent to which such persons may be adversely affected by the rule. The Commission has determined that there will be no significant adverse effect on such persons as a result of Part 1205. In the first place, the rule can affect only those persons who are physically capable of using a power lawn mower. None of the rule's provisions will make it more difficult to operate a mower that complies with the standard. On the contrary, complying mowers should be easier to use because the need for manually restarting the mower will be less and because, if the mower uses a brake-clutch to comply with the blade control requirement, use of the brake-clutch can reduce the tendency of the engine to stall in heavy grass. Although a person's ability to hold a device such as a blade control for a long period of time will decline with age, the force required to hold the blade control can be made low enough that it will not be a problem during the length of time that it takes for consumers to mow a lawn.

After considering the possible adverse effects on mowers that could be caused by the standard and balancing them against the increase in utility that is expected, the Commission concludes that, for a typical consumer, the increases in utility should more than offset any decreases.

(5) *Probable effect of the rule upon the cost of the product.* The Commission estimates that the retail price impact of the standard will be about \$35 for the average walk-behind mower. Based on an average useful mower-life of about 8 years, the additional annual cost to the purchaser is expected to average about \$4.40. The probable effect of the standard on the various types of mowers within its scope will differ. Percentage increases in price will vary from about a 7 percent increase for power-restart self-propelled mowers to about a 30 percent increase for gasoline-powered manual start push mowers. (See Table 1 of the CPSC report, *Economic Impact of Blade Contact Requirements for Power Mowers*, January 1979, for the incremental cost calculation by product category.) The costs attributable to individual requirements of the standard are discussed in paragraph (8) below.

(6) *Probable effect of the rule upon the availability of the product.* The Commission finds that the standard is not expected to have a significant impact on the availability of walk-behind rotary mowers, since domestic production capacity appears to be sufficient to handle any increased demand for safety-related components or materials. Any increased demand

for raw materials will be small compared to the volume of raw materials currently used for production of walk-behind mowers. Furthermore, walk-behind power mower production does not consume a large proportion of the annual production of any of the raw materials it uses. Although it may be more costly to adapt some types of power mowers to the standard than others, the effects of the standard on the price or utility of a particular category of power mowers are not expected to cause radical shifts in demand among types of mowers. The Commission finds that all types of power mowers subject to the standard will be available, although some, such as house-current-powered mowers, may increase their market shares because they can be brought into compliance with the standard at a lesser cost.

Because some manufacturers may not revise their entire product line before the effective date of the standard, individual mower manufacturers may initially have less varied lines than at present, but there should be no decrease in the overall types and features of mowers available to consumers.

(7) *Alternative methods.* The Commission has considered other means of achieving the objective of the standard. For example, alternatives were considered such as hand probes, "blade harmless" tests, and blade control by engine kill but allowing manual restart. These alternatives have been rejected by the Commission as being either unfeasible or not as effective as the rule which is being issued.

Similarly, the Commission has found no alternative means of achieving the objective of the standard that it believes would have fewer adverse effects on competition or that would cause less disruption or dislocation of manufacturing and other commercial practices, consistent with the public health and safety. For the power mower industry in general, the disruptions and dislocations of existing manufacturing and commercial practices due to the standard are expected to be minor. Small manufacturers of relatively low-priced mowers may find their price differentials with the larger, nationally-known firms narrowed. The small manufacturers are primarily assemblers of mowers and will have to rely on their suppliers for most of the components and changes needed to comply with the standard. These small manufacturers are the firms, if any, most likely to withdraw from the mower market since they generally have no engineering staff and have low volumes over which to spread development costs. If any firms should withdraw from the market, it is possible that some portion of them may return when complying designs and

parts become available to them. The standard is not expected to have an appreciable impact on foreign trade or domestic competition since exports and imports represent only a small percentage of domestic shipments and production.

The distribution patterns for power lawn mowers may be slightly affected. Retail outlets that provide more service to the customer may benefit from the standard temporarily. Complying mowers will have different controls and features than current mowers, and mower purchasers may want more information and assistance than is provided by outlets such as discount stores and drug stores. Over the long run, as mower purchasers become familiar with the safety-related features, the advantage of the small, service-oriented outlet will decline. Since lawn mower sales are a relatively small proportion of discount store or drug store sales, no significant impact on these types of outlets is expected.

(8) *Unreasonable risk of injury.* The determination of whether a consumer product safety rule is reasonably necessary to reduce an unreasonable risk of injury involves a balancing of the degree and nature of the risk of injury addressed by the rule against the probable effect of the rule on the utility, cost, or availability of the product. The factors of utility and availability of the product, adverse effects on competition, and disruption or dislocation of manufacturing and other commercial practices have been discussed above. The following discussion concerns the relationship of anticipated injury reduction and costs for various requirements of the standard.

The standard consists of 3 main requirements: the foot probe test, the blade control with 3 second stop time, and the warning label. The foot probe and blade control requirements, while worthwhile by themselves, each have additional supporting requirements that increase or guarantee the effectiveness of the primary requirement.

The foot probe requirement for the rear of the mower and the discharge chute is supported by (1) the obstruction test, (2) the shield strength test, (3) the requirement that shields that are movable for the attachment of auxiliary equipment must either return automatically or prevent operation of the blade when the equipment is removed, and (4) the requirement that power restart controls must be located in the operator control zone.

The foot probe and related requirements are expected to reduce the number of blade contact injuries to the foot by 13,000 each year. It is not possible to apportion this injury reduction among the respective requirements because they are interrelated.

The cost of these requirements is estimated to be about \$4.00 per mower, mostly for redesign of the shields. The shield strength requirement is similar to a requirement in the existing voluntary standard that is almost universally complied with, and should comprise only a small portion of the \$4.00 retail price increase attributable to this related group of requirements. Also, shields complying with the movable shield requirement are featured in some currently produced mowers.

Since 5.4 million mowers are sold, and since the average injury expected to be eliminated by the standard costs approximately \$3,500, these foot probe requirements should result in a cost increase of about \$22,000,000 and undiscounted injury savings of about \$46,000,000, exclusive of any allowance for pain and suffering. (Injury costs consist of medical expenses, lost income, and insurance administration. See the CPSC report, *Economic Impact of Blade Contact Requirements for Power Mowers*, January 1979 for a detailed analysis of the possible effects of discounting and inflation on the computation of the quantifiable benefits associated with the rule.)

The starting location control requirement would apply only to mowers with a power restart capability using engine kill to stop the blade. The cost for relocating the power restart switch, if necessary, should be very minor, and more than offset by the elimination of a clutch, as discussed below.

The requirement that the blade stop within 3 seconds of the release of the blade control is supported by (1) the requirement that those mowers that stop the blade by stopping the engine must have a power restart (to remove the motivation to disable the blade control because of the inconvenience of manually starting the mower each time the control is released) and by (2) the requirement for an additional control that must be actuated before the blade can resume operation (to prevent accidental starting of the blade). Together, these blade control requirements are expected to reduce the number of blade contact injuries by 46,500 per year for an undiscounted savings in injury costs of about \$165,000,000 per year, exclusive of pain and suffering.

Virtually all mowers will be subjected to a cost increase of about \$3 for the blade control actuating means and \$1 for the second control required to restart the blade. (The \$1 cost could be eliminated for power restart-engine kill mowers that do not start when the blade control is actuated.)

Also, most mowers would require a brake for the blade in order to achieve a 3 second stop time. This would add

another \$6.50-\$8.50, depending on the type of mower.

Mowers with power restart capability could allow the blade to stop by killing the engine and thus would not need to provide a clutch to disconnect the engine from the blade. However, a brake might still be required to insure that the mower would stop within the 3 second requirement. Mowers using manual restart would have to provide a clutch or other blade disengagement devices, which would probably be combined with the brake in a unitary brake-clutch mechanism.

The following are the Commission's estimates of the probable retail price increases associated with certain types of currently produced mowers that will be caused by the blade control requirements.

Type of mower	Blade control retail
	Price increases
Electric mowers (house current or battery powered)	\$15.00
Present electric start gasoline mowers.....	13.00-19.50
Present manual start gasoline mowers brake-clutch approach.....	32.50
Power restart approach.....	29.00-39.50

The weighted average retail price increase of the blade stop requirements is expected to be about \$31 per mower for a total retail price increase of \$167,000,000.

The foot probe and blade stop requirements of the standard will obviously not completely protect the users of rotary mowers under all circumstances. In addition, these requirements are not applicable to reel-type mowers. It is still essential for consumers to be aware of the hazard of blade contact and take the proper precautions to protect themselves. It is especially important that users not become complacent with the knowledge that the mower incorporates blade contact safety requirements. Accordingly, the Commission has determined that it is desirable that rotary and reel-type mowers bear a label warning of the danger of blade contact. Such a requirement would have practically no effect on the retail price of mowers since labels are very inexpensive and practically all currently produced mowers bear some type of warning label. In view of the hazard that will be associated with power mowers even after the effective date of the standard, and the low cost of the label, the Commission concludes there is an unreasonable risk of injury that can be addressed by the label requirements in Part 1205.

Labeling requirements under the CPSA may be issued under the authority of either section 7 of the act or

section 27(e), or both. Under section 7, the Commission must find that the label is reasonably necessary to prevent or reduce an unreasonable risk of injury. Under section 27(e), the Commission must determine that the label conveys performance and technical data required to carry out the purposes of the act, one of which is "to protect the public against unreasonable risks of injury associated with consumer products" (section 2 of the act). The Commission concludes it has authority to issue the labeling requirement of Part 1205 under both section 7 and 27(e) and finds that issuance of the requirement is necessary to convey the performance and technical data concerning the blade contact hazard, in accordance with section 27(e), for the purpose of the act mentioned above.

Therefore, after considering the anticipated costs and benefits of Part 1205 and the other factors discussed above, and having taken into account the special needs of elderly and handicapped persons to determine the extent to which such persons may be adversely affected by the rule, the Commission finds that Part 1205 (including the effective dates) is reasonably necessary to eliminate or reduce the unreasonable risk of injury associated with walk-behind power lawn mowers and that promulgation of the rule is in the public interest.

F. RESPONSE TO COMMENTS

In response to the proposal of May 5, 1977, the Commission received 118 written comments. An informal proceeding to receive oral comments on the proposal was held on June 13, 1977. Those persons who submitted comments by August 12, 1977, were given a further opportunity until September 6, 1977 to submit comments on oral or written comments that were submitted by others (42 FR 34892). In addition, the Commission has received a number of late comments, which it has considered; and the Commission's staff has held several public meetings to discuss various issues concerning the lawn mower proposal. Also, on November 2, 1978 (43 FR 51038), the Commission requested additional comments on the data it had received concerning the safety and reliability of brake-clutch mechanisms. Twenty-one additional written comments were received in response to this request, and these comments are addressed in this notice. Also addressed are oral comments on this issue that were presented during a proceeding held on December 11, 1978.

Comments on the proposal were submitted by individual lawn mower manufacturers, the lawn mower industry trade association, private testing laboratories, private inventors, individual

consumers, and a consumer testing organization.

Because the Commission at this time is issuing requirements applicable only to blade contact injuries with walk-behind power mowers, only the comments (including late filed comments) pertaining to such requirements are being addressed at this time. Comments on other aspects of the proposal will be addressed when the Commission takes action on other requirements.

The principal issues raised by the comments, and the Commission's responses to the issues, are explained below under the heading of the section of the standard to which they apply. There is also an explanation of the instances in which the final standard differs from the proposal.

SCOPE OF THE STANDARD (§ 1205.1)

The industry trade association argues that the Commission has impermissibly expanded the scope of the proposed standard as it applies to the blade contact hazard by describing the blade contact hazard as endangering both operators of mowers and bystanders. They argue that in the notice of proceeding the Commission described only the hazard of blade contact with the operator and that the notice of proceeding limits the Commission's authority to expand the nature of the hazard to be addressed.

The Commission does not agree that the section 7 notice of proceeding serves as a limitation on the Commission's authority to address the hazards associated with a consumer product in a standard development proceeding. In this instance, it is apparent that lawn mowers can present similar risks of injury due to blade contact to bystanders and operators. There is nothing in the CPSA that limits the Commission's authority to include in a proposed standard provisions that address a risk of injury not specifically described in a section 7 notice of proceeding but which are inherently related to the risk that was described. In any event, the Commission has not included separate provisions in the final standard to address the risk of injury to bystanders. The provisions of the final standard are intended to address the risk of injury to operators, but those provisions may also address any risk of blade contact injury to bystanders.

Several commentators state that the scope of the standard is too broad. They contend that mowers other than rotary mowers (such as reel-type mowers), 3 wheel mowers, high wheel mowers, mulching mowers, monofilament line mowers, and walk-behind garden tractors should not be included within the scope of the standard. It is their view that the Commission has

not given adequate consideration to the effect of the requirements of the standard of these types of mowers. Several commentators also expressed the view that a maximum cutting width and/or horsepower should be specified to further delineate products within the scope of the standard because otherwise large horsepower walk-behind mowers or lawn and garden tractors might be considered to be within the scope of the standard.

For the reasons discussed below, the Commission has decided to limit the scope of the performance requirements of Subpart A of Part 1205 to rotary walk-behind power mowers which are equipped with a rigid or semi-rigid blade and which have a cutting width of more than 12 inches. Mowers with a cutting width of 30 inches or greater, a weight of 200 lb or more, and an engine of 8 hp or more are excluded from the standard. For reasons also discussed below, the labeling provisions of the standard apply to reel-type mowers of a similar size.

a. Reel-type mowers. After considering the question of whether the standard should apply to reel-type walk-behind power mowers, the Commission has decided not to apply the standard, except for the warning label provisions, to this type of mower.

The Commission believes that the economic and injury data presently available to it do not show that the risk of injury associated with reel-type mowers justifies applying the standard to reel-type mowers. Reel-type mowers constitute less than 1% of the walk-behind mower market, and thus consumer exposure to that product is not as great. In addition, the injury data associated with reel-type mowers that are available to the Commission indicate that injuries with these mowers comprise less than 1% of the injuries associated with walk-behind mowers (NEISS Power Mower Baseline Study, July-September, 1977). In view of the lack of injury data, the infrequent use of reel-type mowers, and the differences between reel-type and rotary mowers, reel-type mowers are not required to meet the blade stop time or shielding requirements of the standard. However, because Commission injury data does show that mower operators have contacted the moving blade of reel-type mowers, the labeling provisions of the standard apply to reel-type mowers in order to warn of the hazard of blade contact.

b. 3 wheel, 5 wheel, high wheel, and air supported mowers. The Commission has included rotary 3 wheel mowers, 5 wheel mowers, high wheel mowers, or air supported mowers in the standard. The number of wheels or the use of an air cushion instead of wheels would appear to have little relevance to the likelihood of contact

with the rotating lawn mower blade. These mowers would present the same risks of blade contact as the common 4 wheel rotary mower. The Commission has considered the potential effects of the standard's requirements on these types of mowers. Especially since the final standard requires foot probing only at the discharge chute and at the rear 120° of the mower, the standard should not have an undue adverse effect on these mowers.

c. *Semi-rigid blade or rigid blade other than metal.* Most of the mower blades used today are made of metal. The Commission has been advised, however, that some persons are experimenting with rigid or semi-rigid blades made of material other than metal, such as plastic or heavy rubber. However, no convincing evidence has been presented to the Commission to show that these blades present a different risk of injury than metal blades. If these blades are rigid or semi-rigid, they appear to present an unreasonable risk of amputation, laceration, fracture, or avulsion in the same manner as metal blades. Blades typically rotate at a tip speed of approximately 200 mph, and a hand or foot struck by a semi-rigid or rigid blade made of material other than metal, that also cuts grass, can be expected to cause the same types of injuries as a metal blade. Therefore, the Commission believes that mowers with rigid or semi-rigid blades made of materials other than metal should be included within the scope of the standard.

d. *Nonrigid blades.* The Commission has not included nonrigid blades, such as those made of a monofilament line, within the scope of the standard. The Commission is aware that prototype mowers and at least one production mower have been developed that use a rotating monofilament line to cut grass. A monofilament line is different by its very nature from a rigid or semi-rigid blade. The Commission has not had an opportunity to evaluate whether this type of grass cutting mechanism presents the same risk of injury as a rigid or semi-rigid blade. However, the Commission believes that there may be sufficient differences in blade mass, stiffness, and/or sharpness between these mowers and mowers which use a rigid or semi-rigid blade that the Commission cannot presume that they present the same risk of injury. Therefore, the definition of "blade" as used in the standard has been revised to include only rigid or semi-rigid mechanisms.

The Commission intends to conduct an analysis of the injury potential associated with these blades as part of its ongoing investigation of lawn mower injuries. If appropriate, the Commission could take regulatory

action in the future with respect to mowers with these flexible "blades".

e. *Mulching mowers.* One commentor suggests that mulching mowers should not be included in the standard because they lack a discharge chute, and, therefore, there would be no hazard of blade contact due to clearing the discharge chute. Mulching mowers are essentially the same as other rotary lawn mowers except for the absence of the discharge chute. Except for attempts to clear the discharge chute, blade contact with the hand can occur in the same manner as with other mowers, for example, while making adjustments to the mower or by inadvertent contact. In addition, foot contact with the blade can occur in the same manner as with other mowers, for example by pushing or kicking the mower with the foot, or by slipping or falling while mowing or by other inadvertent contact. Therefore, the Commission has included mulching mowers within the standard as long as they fit the definition of "rotary power lawn mowers."

f. *Maximum HP, weight, and/or blade width.* The Commission's standard for power lawn mowers is intended to address the unreasonable risks of injury associated with the mowers that are typically used by consumers around a residence or household. There are a number of mowers that, although falling generally within the definition of the term "consumer product," were not intended by the Commission to be included within the scope of this standard because of their relatively infrequent use by consumers, and the Commission has decided to exclude these mowers from the scope of the standard. These would include mowers that have a large cutting width, are extremely heavy, and have a large HP engine.

The requirements of the standard may affect these large mowers, and their manufacturers and users, differently. Most manufacturers of these mowers are smaller firms which produce a limited number of mowers for commercial and specialty purposes. The economic burden for these manufacturers could be greater than that for the manufacturers of the smaller mowers usually used by consumers since they must spread the cost of compliance over fewer production units.

Since the cost per unit would be higher, manufacturers might choose to drop models or leave the industry. The Commission is aware of only six manufacturers that produce walk-behind mowers that will not be covered by the standard. Availability of these large mowers might therefore be more severely affected than the availability of mowers in the smaller size

categories where there are far more firms competing.

Accordingly, the Commission has decided to exclude from the standard coverage mowers that have, in combination, a blade cutting width of 30 inches or more, a weight of 200 lb or more, and an engine of 8 hp or more. Mowers subject to the standard account for approximately 98% of all walk-behind mowers sold. These criteria were selected because few injuries have been reported for these larger mowers and because the Commission believes that such mowers are not typical of the mowers normally used by consumers. The Commission points out, however, that its decision to exclude these large mowers from the standard is not based on a finding that there is in fact no unreasonable risk of injury associated with these mowers. Accordingly, section 26 of the CPSA would not preclude state or local regulation of the blade contact hazard associated with mowers outside the scope of the standard.

EFFECTIVE DATE (§ 1205.2)

The proposed effective date provided that the standard would become effective 2 years after the final standard was issued. At that time, the blade of a walk-behind mower would have to stop within 5 seconds of the release of the blade control. Two years after that date (4 years after the standard was issued), the permissible blade stopping time would be reduced to 3 seconds. As explained below, the final standard applies to mowers manufactured or imported after December 31, 1981, except for the labeling requirement, which will apply to mowers manufactured after December 31, 1979. When the standard is effective, the blade of a walk-behind rotary mower will have to stop within 3 seconds of the release of the blade control actuating mechanism. The interim 5 second stopping time has been deleted in the final standard and the initial effective date has been lengthened, in order to avoid the need for industry to make more than one change and to achieve the protection of the three second time at an earlier date.

A number of commentors addressed the issue of effective date. Several manufacturers and the industry trade association commented that the proposed effective date of two years for most sections of the standard could not be met by the industry, or could only be met at great cost. Commentors claimed that since the entire industry would be retooling at the same time to meet the standard, tool and die shops would not have the capacity to meet all of the demands, and thus more time would be needed.

Some of the comments opposing the two year effective date indicated that

the portions of the proposed standard that concerned thrown objects or riding mowers would be especially difficult in terms of meeting a two year effective date.

Other comments indicated that prototype and production testing of newly developed mower designs would require two mowing seasons to accomplish.

One manufacturer requested that the effective date coincide with the beginning of the fall production season (usually between September 1 and October 1) and stated that the normal manufacturing and development time for a riding mower or garden tractor would be 2.5 years.

The industry trade association states that the average *normal* lead time is 44 months. They believe that compliance with the standard as proposed will take considerably longer than this because of the simultaneous tooling demands of the entire industry necessary to meet all the requirements of the proposed standard. Although they do not suggest in their written comment what the lead time should be, the implication is that 4 to 5 years would be necessary.

On the other hand, the consumer testing organization argued that two years is adequate for the industry to achieve a three second stopping time. In addition, it argued that warning labels and other provisions of the standard that are similar to present voluntary standards should become effective in less than one year.

A brake-clutch manufacturer recommended that a two second blade stopping time be set to become effective two years from the date the final standard is issued.

In evaluating these comments, it must be kept in mind that the performance requirements of the standard that is being issued are intended to address only blade contact hazards for walk-behind rotary mowers. As a result, manufacturers will not have to make nearly so many changes at one time as they would have had to with the proposed standard.

The Commission contracted with Battelle Columbus Laboratories for an analysis of the anticipated economic impact of the proposed standard. Pages 88-92 of their report entitled "Economic Impact Analysis of Proposed Safety Standard for Power Lawn Mowers," dated December 30, 1976, explains the basic factors considered by the Commission in making its decision on the effective date. The Commission concurs with the report's conclusions that are relevant to the blade contact provisions that are being issued at this time. Even though the report is over 2 years old, there have been no changes that would affect the relevant conclusions in the report.

The report points out that among the various firms in the industry there is a wide variance in the engineering capabilities and access to financial capital required to make the changes necessary to comply with the proposed blade contact requirements. There is also a disparity in the degree to which existing mowers already comply with the proposed blade contact requirements. The largest firms in the industry have engineering staffs and the financial capital to produce complying mowers with shorter lead times. Smaller firms may have to rely heavily on their suppliers for both safety-related components and the engineering expertise to incorporate them in their designs. Another factor that could affect the effective date is the delays that could be caused by a large number of orders being placed simultaneously with tool and die makers by mower manufacturers and suppliers to the mower industry.

Battelle estimated that given these considerations, the time required for making changes to achieve compliance for a typical walk-behind mower with the comprehensive proposed standard would be 21-30 months or more. Most firms they interviewed felt that a minimum of two years would be required to achieve compliance, assuming that the effective dates coincide with the start of a model year. The Commission has reviewed the Battelle report and agrees with its conclusions concerning the effective date.

As noted by one commentator, production for a model year usually begins about September 1 of the previous year. Therefore, manufacturers will have about thirty-one months before normal production would begin for the model year in which the standard becomes effective. The data available to the Commission indicate that the industry can make the necessary changes by that date. However, the additional 4 months until December 31, 1981, are available if manufacturers encounter unexpected difficulties.

The Commission believes that the 4 or 5 year lead time suggested by some of the comments is clearly excessive, especially since the provisions of the standard address only blade contact injuries, rather than the broader provisions of the proposal. Substantial research has already gone into ways to comply with the provisions of the proposed standard. At this time, at least three manufacturers are making brake-clutch units that appear to comply with the 3 second blade stop requirements of the proposed standard, and patent activity in this field has been strong. The solving of these difficulties by a least three manufacturers indicates that the maximum lead time is not required.

On the other hand, the two year effective date suggested is not believed to be practical. Some manufacturers will have to make major changes to their mowers to comply with the standard. A short effective date could also cause major bottlenecks in the production of safety-related components, and there could be shortages in the number and types of mowers available to consumers. The retail price impacts on consumers would be higher than with a longer lead time, and the number of firms (especially small firms) that could be forced out of business by an inability to meet the effective date could be increased.

Based on a balancing of (1) the need for the standard in order to reduce the risk of injury associated with walk-behind mowers and (2) the possible adverse economic effects caused by the shorter effective dates, the Commission has decided that the standard should become effective December 31, 1981. A detailed discussion of the economic costs associated with this effective date is contained in the Battelle analysis referred to above. It is expected that for this effective date, the adverse effects described above for a two year effective date would be substantially mitigated. Manufacturers should have had enough time for field testing, and the supply of walk-behind mowers should be adequate to meet the demand. Individual mower manufacturers may initially have less varied lines than at present, but there should be no decrease in the types and features of mowers available to consumers. For one example, one manufacturer might choose initially not to provide an 18 inch model and another might choose not to provide a 22 inch model, but each type would probably still be available to the consumer. This time frame makes an allowance for the difficulties involved in redesigning, testing, and tooling for a complete new line.

On the other hand, the Commission agrees with the comments that the labeling requirements can be complied with in one year with no undue adverse economic impact attributable to the shorter effective date. This is because the required label can easily be incorporated into production within this time. In addition, most manufacturers are currently providing a label and will need only to change the form of the label. Accordingly, the labeling requirement is being issued to apply to reel and rotary mowers manufactured after December 31, 1979. (This labeling requirement is issued under the authority of both section 7 and section 27(e) of the act.)

For the reasons given above, the Commission finds that the December 31, 1981, effective date for the performance requirements of the stand-

ard and the December 31, 1979, effective date for the labeling requirements are in the public interest. The Commission also finds, for the reasons given above, that good cause exists for having the effective date for the performance requirements be December 31, 1981, and for the labeling requirements be December 31, 1979, rather than the 180 day limitation on the effective date that would normally apply because of section 9(d) of the CPSA.

As is discussed in more detail in section F-§ 1205.5d.(5) of this preamble, the lawn mower industry is currently engaged in an effort to develop hand probes that could be used to determine whether the mower blade is accessible during activities that can be expected to take place around the mower. Their hope is to develop probes, and test procedures for their use, which would be suitable for inclusion in the mandatory standard and provide an alternative to the standard's blade stopping time requirement. The industry has estimated that it will take another 4 months to develop the probes and test procedures.

The Commission cannot predict whether this development effort will ultimately be successful or whether mowers that embody an adequate degree of safety and utility can be built under such alternative requirements. (For a discussion of the feasibility of probe requirements, see *Industry trade association probes* below.) However, the Commission does believe that it would be highly desirable if alternative requirements could be developed that would provide an adequate degree of safety with a potentially lower cost than may be required by the blade stopping time requirement. Accordingly, the Commission has authorized its staff to cooperate with the industry development effort and to expedite analysis of the results of the industry effort to determine if the probe requirements are suitable for inclusion in the mandatory standard.

At its meeting on January 25, 1979, at which a draft of the final rule prepared by the staff was considered, the Commission discussed the possibility of delaying the effective date of the standard. The issue was whether the industry probe development effort could be completed, and the results assessed, before firms would need to begin their development of designs that comply with the Commission's final standard. After considerable discussion, a majority of the Commissioners concluded that to achieve the goal of reducing injuries at the earliest possible date, it was not appropriate to extend the effective date of the standard before the results of the development effort are even known. The majority noted that if the extension were

granted now, and the probe development effort were to fail, the public would have been needlessly denied the opportunity to purchase safer mowers for use in the 1982 mowing season. The majority also noted that not all mower manufacturers would have to begin developing designs in the next six months in order to comply with the final standard. Moreover, for any that did, the costs incurred in the first six months would not be very large, as it is likely that they would be incurred mainly for drafting system and component redesigns and perhaps beginning the construction and testing of prototypes of modified units. The largest costs are associated with actual retooling, and those would not be incurred until after the Commission has time to evaluate the probe development effort and determine whether a stay is warranted. Finally, while six months should be adequate for the industry to demonstrate whether it can develop a useful probe test, more than six months, and perhaps as long as a year, would be needed before the probe could actually be incorporated as an alternate requirement of the standard. Therefore, the Commission stated that it encouraged the industry to continue the effort and that, if the results of the development effort warrant and if it appears necessary, serious consideration will be given to an appropriate extension of the effective date at the time the Commission analyzes the development results. The Commission also stated that it would allot resources for the staff to work with the industry in its efforts.

The Commission also pointed out that section 10 of the CPSA provides a procedure for petitioning the Commission to amend or revoke a standard. Any party who believes there are suitable alternatives to the Commission's final standard can petition the Commission to adopt them. The Commission believes that petitions to amend the standard are the most appropriate way to consider alternatives to the standard that may be developed in the future.

In order to facilitate the consideration of alternatives and other changes to the standard, the staff had suggested a procedure for reconsideration of the standard that would have involved a 45 day stay in the issuance of the standard while petitions for reconsideration were considered. The Commission decided that this procedure was not suitable for the lawn mower standard, however. In the first place, the reconsideration procedure has a considerable potential for substantially delaying the issuance of the standard while the petitions are being considered. Second, the Commission believed that it would not be appropriate to introduce a new and complicated procedure

in a particular proceeding without extensive consideration of how the procedure might be generally applicable to other rules that will be issued by the Commission.

For the reasons given above, the Commission has decided that the best way to consider possible changes and alternatives to the standard is through the petition procedure established in section 10 of the act and not by a delay in the effective date or by reconsideration procedures.

DEFINITIONS (§ 1205.3)

Because the standard being issued at this time applies only to blade contact injury from walk-behind rotary mowers, only definitions applying to these mowers are being issued, and only those comments addressing definitions applicable to blade contact with these mowers are discussed at this time.

One commentator suggests that the Commission "harmonize" the definitions in the mandatory standard with those in the voluntary industry standard, ANSI B71.1-1972.

When developing its definitions, the Commission reviewed the definitions of ANSI B71.1-1972 and where feasible made the definitions in the mandatory standard consistent with those of the voluntary standard in order to minimize any confusion that might result from the terms used in the mandatory standard.

a. *Maximum operating speed.* A commentator suggests that the definition of "maximum operating speed" as proposed at § 1205.2(a)(13) be revised. The definition as proposed by the Commission reads as follows:

"Maximum operating speed" means the maximum rpm obtainable by the engine or motor under the conditions of the particular test where the term is used."

The commentator recommends that the term "governed" be inserted prior to "rpm" and that the following language be added to the definition to address mowers other than gasoline mowers:

"For an electrically-powered mower the speed attained when the mower is energized from 120 volts, 60 Hz, through a 100-foot, 16-gage extension cord. For a battery-powered mower, the speed attained with the battery fully charged at the start of the test."

The term "maximum operating speed" is used in the final standard as a condition for testing blade stopping time. The mower is required to be tested when it is in the condition in which it is intended to be used. If a mower power source is equipped with an integral governor designed to automatically limit the maximum speed attainable by the motor or engine, the mower would be tested at the maxi-

mum "governed" rpm obtainable. However, a mower may not be equipped with an integral governor. Its operating speed may be controlled by a variable speed control device or throttle, by adjustments to the fuel mixture, or by other means. Adding the word "governed" could, therefore, confuse the intent of this definition by leading persons to believe that the mower could be tested at less than the maximum obtainable rpm. Since this result is not intended for mowers without an integral governor, the suggested change has not been made in the definition.

In regard to the suggested addition for electric mowers, the use of an extension cord poses potential problems of test reproducibility. In addition, if the Commission were to specify a particular voltage, as suggested by the commentors, the definition would not take into account variations in the voltage that may be available at the testing facility. The Commission agrees that language should be added to take into account (1) the dropoff in voltage that occurs when an extension cord is used with electric mowers and (2) variations in voltage itself. Therefore, the Commission has added language to the definition of "maximum operating speed" for extension cord powered electric mowers to specify that the voltage supplied to the mower shall be in a range that is commonly found at residential branch-circuit outlets (115 V to 120 V). This will allow for a reasonable range of variation in the supply during the test. The following language has been added:

"For an electrically-powered mower, [maximum operating speed] is the speed attained when the mower is energized from a 60 Hz alternating current source that delivers a voltage no greater than 120 V and no less than 115 V at the power input to the mower with the mower running."

The commentor's suggested revision for a battery powered mower was intended to provide a clearer definition of the blade stopping time test, but it could be subject to differing interpretations of "fully-charged". To reduce that possibility, the following language has been added to the definition:

"For a battery-powered mower, it is the speed attained after the battery has been fully charged in accordance with the mower manufacturer's instructions."

The revised definitions of "maximum operating speed" appear in § 1205.3(a)(8) of the final standard.

b. *Mulching mower.* A commentor expresses the view that the definition of "mulching mower" in proposed § 1205.2(a)(15) is unclear.

The term "mulching mower," although defined in the proposal, did not appear in the blade contact provi-

sions of the proposed standard. Therefore, there is no need to define the term in the standard that is being issued at this time. It should be noted that the standard applies to all "rotary mowers" as defined in the standard. To the extent that a "mulching mower" is a rotary mower, it would be covered by the standard.

c. *Operating control zone.* A commentor states that the term "operating control zone", defined in proposed § 1205.2(a)(17)(i) (final § 1205.3(a)(11)), is unnecessarily restrictive and imposes unwarranted design limitations on the placement of manual restart controls. The commentor contends that because of the effort required to start the mower and because of the potential effects of recoil, placing starting controls in the proposed operator control zone could make the mower unstable or cause the operator to move out of the operator control zone while starting. The comment concludes that the measuring cylinder needs considerable expansion.

From Commission injury data, it is estimated that over 2,000 injuries are treated in hospital emergency rooms each year due to foot contact with the mower blade when the mower is being started. The operating control zone and its related requirement were conceived in order to keep the operator away from the blade if the blade begins to rotate when the power source is started. This degree of separation is necessary to accomplish the safety-related purpose, and mowers currently marketed could easily meet this requirement. It should be noted that mowers whose blades start rotating when the power source is started are almost certainly going to be engine kill blade control mowers that are required to have a power restart mechanism. Therefore, effort and recoil should present no problems. In any event, the Commission believes that manufacturers have the capability of complying with the requirement without introducing additional safety problems of the type referred to in the comment. Any particular designs that could result in injury because of recoil or other factors could be subject to corrective action under section 15 of the CPSA.

d. *Rotary mower.* One commentor recommends a change in the definition of "rotary mower", which was defined in the proposal (§ 1205.2(a)(22)) as follows.

"'Rotary Mower' means a power lawn mower in which one or more cutting blades rotate about at least one vertical axis."

The commentor suggests that the definition be changed to read:

"Rotary Mower means a power lawn mower in which one or more cutting blades cut grass by impact of rotating blades on free standing grass."

The commentor states that the Commission's proposed definition could result in certain mowers that are not rotaries, such as sickle mowers, being considered as rotaries.

The Commission agrees with the basic principle behind this comment but believes that safety-related characteristics of the type of mower referred to by the term "rotary" can be better described by being more specific about the type of rotation involved rather than by whether the grass is free-standing. Accordingly, the phrase "in essentially a horizontal plane" has been incorporated into the definition. It should be noted that the definition used in the standard appears in the February 1975 Federal Specification 00-M-1243A, Mower, Lawn, Power (Heavy Duty, Institutional, Rotary, 21 inch, Gasoline Engine Driven). This specification was approved by the Federal Supply Service, General Services Administration, for use by all Federal agencies. It is, therefore, a definition known to professionals associated with the mower industry. Accordingly, the definition has been modified as described above, and the revised definition appears in § 1205.3(a)(14). The Commission does not interpret this definition as applying to sickle bar mowers.

e. *New definitions.* One commentor recommended clarifying the terms "crack," "deform," and "separate" in the shield strength test. These terms, as well as the term "stress," have been defined in the final standard, at § 1205.2(a), (3, 5, 15, and 17).

f. *Blade.* The definition of "blade" that appeared in proposed § 1205.2(a)(2) has been changed to include only a rigid or semi-rigid device. This change was made because non-rigid blades are not covered by the final standard, as explained above under *Scope of the standard*. The revised definition appears in § 1205.3(a)(1) of the final standard.

WALK-BEHIND ROTARY POWER MOWER PROTECTIVE SHIELDS (§ 1205.4)

a. *Foot probe.*—1. *Area of probing.* Section 1205.3(a)(1) of the proposed standard required that walk-behind mowers be able to pass a foot probe test. The foot probe requirement and test were intended to address potential injuries to the operator's feet caused by contact with the rotating blade during lawn mowing operations. The proposed foot probe test consisted of probing around the entire periphery of the lawn mower with the foot probe specified in British Standard BS 5107, "Specification for Powered Lawn-mowers", April 1974 (the UK probe). The proposed test required that the probe be inserted under all points of the bottom edge of any shields (including the housing). The test is

passed if the probe does not enter the path of the blade or cause any part of the mower to enter the path of the blade.

Commentors stated that since the foot probe test is designed to address injuries to the mower operator's feet caused by contact with the rotating blade, and since the proposal would require walk-behind mowers to be equipped with a blade control system that stops the blade when the operator leaves the operating position, there is no need to probe the entire periphery of the mower. They point out that if the blade stops shortly after the operator leaves the operating position, then the risk of foot contact with the rotating blade in positions that are not accessible from the operating position will be addressed by the blade stop provision. The commentors, therefore, suggest that only the rear periphery of the mower should be probed. The Commission generally agrees with these comments.

The blade control system and foot probing were originally conceived as separate requirements, with the former intended to address hand injuries and the latter intended to address foot injuries. However, the Commission has since analyzed all the cases reported to it through December, 1977. These cases show that the blade stopping requirements should eliminate or greatly reduce injuries occurring after the release of the blade control device. Therefore, only injuries occurring when the mower handle has not been released need to be addressed by the foot probing requirements. The great majority of such foot injuries occur at the rear of the mower. Therefore, at § 1205.4(a)(2)(1)(B) of the final standard, the Commission has reworded the foot probing requirements to limit the area to be probed to that in which known injuries occur. This is the area within 60° of either side of the centerline at the rear of the mower and the discharge chute.

The three-month representative sampling of mower injuries in 1977, mentioned above, demonstrated that operators who are holding the mower handle can and do contact the mower blade through the discharge chute while performing routine mowing operations.

A requirement that the rear and discharge chute pass the foot probe test, in combination with the blade stop requirement, will address virtually all blade contact foot injuries (CPSC memoranda dated August 4, 1978 and October 26, 1978).

Anticipating that the Commission might only require foot probing at the rear of the mower, one commentor states that limiting foot probe testing to the rear of the mower will not protect bystanders. However, bystander

foot injuries do not represent a substantial injury pattern. As of January, 1978, the Commission had received only four reports of injury to the foot of a bystander. One of these four might have been prevented by a 360° foot probe requirement (CPSC memorandum, January 30, 1978). However, the Commission does not believe that such a requirement can be justified by the injury data concerning blade contact injuries to the feet of bystanders. Nevertheless, once a mower user leaves the normal operating position, the blade will stop, and, to that extent, bystanders will be protected by the standard.

2. *Nature of Probe:* Many of these same commentors complained about the use of the UK foot probe and about the fact that the test procedure of the proposal differs from that in the British Standard from which the UK foot probe is derived. They stated that the mower industry has had virtually no experience on production units with the UK probe and needs time to evaluate it. They also stated that over 80% of the walk-behind mowers tested by the National Bureau of Standards (NBS) failed the test and that mower housings would have to be redesigned. They also state that if shields have to be added to the sides and front of the mower there will be an adverse effect on product performance. Specifically, they argued mowers would be 3 times harder to push and would not be able to mow close to walls. The commentors did not provide any data to support their claims.

Two commentors suggest that the worst case for a foot probe test should be used in the standard. They suggest the worst case is represented by a foot smaller than that represented by the UK probe in the proposed test. Two other commentors suggest the UK probe is excessively severe.

NBS analyzed 3 existing foot probes—ANSI, CU and UK. It determined in a study (NBSIR 77-1294, Power Lawn Mowers: Evaluation of Anthropometric Foot Probes) that, of the probes tested, the UK foot probe most closely represents a human foot. The commentors have not disputed this conclusion. Insofar as the test procedure is concerned, the UK procedure consists of inserting the probe under the housing and raising the probe while keeping the bottom of the probe parallel with the supporting structure. The test procedure called for in the proposal was developed by CU and consists of inserting the probe as far as possible with an insertion force of not more than 4 lb. under the bottom edges of the blade housing and shields and then pivoting the toe of the probe upward around the heel as much as possible as the probe is withdrawn.

After considering the available injury data, the Commission concludes that the test procedure in the proposal is representative of the ways that injuries actually occur. The decision to use the UK probe instead of the other available probes is supported by the findings reported in NBSIR 77-1294. 127 males and 74 females ranging in age from 9 to 66 years participated in the study. Tests were run on each participant, with and without shoes, to determine the path the foot would take when inserted into various height openings, rocked back on the heel and then withdrawn. These data were then compared to similar data obtained by repeating the tests using the CU, ANSI, and UK probes. This procedure essentially duplicates the procedures in the final standard. These tests showed that, while none of the probes would have completely protected any of the participants of the study, the UK probe test data most closely approximates the human foot data. Therefore, use of the UK probe in the manner required by the test procedure in the standard will provide the best available representation of the behavior of the human foot (with or without shoes) and will provide a higher degree of protection than the ANSI probe and procedure or the CU probe. As far as the procedure used in British Standard BS 5107 (the UK probe), analysis of the data gained through the NBS study mentioned above shows that the critical difference between these probes and the human foot is the flexibility of the human foot (with or without shoes). The NBS study shows that rotating the UK probe about its heel provides the best available simulation of the possible action that can be done by the human foot.

The NBS study discussed above showed that a probe based on the 95th percentile test data would be needed to provide greater protection than that afforded by the UK probe. It also showed that the UK probe would not have protected all of the test subjects all of the time. Obviously, it would be possible to make the foot probe, and therefore the standard, more or less severe. The Commission, however, believes that mowers which comply with the foot probe requirements of the standard will be significantly less hazardous than ones which would not comply. While a more severe probing requirement would somewhat increase the level of safety afforded by the standard, the delay in issuing a standard that is inherent in developing such a probe would not be warranted. The foot probe requirements of the final standard will substantially reduce or eliminate foot injuries occurring at the rear of the mower and at the discharge chute.

In regard to the comments that 80% of all walk-behind mowers would fail the proposed foot probe test, it should be noted that NBS only tested 6 mowers, of which one mower passed the proposed 360° foot probe requirements, and one cannot draw sound conclusions from these tests concerning the percent of all mowers that would pass the proposed probe test. In addition, these NBS tests consisted of 360° probing of the mower. As discussed above, the standard now requires probing of only the rear of the mower and the discharge chute. In addition to the mower that passed the 360° probing test in the NBS study, another mower field tested by GSA (see brake-clutch reliability comments below) will pass the foot probe test in all areas except for one point at the front of the mower midway between the front wheels. Moreover, when these mowers were tested by GSA, they were not found to be hard to push or inconvenient to use. Rather, they were found to cut grass with no loss in cutting performance. Since the GSA test included extensive field tests of 50 mowers, the conclusions of the users on the performance of the mowers are significant.

Some of the comments seem to assume that the only way to meet a 360° foot probe requirement would be to lower the periphery of the mower housing. However, the mower tested by GSA, discussed above, clearly shows other means can be used. This mower used shields around the housing.

As noted above, the voluntary standard (ANSI B71.1-1972) requires a rear trailing shield and probing of the discharge chute. It is anticipated that most mowers that comply with the ANSI standard will be able to meet the foot probe test of the final standard with modifications that involve little or no decrease in mowing utility. Thus, it appears that the concerns of the mower industry with the foot probe test are unfounded and, in any event, have been largely addressed by the change in the requirement providing for probing only the discharge chute and the rear periphery of the mower.

One commentator suggests that the foot probe is unrealistic because the probe represents a bare foot. However, as discussed above, the data obtained in the NBS study show that the UK probe provides the best state-of-the-art measurement of the accessibility of the rotary mower blade to the human foot (with or without shoes). Further, it should be noted that during the NBS study (NBSIR 77-1294), the British Standards Institution, which developed the UK probe, was contacted. They indicated that the design of this probe is based on

the dimensions of the size of shoe most commonly worn by adult males. The probe is a composite designed to provide a reasonable degree of safety and reasonably represent a human foot. The NBS study confirms that the objectives of this design were attained.

Several commentators indicated that the wording of the proposed foot probe test procedure at § 1205.3(a)(2)(B) needed to be clarified to eliminate ambiguity and misunderstanding. Specifically, they felt that, as proposed, the procedure could require insertion of the probe at an unrealistic number of points.

This comment has merit. The wording of the requirement and procedure has been changed accordingly. The requirement now states that the mower must be capable of compliance at any point within the area to be probed rather than that the probe must actually be inserted at all points under the housing.

The test also states that, during insertion, the sole of the probe is to be kept in contact with the supporting surface and that insertion shall stop when the housing lifts or the horizontal force on the probe reaches 4 lb. A comment contends that the insertion force requirement is unclear. However, the Commission believes the requirement is clear as proposed. The requirement means that the 4 lb force is a maximum force, not a constant insertion force and that shields should not be raised up during the test unless the design of the shield is such that it naturally rides over the probe during insertion. Thus, if the shield was preventing the probe from entering the blade path during the test, insertion would stop at the specified force level.

One comment suggested that it was not fair to mower manufacturers to require that mowers be tested by the foot probe both with and without a grass catcher (if one is made by the manufacturer for use on the mower), when makers of after-market grass catchers are not required to perform similar tests on their grass catchers.

The requirement was included in the proposal to insure that grass catchers made and sold by mower manufacturers specifically for their mowers would not negate the protection of the standard's foot probe requirements. Upon consideration of this comment, however, the Commission concludes that the requirement is unnecessary. Presently produced mowers are apparently no more hazardous with the grass catcher installed than without it. The Commission cannot predict that mowers that are unsafe with grass catchers installed may be produced in the future. In addition, product liability considerations may prevent either accessory or original equipment manufacturers from recommending the use of their

grass catchers with mowers that will not pass the foot probe test with the grass catcher installed. For these reasons, the Commission cannot presently conclude that the risk of injury from unsafe mower-grass catcher combinations is sufficient to warrant a mandatory requirement in this area. However, the Commission will continue to monitor the injury data associated with power lawn mowers after the effective date of the standard, and if injuries are being caused by the use of grass catchers, the Commission could consider amending the standard to include these products.

b. *Terrace test.* Section 1205.3(a)(1)(i) of the proposal included a "terrace test." This test was designed to protect against foot contact with the blade when the mower is pushed across a transition from a horizontal surface to a lower inclined surface. Several commentators state that this test fails to realistically portray actual mowing conditions. They suggest several changes in the test to correct the problems they discuss.

The Commission has considered the comments on the terrace test and decided to delete the entire test. The test was developed by the offeror to simulate the action of the mower as it traverses from a level to an inclined surface. This action tends to raise the rear of the mower. Probing the rear under these conditions is a more severe test than probing on level ground. However, analysis of the injury investigations in the Commission's files did not reveal any clearly defined incidents of foot injury while the mower was traversing from a level to an inclined surface. The absence of injury data is the prime reason for deleting this requirement. Also, an investigation of the curvature found on residential slopes indicated that the curvature used for the terrace test in the proposal was too severe. While a fixture using more realistic curvature was not constructed by the Commission, engineering judgment indicates that such a more realistic fixture would be a less severe test than the proposed terrace test. Thus, the theoretical decrease in safety resulting from deleting this test is further minimized.

c. *Obstruction test.* Section 1205.3(a)(2)(ii) of the proposed standard required mowers to pass an obstruction test. This test consisted of pushing a mower across a depression in the ground and over a raised obstacle and then pulling the mower backward over the obstacle and depression. In order to pass the test, no more than one wheel at a time could be lifted from the fixture surface, no shield could stop the mower as a result of contact with the raised obstacle, and no shield could enter the blade path.

Several commentors express concern with the obstruction test requirement that the raised obstacle not stop the mower by interfering with any shields. The commentors state the Commission included this provision to prevent a design which would cause a nuisance or inconvenience to the user. They state that the mower would not present a hazard to the user unless the offending shield was removed. They contend that if a user removes a shield because of its inconvenience, the user has assumed the risk of any resulting injury, and therefore the requirement does not address an unreasonable risk of injury.

In enacting the CPSA, Congress found that the "complexities of consumer products and the diverse nature and abilities of consumers using them frequently result in an inability of users to anticipate risks and to safeguard themselves adequately" (15 U.S.C. 2051(a)(2)). The CPSC was created to protect consumers against unreasonable risks of injury "associated" with consumer products. The term "associated" was used in the act to "convey the fact that the risk of injury did not have to result from the 'normal use' of the consumer product but could also result from such things as 'exposure to or reasonable foreseeable misuse of the consumer product'." 92 Cong. Rec. S18199 (daily ed. October 14, 1972) (remarks of Senator Moss). The Commission concludes that it is reasonably foreseeable that consumers will intentionally remove a shield (for example a rear trailing shield), if the shield prevents them from pulling a mower backward or pushing it forward. Indeed, a number of the consumer comments on the proposed standard make the point that consumers will remove rear trailing shields if they adversely affect the utility of the mower. The requirement of the obstruction test that shields shall not stop a mower from going over the raised obstacle ensures that the standard will not needlessly have an adverse effect on the utility of the mower.

The fact that a consumer's actions might fall within the tort liability concept of "assumption of risk" would not prevent the existence of an "unreasonable" risk of injury associated with the product. The Commission's injury data show that the large majority of foot contact injuries that occur while the operator is in the normal operating position take place at the rear periphery of the mower. If shields used on a mower will not pass the obstruction test, it is reasonably foreseeable that consumers would remove the shield. Because such action is reasonably foreseeable use or misuse of a mower, the Commission has the au-

thority to address such action in a mandatory standard.

However, the risk of injury resulting from removal of the shield is not the only reason for requiring the obstruction test. The Commission's injury data disclose that mower operators have been injured when the mower is suddenly stopped by surface irregularities, causing the operator to stumble or become unbalanced and thrust a foot into the blade.

Therefore, since the obstruction test addresses a known hazard and since it addresses the unreasonable risk of the removal of safety devices, it is included in the final standard.

d. Handle and upstop requirements. Another commentor states that the structural requirements for walk-behind mower handles, and the associated tests as proposed at § 1205.3(b), are not justified. The commentor states that he is unaware of any injury data involving structural failure of a mower handle and does not see how any injuries associated with mowers will be reduced or eliminated by these provisions. He also points out that manufacturers of walk-behind mowers are now voluntarily meeting the criterion of the proposed requirement concerning the distance of handles from the rear of the mower. For the reasons given below, the Commission has decided to delete the handle strength and upstop requirements.

The handle requirements were proposed because the mower handle could create a hazardous situation if it fails structurally or allows an operator to come too close to the blade. These requirements were felt to reasonably ensure that hazardous situations would be prevented. Still, the commentor is correct in observing that Commission data does not clearly demonstrate that mower handles have contributed significantly to injuries.

The ANSI B71.1-1972 voluntary standard contains provisions requiring an upstop which limits the horizontal approach of the handle to the blade to 17 inches. The ANSI B71.1b-1977 supplement contains a 50 lb static force structural test of the handle. While similar to the Commission's proposed requirements, these provisions are less stringent. First, the voluntary standard does not contain a rocking test. The force level used in the voluntary standard is lower than the force proposed by the Commission, and the voluntary requirement only requires that the 17 inch distance is maintained after removal of the force. The Commission's proposed procedure required that the separation from the blade be maintained during the time the force is applied to the handle. These are significant engineering differences. However, as stated above, the Commission has limited data directly associating

handle failure with injuries. These voluntary standard requirements were updated and approved in May 1977. The Commission has no reports of injuries caused by a handle that would pass the voluntary requirements but fail the proposed Commission requirements. For these reasons, the Commission has not included the handle or upstop requirements in the final standard.

e. Movable shields. Several commentors indicated agreement with the intent of § 1205.3(a)(3) of the proposal that movable shields shall not be removable without the use of tools, that a coin is not a tool, and that shields which are movable for the purpose of attaching auxiliary equipment shall automatically return to their previous position when the equipment is removed. However, they felt that the requirement was design restrictive in that it did not allow manufacturers to use a control to prevent the blade from operating when the shield is not in place. Since this type of blade control would also adequately protect the user from injury, the Commission has decided to allow either such a blade control or a movable shield which automatically returns to its intended position. The revised requirement appears in § 1205.4(c) of the final standard.

The proposal's requirement that shields be removable only with tools, and that a coin would not be considered a tool for this purpose, was intended to discourage consumers from removing the protective shields. A comment suggested that this requirement could result in a decrease in safety to consumers by also discouraging consumers from reinstalling shields after they are removed. The Commission does not know the extent to which users might remove shields with tools and not reinstall them. After considering this comment, however, the Commission concludes that there is insufficient data to support a mandatory requirement in this area, especially in view of the fact that the voluntary ANSI Standard B71.1-1972 requires that the shields not be removable without tools. Accordingly, the proposed requirement that shields not be removable without tools is not included in the final standard.

f. Shield strength requirements. Several commentors found the shield strength requirements at § 1205.3(a)(1)(ii) to be ambiguous and unclear. Of particular concern was the implication in the proposal that the mower housing would have to be subjected to the strength test. The commentor felt that was unnecessary and alleged that no known housing would fail such a test.

The Commission agrees that the housings of presently produced

mowers appear to be adequately strong, and present no unreasonable risk of injury due to weak housings. The Commission also notes that the voluntary standard, to which most presently produced mowers conform, includes a structural integrity test for the housing. Accordingly, the mower housing need not be tested in accordance with the shield strength requirement, which appears at § 1205.4(a)(2) of the final standard issued below.

WALK-BEHIND ROTARY POWER MOWER CONTROLS (§ 1205.5)

a. *Background.* Section 1205.5 of the proposed standard included requirements for blade controls for walk-behind mowers. The proposed blade control system would (1) prevent the blade from operating unless the operator activates the control, (2) require that the operator be in continuous contact with the control in order for the blade to continue to be driven, and (3) cause the blade to stop within a specified time after the operator releases the control. The effect of these requirements is that when the operator lets go of the mower handle, the blade will stop before the operator's hands or feet can come into contact with the mower blade when the operator approaches the blade area to perform a task such as clearing the path of the mower, attempting to clear a clogged discharge chute, adjusting the wheels, emptying a grass catcher, or making other adjustments to the mower. The injuries that occur due to operator hand and foot contact with the rotating blade include lacerations, amputations, avulsions, and other injuries. The blade control system also will protect against foot contact injuries in areas of the mower other than the rear periphery. As discussed below, the requirements also would address some blade contact injuries to bystanders.

The Commission estimates that about 77,000 injuries due to contact between a mower operator and the rotating blade occur each year and that over 30,000 of these are treated in hospital emergency rooms (NEISS Power Mower Baseline Study, July-September, 1977). Although a voluntary industry standard has been in effect since 1972 and was last upgraded in 1977, the provisions of that standard do not directly address injury due to contact between a mower operator's hands and the rotating blade. According to the industry trade association (the Outdoor Power Equipment Institute or OPEI), the incidence of blade contact injuries at the discharge chute has not been reduced by the voluntary standard (OPEI letter dated December 16, 1976, p. 23). An analysis of injury data by OPEI also indicates that, for mowers that comply with the volun-

tary standard, the number of blade contact injuries occurring while the operator is outside the normal operating position is increasing, although OPEI has said that this result is anomalous. The Commission estimates that the blade control requirements of the standard will eliminate or reduce the severity of over 18,000 injuries treated in hospital emergency rooms each year (NEISS Power Mower Baseline Study, July-September, 1977).

b. *Miscellaneous comments.* One commentator objects to the proposed blade control system and suggests that requiring that a mower operator's hands both guide the mower and engage a blade control could create a hazardous situation, such as difficulty in negotiating a steep hill. No evidence supporting this commentator's concern was submitted. The Commission believes that, on the contrary, to safely operate a mower the operator should firmly grip the handle. The blade control system would not prevent the operator from doing so, and an operator who is firmly gripping the handle should have no difficulty also holding the blade control. The Commission notes that some presently manufactured self-propelled mowers have controls which the operator must hold while operating the mower, and no information concerning hazards associated with this type of control has been reported to the Commission.

One commentator states that a blade stopping control will not protect bystanders since such a control is dependent on operator actuation. As of January, 1978, the Commission had 10 investigation reports on file involving bystanders injured by the blade of a walk-behind mower. Half the injuries in these reports involved children being injured from unattended running mowers (CPSC memorandum, January 30, 1978). A blade control would prevent such injuries since the blade would not be rotating when the operator is not present. For the remaining injuries, the operator would have to release the control in order for a bystander to be protected. Since such bystander injuries do not represent a substantial injury pattern, and since some bystander protection is afforded by a blade control system, the Commission has not expanded the blade contact requirements of the standard to provide additional bystander protection.

Another comment points out that § 1205.5(a)(2) of the proposed standard is unnecessary. This section stated that a self-propelled mower with a traction control that inherently performs the function of the blade control need not have a separate blade control system. The commentator stated that the statement is unnecessary since the standard clearly does not re-

quire a dual system. The Commission agrees and has not included this provision in the final standard.

One commentator says that the blade control requirement should be revised to require that the control which stops the mower blade also stop a self-propelled mower from traveling, in order to address the potential hazard of striking a bystander. The Commission is not aware of any blade contact injuries to bystanders in which the travel of a self-propelled walk-behind mower was a significant contributing factor. Therefore, the Commission has not included the suggested requirement.

c. *Performance versus design requirements.* A number of mower industry commentators state that blade control system provisions of the proposal, which require the blade to stop within a specified time after the blade control lever is released, are design restrictive. They argue that the blade stop time requirement is only one acceptable way to address the potential hazard of contact with the rotating blade. The commentators suggest that the Commission should develop and propose "performance" requirements which would allow solutions such as blades that are inaccessible or that are relatively harmless. These commentators argue that by mandating blade stop time requirements, the Commission will stifle innovation and discourage manufacturers from developing alternative ways of making lawn mowers safer.

Section 7(a)(1) of the CPSA states that a standard should be expressed in terms of performance requirements "whenever feasible."

Thus in order to determine if the Commission's requirements comply with this statutory directive, one must determine whether the standard's requirements are expressed as performance requirements and, if not, whether expressing them as performance requirements is feasible.

Except in extreme cases, whether a given provision is a performance requirement or a design requirement depends on a subjective judgment of semantics. In relation to a stop-time requirement, a "pure" design requirement would, for example, specify that a brake-clutch of a particular design must be used, that it would have certain specified dimensions, materials, spring pressures, and coefficients of friction and would contain numerous other specifications so that there would be no discretion in the design of the brake-clutch. On the other hand, a "pure" performance standard would only specify that the mower must be constructed so that no one could be hurt by it. In these extreme examples, the design requirement does not allow any flexibility and the performance requirement does not provide any

guidance toward what would be acceptable.

The Commission does not agree that the blade stop time requirement of the standard is a design as opposed to a performance requirement. Although the standard requires mower blades to stop within a specified period of time, no specific means of meeting the stop time is required. Manufacturers are not restricted to any particular design to meet the stop-time requirement.

Two currently known methods for meeting the stop time requirements are by using a blade disengagement system such as a brake-clutch mechanism or by stopping the engine. However, there are many different designs of brake-clutches. In addition, manufacturers may use their innovative ability and technology to design other systems that would comply with the blade stop time requirements. Thus, the blade stop time requirement is a "performance" requirement. (However, for the reasons discussed below, the final standard does prohibit a design that stops the blade by stopping the engine if there is only a manual restart.)

The reasons given in the legislative history for preferring performance requirements are that product innovation should not be stifled by government action and the belief that performance requirements can be expected to foster rather than stifle competition. (S. Rep. 92-835, p. 30; H.R. Rep. 92-1153, 189; 92nd Cong., 2d Sess., (1972).) The legislative history provides no discussion of the meaning of "feasible," as it is used in expressing the preference for performance requirements whenever feasible. The ordinary dictionary definitions of the term feasible include: Capable of being done or dealt with successfully; suitable; reasonable; likely; and practicable.

Although it would be a factor in the determination of what performance standards are "feasible," the fact that it may be technologically possible to develop a performance standard does not mean that the standard is feasible. In determining whether a standard is feasible, the Commission may consider factors such as whether it is a reasonable use of Commission resources to develop and propose a performance standard for the particular risk of injury, the availability and effectiveness of less performance-oriented standards, and whether it is practicable for manufacturers to produce products that comply with the performance standard. The Commission can also consider the amount of time and resources needed both for the development of a proposed performance standard and for issuance of the final standard.

The commentators have suggested a number of alternative types of requirements that they believe are more performance-oriented than the blade stop time requirement of the final standard. The feasibility of each of these suggestions is discussed below in the portion of the preamble that relates to the particular suggestion. However, the Commission notes that none of the suggestions, if adopted, would involve pure performance requirements. (A possible exception could be the suggestion that a test for a harmless blade be developed. Even this test is design restrictive, however.)

The lawn mower industry has recently suggested the initiation of an effort to develop what they refer to as "performance requirements" that they believe would be less restrictive than the performance requirements that are being issued by the Commission. They wish to develop hand and foot probes to measure whether the blade is accessible for contact with the operator and, if so, whether the blade is capable of causing an injury. The feasibility of this proposal is discussed below under "Industry trade association probes." The Commission notes, however, that even these suggestions are not pure performance requirements. In order to pass the accessibility tests that the commentators suggest could be developed, the mowers would have to be designed so that the probes would not contact the blade during the test procedures. It would still be possible to argue, however, that there could be other ways to determine if the mower was sufficiently safe. In addition, consumers who came into contact with the blade in ways that were not envisioned by the test procedures would still be injured.

It is the Commission's judgment that, at this time, no method other than blade stop time requirements exists which would adequately reduce or eliminate the unreasonable risk of hand injury associated with operator contact with the rotating mower blade. The Commission must address the hazards that now exist with lawn mowers as they are currently manufactured. While some manufacturers argue that their innovative ability would be stifled if the Commission mandates a blade stop time requirement, it must be recognized that the basic design of lawn mowers has remained essentially the same over the past two decades. Beginning in 1960, a voluntary industry standard went into effect. This standard was last revised in 1972, with supplements in 1974 and 1977. Although the vast majority of all mowers are said to comply with the standard, the number and types of lawn mower injuries, even considering the increased number of lawn mowers in the marketplace, do not appear to

have been significantly affected. Therefore, the Commission believes it must proceed with the blade stop requirements it proposed.

It should be noted that the Commission recognizes that innovative means to cut grass may not present the same risk of injury as rigid or semi-rigid blades. As discussed above, the Commission has excluded monofilament line mowers and any other blades that are not rigid or semi-rigid from the scope of the standard.

d. Blade harmless or blade inaccessible. In the May, 1977 proposal, the Commission stated it would be desirable to have a test that would identify a blade that is reasonably safe if an operator inadvertently touches it. The Commission specifically sought public comments suggesting a suitable test to determine blade harmlessness. The Commission believed that inclusion of such a test would encourage industry to develop safer blades which might be the most effective means of reducing injuries caused by contact with the blade. The Commission, however, was unable to find a repeatable test that could sufficiently indicate when an individual is likely to be injured by a moving blade.

Several commentators suggested various test methods to measure blade "harmlessness" or blade "inaccessibility." Other commentators suggested various mower or blade designs in which the blade was said to be inaccessible or harmless. The Commission's evaluation of these various designs and test methods is discussed below:

1. *CU "blade harmless" test.* Consumers Union's recommended standard for power lawn mowers included a "blade harmless" test that would apply both to mowers without a blade control system and to mowers with a blade control system that would stop the blade or render it harmless after three seconds. In the CU test, a vinyl-wrapped dowel was inserted into the path of the blade, either while it was revolving at maximum operating speed or three seconds after release of the blade control. If the tape was not cut, CU considered the risk of injury acceptable. The Commission did not include CU's "blade harmless" test in its proposed standard because the test did not appear to be repeatable and because the Commission had no information indicating whether a vinyl wrapped dowel rod was a reasonable surrogate for a human hand.

2. *Remote controls, etc.* The industry trade association OPEI, contends that there is no need for either a blade stop requirement or hand probes if the mower has no discharge chute and if the controls for starting and for wheel height adjustment are located away from the housing. They believe there will be no occasion for injuries if oper-

ators do not need to approach the blade to perform these tasks. However, the data available to the Commission indicate that only 47% of the blade contact hand injuries occur during acts related to clearing the discharge chute, adjusting the mower height, or starting the mower. The remaining injuries result from such things as accidental contact, removing debris, and cleaning the mower or adjusting the carburetor of the mower (NEISS Power Mower Baseline Study, July-September, 1977). Therefore, the elimination of the discharge chute and the relocation of the other controls, alone, would not provide adequate protection against hand contact with the blade, and the Commission does not adopt this view.

3. *Other alternative test methods.* Two commentators presented comments on alternative test methods for inaccessibility and/or blade harmlessness. One of them identified the complex array of hazard data analysis, human factors analysis, and engineering investigation that would be needed to support such test methods but did not provide the Commission with a supportable test method.

Another commentator suggested an alternative test to the CU blade harmless test and a different foot probe test. His alternative to the CU test was to replace the vinyl tape on the CU probe with surgical tubing. The tubing, the commentator suggests, would be thicker and more resistant to impact and more closely related to human skin. He also mentioned using chicken legs. The foot probe test submitted by this commentator involves thrusting a natural leather shoe for an adult male, fitted with a snug hardwood shoe tree, into the path of the rotating blade. The test would be run at various engine or motor speeds from 1000 revolutions per minute to the maximum operating speed of the mower. Failure would be measured by "any significant cut or tear that shows conclusive evidence that a serious laceration or amputation would have been sustained by the human foot." A scuff or minor opening in the surface of the shoe leather would not be a significant cut or tear. These suggestions were not supported by any data showing that surgical tubing, chicken legs, or shoe leather would sufficiently indicate the potential for injuries to a mower operator. In addition, there was no showing of what size or shape of shoe should be used or why a shoe would provide more realistic protection than the foot probe. Accordingly, these suggestions are not suitable for inclusion in a final standard.

4. *Mower designs presented as means to reduce injury.* On May 4, 1977, the Commission held a "Lawn Mower Inventor's Day." At that time, four

mower designs which the inventors felt incorporated an inaccessible blade or a "harmless" blade were presented. Two of these inventors participated in the June 13, 1977, oral presentation on the proposed standard, and one of them submitted extensive written comment.

In addition to these individuals, at the oral presentation one person discussed the safety merits of a lawn mower blade being developed by his company. Other persons extensively discussed the merits of including blade inaccessibility and blade harmless provisions and test procedures in the standard in addition to the provision for a blade control system.

These approaches, which would involve the development of foot and hand probes, were not supported by further data. One commentator did state that a mower blade he presented on Inventor's Day and at the oral presentation had not seriously injured his hand at engine speeds of 1000 rpm. However, a major retail chain store commented that it had tested this blade in its laboratory in October 1975 and had concluded that the blade still impacts with sufficient force to damage a person's foot. They also stated that if a hand were contacted by the blade, a finger would probably not be severed but severe injury would result. The laboratory report also indicated the blade did not cut grass properly.

The oral commentator who presented an allegedly less harmful lawn mower blade made similar claims about the ability of his approach to reduce severity of foot injuries (with shoes) from lacerations and amputations to "bruised up pretty bad."

The Commission's staff concluded that these suggested methods for determining the injury potential to the hand or foot from a rotating mower blade were not suitable for use in a mandatory standard due to lack of criteria which could define a requirement to determine if the blade was inaccessible or harmless and the unfeasibility of developing such criteria within a reasonable time. The Commission agrees with this conclusion.

5. *Industry trade association probes.* The industry trade association, OPEI, met with the Commission in March of 1978. At that time, they offered for the consideration of the Commission's staff a draft of alternative requirements for determining the accessibility of the mower blade to the hand or foot. This draft used the UK foot probe for determining foot accessibility under various test conditions. It recommended the use of a finger probe developed by UL as an electrical hazard accessibility probe for probing the discharge chute. Two "cupped hand" silhouette type probes were of-

fered for probing the lower edge of the mower housing. The trade association has stated that these recommended alternative provisions were a first draft which they believed points in the right direction and is a step forward in the development of performance language for a final standard. They did not claim that the submitted provisions were developed and supported sufficiently for their inclusion in a final mandatory standard.

The Commission's staff evaluated these probes, and the Commission has concluded that these probes are not a satisfactory alternative to the blade stop time requirements of the proposed standard (CPSC staff memorandum, October 19, 1978). One deficiency in the suggested "cupped hand" probes is that there has been no data presented to show that the shape of the probes adequately defines the area of potential blade contact that would result from actions which the operator might attempt about the mower. Also, the suggested test procedure for these cupped hand probes provided for the probes to be slid toward the mower in a vertical position. If the mower housing were low enough that the probe would not go under the mower, the mower would pass the test. However, the cupped shape of the probe does not allow for the fact that an actual human hand could easily reach under the housing's edge by opening the hand to a less cupped position.

As far as the finger probe is concerned, the insertion depth of the probe is limited by a collar, and the trade association alleges this would protect against an adequate number of the injuries that have occurred in the past. Current mowers could be made to pass the suggested test by extending the length of the discharge chute past the probe's insertion depth. However, a user who wished to clear the discharge chute could reach in until the area of the clog is reached and would not be limited to the probe insertion depth unless it was not possible to reach in further.

In general, before hand probes to measure accessibility to the blade could be determined to provide an adequate degree of protection to the consumer, questions must be answered such as (1) what types of hand movements will the users attempt that could result in blade contact and (2) what probe dimensions and degree of manipulation would be needed to protect hands performing these movements. It may not be possible to answer these questions with a reasonable expenditure of money and time, if at all, and the Commission concludes that hand probes to measure blade accessibility are not feasible.

The trade association, after submitting the originally suggested probes,

suggested that the probes should be covered with a layer of a relatively soft material that, if cut or penetrated by the operating mower blade, would indicate a sufficient potential for injury by blade contact. The basic problem with this suggestion is that the Commission knows of no data that can correlate the type and force of blade impact that would cut open the probe covering with the potential for injury to a human hand. There is no known substitute for an actual hand for the purposes of estimating potential injury from blade contact, and there is no known methodology for obtaining sufficient data for developing such a substitute.

The difficulties involved with such a development effort were made clear to the Commission in its effort to develop devices that could adequately detect when a point or edge was sufficiently sharp to constitute a hazard to young children. Even after years of work, no test or procedure was developed that the Commission could conclude was suitable as a uniformly applicable mandatory standard. An effort to determine when a power mower blade will not harm the operator is potentially even more complex, since the procedure would have to protect against avulsions and fracture, as well as lacerations.

The trade association has stated further that they believe adequate and supportable blade accessibility and blade harmless test criteria and procedure could be developed within 6 months, and that the Commission should cooperate with industry in developing these tests.

For the reasons given above, the Commission has concluded that mandatory requirements for probes to measure blade accessibility and/or blade harmlessness are not feasible. However, the Commission does believe that requirements other than blade stop time requirements that would adequately protect consumers would be desirable. Therefore, since the industry wished to attempt to develop such requirements, the Commission is willing to permit the staff to monitor the development of the requirements. However, because of the number and nature of the blade contact injuries that are now occurring, the Commission does not believe that it would be appropriate to delay issuing the final standard to see what this effort by the industry may produce. The Commission also wishes to stress that it is not undertaking to develop hand probe requirements itself but that it is allowing the staff to cooperate with the industry effort. However, if suitable probes are developed, the Commission will consider whether they are appropriate for inclusion in the mandatory standard and will consider whether an

extension of the effective date of the standard is appropriate.

At the present time, however, the Commission cannot conclude that such probes are feasible requirements. In the first place, it is not clear that criteria for the construction and manipulation of such probes, sufficient to reproduce the range of actions that could be achieved by a mower operator, can be developed with the resources that may be available. Also, the time required for development of such probes, the development of proposed mandatory requirements, the response to comments that are received on the proposal, and the issuance of a final standard would be excessive in view of the number of ongoing injuries caused by contact with the blades of power mowers. For these reasons, and because of the limited resources of the Commission, the Commission concludes that performance requirements of the type suggested by the mower industry trade association are not feasible for proposal as mandatory requirements.

e. *Blade stop*—1. *Three second stop time.* A number of comments concerned the proposed requirement that the blade stop within 3 seconds of release of the blade control. The proposal would have required an interim 5 second stop time 2 years after issuance of the standard and a 3 second stop time 4 years after issuance. The final standard requires a 3 second stop time nearly 3 years after issuance. The purpose of this requirement was to ensure that the blade will stop before the operator's hand can touch it, after leaving the operating position.

Some comments suggested that the 7 second stopping time that is met by most current mowers, if combined with a blade stop control, would adequately protect consumers. These comments reasoned that if the operator knows the blade is going to stop, he or she will wait until the blade has stopped before approaching the area of the blade.

These comments also speculated that the operator would sense the decreasing noise and vibration as the blade comes to a stop and would thereby be warned to keep away until the blade stops. They contend that the stop times should be based on human factors research, taking into account the psychological reaction to the changing environmental conditions associated with the engine stopping.

These comments contend that the studies the Commission considered in setting the blade stop times merely measured how quickly an operator could reach the blade and were conducted under unrealistic conditions. They noted that the studies either did not use actual lawn mowers or that the mowers were not running. Com-

mentors also suggested that in real life situations, operators will take substantially longer than 3 seconds to reach the blade because operators fear the rotating blade and because time will be needed to prepare to perform the task which brings them near the blade.

The studies the Commission considered in establishing the stop time included:

1. A 1975 NBS analysis of films of blade access times taken by the University of Iowa.

2. A series of tests conducted at Eckerd College by a task group of CU's development effort.

3. A limited blade access study conducted by the Office of the Medical Director of the Commission.

4. A time to blade access study conducted by NBS.

The NBS study was conducted using accepted human factors techniques and shows median times of between 2.0 and 2.4 seconds for the mower operator to reach the blade, depending on the location of the discharge chute. The Iowa and CU data are similar, with mean access times of 2.68 and 2.89 seconds respectively.

The conjectures of the comments that human factors considerations or changing noise and vibration characteristics will result in longer access times in real life situations are totally unsupported. In fact, the Commission is aware of one incident in which the victim probably contacted the blade less than 3 seconds after intentionally operating the mower's shut-off control. Even if it were true that consumers will often take somewhat longer to approach the blade than is indicated by the studies, this would not warrant lengthening the 3 second stop time requirement. First, it would be virtually impossible to devise a test that would accurately measure the effect of factors such as fear of the blade on the access times without ensuring that the test participants believe they are being subjected to a risk of injury. The only way to establish such tests would appear to be actually subjecting subjects to a risk, and, of course, this would clearly be unacceptable. No commentators suggested a means of testing to take these psychological factors into account. Second, the commentators did not show how much time they believe an operator would need to reach the blade. The Commission's 3 second requirement is already somewhat longer than the median access times produced by the studies. In addition, the Commission believes that different individuals would take different periods of time to reach the blade. To establish longer stopping times based on median human factors considerations (if such could be determined) would still leave many individuals at risk.

The Commission believes that the 3 second requirement sets a safety criterion that should protect the vast majority of users from injury resulting from time to blade access. The fact that some individual consumers might take significantly longer than this is not material.

Some commentors suggested that the Commission establish a 7 second stop time and then amend the standard to lower the time if experience shows that to be needed. The Commission believes it cannot adopt a "wait and see" attitude in view of the seriousness, and large numbers, of injuries that are occurring as a result of contact with the rotating blade. Therefore, it has not adopted this suggestion.

A number of comments stated that 3 seconds after the engine is shut off or the blade is disconnected, the blade will be "coasting" and would not produce a severe injury. This statement was also unsubstantiated. While it seems rational to assume that a blade coasting after 3 seconds has less potential for injury than a blade under full power, there is no way to determine at what length of time and under what conditions a blade could be reasonably expected to produce only an "acceptable" injury. As discussed above, the Commission knows of no acceptable substitutes for a human hand that could determine at what velocity and force the risk of injury from the blade would be reasonable. The Commission notes that the usual rotary mower blade is a relatively heavy sharpened piece of metal, and the Commission is unable to conclude that even at slow speeds such a blade would be safe. Accordingly, it has not changed the 3 second stop time requirement.

Another comment stated that the Commission did not take into account the effects of normal product deterioration, which could result in longer stopping times as the mower ages and that a consumer would expect the blade to stop in 3 seconds and could be injured if he or she put a hand under the mower after 3 seconds when the blade had not stopped because of product deterioration. It would appear that this comment would support establishing even shorter stopping times and would apply also to any stopping time requirement. However, the Commission has no reason to believe that stopping times will lengthen appreciably as the product is subjected to reasonably foreseeable wear and tear. In addition, tests conducted by brake-clutch manufacturers indicate that there are devices available that will stop the blade within 3 seconds during the useful life of the mowers being tested.

One commentor states that the test procedure for measuring stopping time

does not consider that in an actual mowing situation the resistance of the grass against the blade will cause the blade to stop faster than it will in the test. The Commission believes it cannot include this consideration because mowers are used in varying situations and under varying conditions. For example, the Commission's injury information shows that numerous injuries occur over already cut grass or even over surfaces other than grass, such as concrete. In addition, even if the mower were over grass, the degree of grass resistance could reasonably be expected to vary considerably according to the particular mowing conditions. Therefore, grass resistance would not be an appropriate factor to include in a test for stopping time.

2. "Engine kill". The standard requires that the mower blade stop 3 seconds after the operator releases the blade control. The Commission knows of two primary ways manufacturers could meet this requirement: by disconnecting the blade from the power source while the power source continues to run (blade disengagement) or by stopping the engine, thereby stopping the blade (engine kill). If the manufacturer chooses an engine kill method to stop the mower blade, it is possible to restart the mower by at least two methods, by a manual start mechanism or a power start mechanism. Manual starting was defined in the proposal as starting the mower engine with power obtained from the physical efforts of the operator. The proposed standard provided that the engine kill method, of stopping the blade could only be used in conjunction with a power restart mechanism or where the mower met an "easy restart" test set forth in the proposal. The Commission included this provision in the proposal because, if a mower had to be manually restarted each time the blade control was released and the engine stopped, and if the mower was difficult to start, mower operators would be likely to disable or override the control (for example, by tying or taping it down) to avoid the inconvenience of manually restarting the mower.

A number of commentors questioned this rationale for requiring an "easy restart" or power restart when a manufacturer chooses to stop the mower blade by an engine kill method. The commentors suggest that the Commission has no authority to include in a standard a requirement, such as easy restart, for the purpose of reducing the motivation for mower users to disable a blade control system. These commentors suggest that a user who defeats a safety device assumes any risk of injury resulting from this action. Thus, consumers who disable a blade control system assume the risk

of being injured by the rotating blade of the mowers. These commentors urge the Commission to allow engine kill with manual restart that would not meet the easy restart requirement.

Nearly all of the consumer comments on the proposed standard, and several other commentors (including CU, the offeror), urged the Commission not to issue a standard that would result in mowers that stop when the operator lets go of the mower. Some argued that it would be inconvenient for an operator to have to restart a mower each time the blade control system was released and that due to the inconvenience, consumers would defeat the blade control. This would be especially true if operators would let go of the handle with both hands in order to perform tasks such as mopping their brows, swatting at insects, or removing debris from the path of the mower. If the blade control were defeated, users would then have no protection, and few injuries would be prevented by the requirement for a blade control.

To defeat a blade control system that uses engine kill with manual restart, all a consumer would have to do is loop a piece of wire around the mower handle and blade control lever—and then release the wire when the consumer desired to stop the blade.

The Commission recognized in the proposal that stopping a rotating blade by means of engine kill has the advantage of allowing the operator to hear when the engine (and therefore the blade) has stopped. The Commission, however, also recognized that where the blade stopped by means of engine kill, and a manual start was needed to restart the mower, the operator would be tempted to disable the control lever by taping or wiring it down in the activated position or by more permanently overriding the control system. The Commission believes it likely such permanent or temporary defeat would occur so that operators could avoid the inconvenience of having to restart their lawn mower each time they released the blade control lever to, for example, pick up debris in the mowing area, take a drink of water, empty a grass catcher and the like. The comments on the proposed standard from consumers support the Commission's position. Nearly all of the consumer comments opposed a blade control system that stopped the blade by stopping the engine and that also required a manual means of restarting the mower. Many of these commentors made it clear that they would take any steps necessary to defeat such a system.

The fact that mower operators are likely to defeat a blade control system

that requires manual restart is also supported by the American experience with automobile seatbelt interlocks and warning buzzers. A Department of Transportation (DOT) survey of automobile drivers shows that as many as 48% of those persons surveyed defeated or circumvented the seat belt interlock system and 36% actually defeated the system, for example by cutting the wires. (Safety Belt Interlock System Usage Survey, DOT-HS-801-594 (1975), DOT-HS-801-957 (1976)). Because of consumer complaints about seat belt warning systems, Congress took the nearly unprecedented action of prohibiting DOT from requiring automobile seatbelt interlock systems or buzzer systems that necessitated buckling of a seat-belt to stop the buzzer (Pub. L. 93-492, 88 Stat. 1482; 15 U.S.C. 1410b(b)). Thus, it is logical to conclude that consumers would defeat an excessively inconvenient blade control system just as many consumers defeated automobile seat belt interlock and buzzer systems.

An analysis of in-depth investigations also lends some support to the conclusion that consumers will defeat a blade control system that uses engine kill in conjunction with manual start (CPSC memorandum, January 30, 1978). In a review of 160 injury investigations, of the 36 operators who reported why they had not turned off their mower prior to the activity which resulted in injury, 13 gave reasons which would indicate that such users would be tempted to bypass an engine kill blade control with manual restart. These reasons included that the mower was hard to start or that the operator was in a hurry and did not wish to take the time to restart the engine.

Some commentators submitted evidence to suggest that consumers will not try to defeat a blade control system that combines engine kill and manual restart. A major mower manufacturer submitted the results of a survey in which 89% of the persons surveyed indicated they stop the mower engine when emptying the grass catcher. The Commission does not believe that this opinion of the users of mowers is relevant to whether the users would disable a blade control if the mower were to stop every time the user had to remove his or her hands from the mower handle. In this latter case, the mower would stop many more times than would be the case where the user might intentionally turn off the mower in order to empty the grass catcher.

Another survey indicating that consumers would not disable a blade control that used engine kill with only manual restart was conducted with the members of a consumer sounding board. However, a review by the Com-

mission of the methodology of this survey indicated that the results of this survey cannot be considered reliable. For example, not all of the persons surveyed participated in mowing lawns. In addition, the participants received a thorough briefing on the safety issues involved. The typical consumer may not be as aware of the seriousness of the risk of injury the blade control was designed to reduce. Also, since the participants were volunteers, it is reasonable to assume that they are more safety-conscious than the average person.

For these reasons, the Commission believes that the evidence that consumers using manual start mowers would, in many cases, disable a blade control that stopped the blade by engine kill is more credible than the evidence to the contrary.

3. *Easy restart.* A number of commentators argue that the easy restart test the Commission proposed is not technologically feasible or supportable. The Commission agrees that the proposed test is not technologically feasible. Recent tests performed for the Commission by the National Bureau of Standards (NBS) show a poor correlation between the subjective judgment of what constitutes a mower that is easy to restart and the results of tests on the same mowers using the proposed test method. The NBS tests showed that the action needed to start a mower manually is substantially different from the force produced during the proposed easy restart test. Extensive and time-consuming research would be needed to develop an appropriate test method that would overcome this problem. Moreover, even if an acceptable easy restart test should be developed, it is possible it would not be effective, since, as indicated in the comments, it may be that consumers would defeat the blade control because of the inconvenience of repeatedly manually restarting the engine, regardless of the ease of manual restart. Therefore, the Commission has decided not to delay issuance of the standard in order to develop an easy restart method. Accordingly, if manufacturers choose to stop the blade by killing the engine, a power restart must be provided.

A number of commentators allege that engine kill is the safest way to address the hazard of contact with the rotating blade because the operator will notice the changing noise and vibration that indicate the mower blade is stopping. However, Commission injury data show that injuries have occurred even where a mower operator consciously turned off the mower before proceeding to perform a task that resulted in placing a hand in the path of the rotating blade. Thus, the changing sound of the stopping engine and

blade cannot be considered a complete protection against the possibility of injury.

These commentators apparently believe that this is an advantage which would not be shared by other blade stopping methods. However, the Commission has witnessed demonstrations of current production mowers which meet the blade stopping requirements without stopping the engine (by using a brake-clutch) and has observed that in these mowers there also is a pronounced and readily distinguishable change in sound and some change in vibration for the mowers between when the blade is engaged and when it is disengaged. Therefore, sound and vibration changes which could warn of a stopping blade are not unique to the engine-kill method of stopping the blade.

In regard to those commentators who argue that the Commission has no authority to consider the situation where a consumer intentionally defeats a safety device, it is the Commission's view, as discussed above under the obstruction test in §1205.4, that those commentators misread the Commission's authority under the CPSA. The Commission may issue mandatory standards that address unreasonable risks of injury associated with consumer products. The term "associated" was used in the act in connection with the term "unreasonable risk of injury" to convey the fact that the risk of injury did not have to result from "normal use" of the consumer product but could also result from such things as exposure to or reasonably foreseeable misuse of the consumer product. It is the Commission's view that the defeat of a lawn mower safety mechanism because of the inconvenience of the mechanism or the adverse effect of the mechanism on the product's utility or performance is a reasonably foreseeable use or misuse of the mower. As such, the Commission has the authority under the CPSA to address that use. It has done so in this case by requiring a blade control system that stops the blade within 3 seconds after the blade control lever is released and by prohibiting engine kill as a means of stopping the blade if the mower has only manual restart.

One commentator suggests that engine-kill not be allowed because stopping the engine might increase gasoline consumption. While the Commission has concluded that engine-kill with manual restart will not be permitted, gasoline consumption was not a factor in that conclusion. This is because, if all walk-behind mowers were replaced with engine-kill mowers, the estimated increase in the total fuel consumption for all vehicles would be miniscule (CPSC Memorandum, June 30, 1978).

4. *Engine kill with interlocks to prevent defeat of the blade control system.* Several commentors have suggested that a blade control system that relies on engine kill with a manual restart could be designed to discourage consumers from permanently or temporarily defeating the blade control system.

A manufacturer suggests a wiring method that would discourage consumers from permanently defeating the system. The Commission has decided not to accept this suggestion at this time since it is questionable whether the suggested design would effectively minimize the chance that consumers would defeat the blade control system. As discussed below, it is so simple to temporarily defeat the blade control that persons inclined to defeat the control would not need to disable it permanently. Accordingly, the Commission believes that a more effective approach would be to reduce the initial motivation for users to disable the blade control system.

The mower manufacturer also suggested a method (interlocks) whereby if the blade control were defeated by, for example, taping or otherwise tying it down in the operating position, and the engine were then shut off by the shut-off control, the engine could only be restarted if the blade control were released. The commentor suggests that such a method would discourage defeat of the blade control system. However, if a mower operator has gone to the trouble of tying down the blade control in the first place, it is not unreasonable to assume that person will simply not stop the mower during the mowing operation in order to avoid any inconvenience resulting from having to untie the blade control to restart the mower. This could increase injuries by causing users to perform tasks around the mower while the blade is operating. Moreover, a temporary defeat of the blade control system could be accomplished by simply looping a piece of wire over the handle and control lever and then unhooking the wire to stop the mower. Since the provision of interlocks would merely interpose an additional and easily accomplished step for a person wishing to disable the blade control, the Commission is not convinced that interlocks would decrease the likelihood of operators permanently or temporarily defeating the blade control.

5. *Power restart.* The proposed standard would allow engine kill as a method of stopping the blade if the mower is equipped with a nonmanual starting mechanism. A nonmanual start mechanism could involve pushing a button or flipping a switch. On the other hand, winding a crank to compress a spring that would provide

the starting force would be considered "manual restart" as that term is defined in the proposal and in the final standard, because it involves starting the engine with power obtained from the physical efforts of the operator. Electric mowers already have power restart mechanisms since electric mowers can be started by flipping a switch. To meet this requirement, gasoline mowers could use some type of stored mechanical energy or battery power or any other method that could be developed by manufacturers. The Commission has no data to indicate that suitable power start mechanisms cannot be developed by manufacturers at a reasonable cost.

6. *Blade disengagement mechanism.* Another means of complying with the Commission's blade stop time requirements is through a blade disengagement system. Such a system consists of a blade control that when released disconnects the rotating mower blade and stops it without stopping the engine. One type of blade disengagement system would be a brake-clutch. While manufacturers would be free to develop other methods of blade disengagement, several commentors raised issues concerning brake-clutch mechanisms.

(i) *Reliability and safety.* A number of mower manufacturers contend that brake-clutch systems are not reliable and may fail in a way that the blade continues to rotate when it should be stopped. They state that, after the blade control is released, consumers will assume that the blade has stopped, and, if it has not, consumers will be injured when they place their hands or feet in the path of the blade. For the most part, commentors provided no data to support their view that brake-clutch systems are unreliable or unsafe.

One mower manufacturer, however, did submit some data to support its contention that these systems are unreliable. This manufacturer assumed that the average number of blade brake-clutch actuations would be 600 cycles per year and stated that a reliable clutch mechanism should be able to withstand 250 hours of field testing and a lab test life of 20,000 cycles without failure. This manufacturer contends that brake-clutches are unacceptable because of their poor reliability and that the level of reliability required is beyond current industry technology.

To support its contention, the manufacturer provided test data on 19 mower units with 5 different clutch designs. None of the units completed 250 hours without failure and none achieved a cycle life of 20,000 cycles. Tests were terminated for the following reasons:

1. Unit was hard to start

2. Clutch slippage excessive
3. Failure of brake to release
4. Severe knocking noise in clutch
5. Brake failure
6. Sticking clutch
7. Failure of brake to override full throttle
8. Clutch control failure
9. Clutch bearing failure
10. Clutch wear excessive

However, another commentor specifically analyzed the results of the tests conducted by the commentor mentioned above in relation to the clutch of one manufacturer. The latter commentor stated that the engine of the mower with which the clutch was tested runs at a lower speed than the engine for which the clutch was designed, which is the engine used by most lawn-mower manufacturers. Since this critical variable was apparently ignored by the commentor submitting the test results, the Commission is unable to rely on these tests in determining the question of brake-clutch reliability.

Other commentors have expressed their confidence in blade brake-clutch reliability. One clutch manufacturer has presented extensive and detailed evidence of the durability of brake clutches. In actual mowing tests, three units have each completed over 250 hours of field testing without failure. In ongoing field tests, two units have compiled a total of 256 mowing hours and 5,016 cycles with no failures to date. In addition to this, the clutch manufacturer, in conjunction with an engine manufacturer, has conducted overload tests and concluded that this clutch does not increase the wear on the engine or crankshaft. In laboratory cycle testing, a cycle life of over 30,000 cycles has been demonstrated, and in laboratory wear tests, 250 hours of operation and 15,000 cycles were completed on several units without a failure to stop the blade in less than 3 seconds. There was no appreciable degradation of blade stopping time throughout the laboratory testing. These tests indicate that the brake-clutches tested are reliable and safe. The Commission has studied the data submitted relating to these tests and has concluded that the tests were conducted under generally acceptable test procedures and accepts their validity.

Another clutch design has been subjected to actual field testing by the General Services Administration (GSA). The GSA, under their Experimental Technology Incentives Program, has reported on the field testing of a mower which GSA felt incorporated unique safety and low noise characteristics (Final Report, Etip Project 150, June 26, 1978). One of the safety features of this mower is a blade brake-clutch. Fifty units of these mowers were tested at ten different locations over a period of four months. This was an accelerated test

with usage varying from less than one hour per day to over four hours per day. Fifty percent of the users were subjecting their mowers to over four hours per day mowing time. There were no reports of a clutch failure. Although the amount of field test time was not recorded for each unit, a conservative estimate would place the test time range from something less than 80 hours to a maximum of 320 hours, with 50% of the units at the high end of the range.

The Commission also notes that at least 2 mower manufacturers are currently manufacturing mowers that include a brake-clutch mechanism.

Because some of the Commission's data became available after the close of the formal comment period, the Commission on November 2, 1978, published a summary of the data on brake-clutch safety and reliability and asked interested persons to examine the data and make additional comments to the Commission if they wished (43 FR 51038). The time for submitting written comments in response to this request was extended to December 15, 1978, and a presentation of oral comments was held on December 11, 1978.

In addition to comment on the data that the Commission had received, the Commission requested comment on four questions that had been raised by the comments on the proposal that concerned brake-clutch safety and reliability. These questions are discussed separately below:

1. *What is the likelihood of a blade brake-clutch system failing in such a way that, rather than stopping, the mower blade continues to rotate?* In dealing with this question, and with the other aspects of brake-clutch safety and reliability, it must be kept in mind that a brake-clutch is a relatively simple device. Due to the large production of brakes and clutches for automobiles and other machines, and because of the extensive use of brake-clutches on other types of machinery, the technology associated with brake-clutch devices is highly developed. As can be seen from the comments, the types of potential problems with any particular application of brake-clutches can be identified, and the technical parameters for solving these problems are also known.

A brake-clutch could be used on a walk-behind power lawn mower to stop the blade without stopping the engine as one means to comply with the standard. The brake-clutch assembly would typically be mounted between the drive shaft of the engine and the blade of the mower. A control assembly would allow the operator to control the brake-clutch while in the mowing position. While there are various types of clutches and brake-

clutch designs, the basic principles can be illustrated through a discussion of a centrifugal brake-clutch. This is the type of clutch referred to by some of the commentators.

When the engine of the mower is started, the clutch is in the disengaged position and the brake is engaged. Thus, rotation of the blade is prevented by both the clutch and the brake. When the operator assumes the mowing position and grasps the blade control device, the control releases the brake and engages the clutch, thereby allowing blade rotation to commence. Speed of blade rotation would then depend on the engine throttle setting as it does with today's mowers. When the operator releases the blade control device, the brake is engaged and stops the blade. But, because the clutch has disengaged the blade from the engine, the engine continues to run. The process would begin again when the operator regripped the blade control device. To improve safety, in one design, the brake is spring loaded, and unless the spring force is overcome by grasping the blade control device, the brake springs cause the brake to engage and the clutch to disengage. Thus, if the actuating linkage broke, the blade of the mower would be stopped.

The parties commenting on this issue agreed that the means for insuring that the blade stops must be resolved for each different model of mower equipped with a brake-clutch. The answer requires engineering analysis and testing of the total system (the engine and its controls, the brake-clutch and its controls, and the blade, including any linkages and fasteners used to interconnect or control the main components).

Some of these commentators suggested that the concept of "failing in an unsafe manner" should include failures where the blades did not continue to rotate and include mower operational characteristics such as hard starting, time between clutch engagement and achieving blade cutting speed, disengagement or slipping of the clutch while mowing, force needed to activate and hold the blade control, the frequency and cost of necessary maintenance or repair, and the knowledge needed to repair or maintain the brake-clutch. These commentators argued that presence of "safe failures" and/or undesirable operating characteristics would cause consumers to bypass the blade control and would therefore be hazardous. The Commission does not agree that the occurrence of "safe failures" or the presence of undesirable operating characteristics are at issue when one is evaluating the likelihood of an unsafe failure. They are related rather to issues which are discussed elsewhere concerning the potential effectiveness of

the standard, consumer acceptance of the brake-clutch, and the overall reliability of the brake-clutch. Therefore, this discussion will focus on the likelihood of an unsafe failure.

One brake-clutch manufacturer categorically states that the design of its unit is such that the blade will always stop. It states that individual units have been tested up to 44,254 cycles and 737 hours without failure. It further reports that testing programs have worn out engines, blades, and other components while the clutch continued to function properly. Another brake-clutch and lawn mower manufacturer states its brake-clutch is designed so that if the clutch fails, the brake stops the blade. It also points out that a feature which costs less than one dollar could be added to stop the engine in case of a brake-clutch failure. This manufacturer reports on successful brake-clutch laboratory tests with engines from two different manufacturers.

Field tests conducted in 1977 by a Federal agency (GSA), which were previously reported, were continued in 1978. The mower manufacturer reports that these brake-clutch equipped mowers continue to perform well and several thousand hours of use have accumulated with complete reliability and safety. This report is basically confirmed by a comment from the Federal agency indicating that after extensive use of these 50 mowers under the varied conditions of the field test (10 sites, light and heavy duty use), "there were no complaints about the reliability and safety" of the brake-clutch. Another manufacturer who currently produces brake-clutch-equipped mowers states that the fact that these mowers are offered for sale demonstrates their belief in their product's reliability.

A university professor and professional engineer who has taught machine design for 18 years, has been active in lawn mower safety design for ten years, and has experience testing brake-clutches on both riding and walk-behind mowers states that it is highly unlikely that a well-designed brake-clutch system will fail unsafely.

A group of commentators generally believe that eventually some brake-clutch mowers will experience failures in a way that will permit the blade to continue rotating. These same commentators also state that there are ways to design a system which will not fail in a hazardous manner but at the expense of added complexity, cost, and weight and with the addition of a feature to kill the engine should the brake-clutch fail. They express concern over internal failures of the brake-clutch mechanism, misadjustment, control cable or linkage failures, and the effect of the environment and

wear and tear on the mechanism. They predict these factors will lead to unsafe failures. Some of these commentators also provide speculative examples of potential component failures which might, in an unspecified brake-clutch system, lead to unsafe failure.

All parties agree that the likelihood of an unsafe brake-clutch failure is a direct result of the design, production, and assembly of the entire system. The brake-clutch and its components and control system must be compatible with the engine subsystem and blade.

A number of commentators state that, at least at present, such an overall system cannot be designed so that unsafe failures will either not occur or occur only rarely. These commentators, however, present little or no data to support this conclusion. Some of these concerns are due to control cable or linkage failure caused by use and exposure. However, since control cables and linkages have been used for various purposes on lawn mowers and other devices for many years, the Commission believes that manufacturers should be able to avoid this source of failure.

The Commission also notes and agrees with the comment that any failures of brake-clutch systems on specific mowers will not automatically result in an injury. Rather, even if a small number of mowers fail unsafely, the overall risk of injury will be that of the prestandard mower plus a factor for operator dependence on the brake-clutch for the failed mowers. The rest of the mowers conforming to the standard will have a low risk of injury.

Other comments and supporting data indicate that two fail-safe brake-clutch designs exist, and the manufacturers of these designs have not reported any unsafe failure during field and laboratory testing. In addition, two mowers equipped with brake-clutches are now being offered for sale, and a third manufacturer has one available.

Finally, a professional engineer believes safe and reliable brake-clutch equipped mowers can be produced. For example, a failure of the clutch to disengage when the blade control is released will not be hazardous if the brake is large enough to stall the engine in this event. Failure of the brake spring can be prevented by minimum size and quality specifications for the springs or by providing more than one spring. Engagement and longevity characteristics of the clutch and brake can be controlled by the proper selection of materials and sizing of the components.

After considering the brake-clutches that are actually in production, the

fact that brake-clutch technology is highly developed, the laboratory and field test showing that brake-clutches are reliable, and the fail-safe features that can be incorporated in the design, the Commission concludes that technology is available to design, produce, and assemble blade brake-clutch equipped lawn mowers which have a minimum likelihood of failing in an unsafe manner. While there may always be some likelihood of specific failures, the use of failsafe design principles and responsible quality control should reduce this likelihood to a minimum.

2. *Can brake-clutch systems be designed so that if they fail, they will fail in such a way that the blade does not turn?* This issue is the opposite of the likelihood of a blade brake-clutch failing in an unsafe manner which is discussed above. Some commentators state either that there are existing designs which only fail in such a way that the blade does not turn or that it is technically feasible to design and produce such systems. Other commentators express reservations that this is technically feasible. These comments were discussed under the issue of the likelihood of an unsafe blade brake-clutch failure. The Commission's conclusion is the same. After careful consideration of the conflicting comment and data, the Commission concludes that technology is available to design, produce and assemble blade brake-clutch equipped rotary lawn mowers which have a minimum likelihood of failing in an unsafe manner.

3. *What is the potential for designing a brake-clutch system that is reliable during the operating life if the mower?* A number of interested parties provided comment on this issue in response to the November 2, 1978 and November 29, 1978 FEDERAL REGISTER notices. The commentators included the lawn mower industry trade association, individual lawn mower manufacturers, brake-clutch manufacturers, lawn mower engine manufacturers, a consumer testing organization, private testing laboratories, university professors, a government agency, and private inventors. Information was also received from a large retail sales organization, a lawn mower rental organization, and other interested parties.

In responding to this issue, the industry trade association and a number of mower manufacturers indicated that analyzing the feasibility of designing reliable brake-clutch systems required defining the term "reliability" as it applies to the mower.

Neither the original commentators on the proposal nor the commentators responding to the November 2, 1978 and November 29, 1978, notices offered the Commission an adequate technical basis for defining reliability as it ap-

plies to a brake-clutch for a rotary lawn mower. However, they have offered some parameters to frame a general definition of this term. Essentially, these parameters are summarized by the industry trade association, which states that a reliable brake-clutch would have to perform at an acceptably high statistical level of reliability:

- (1) The tasks for which it was intended,
- (2) In the manner intended,
- (3) Under the actual conditions of expected use, storage, and maintenance,
- (4) For the expected life of the lawn mower.

A technical dictionary largely concurs, by defining reliability, in the engineering sense, as "the probability that a component part, equipment, or system will satisfactorily perform its intended function under given circumstances, such as environmental conditions, limitations as to operating time, and frequency and thoroughness of maintenance for a specified period of time." This definition reflects the meaning of the term reliability as used by the Commission's staff.

As these two definitions demonstrate, the term "reliability" is a reasonably well understood technical term which can be used without specifying precise levels of reliability as one could in a procurement specification or in establishing a quality control program.

One commentator states that evaluating the potential for designing a reliable brake-clutch requires defining operating life and establishing acceptable levels of reliability as they relate to operating life. He also states that this must be done with an understanding that not all mowers are, or should be, designed with the same operating life objective. Other commentators state that their company has requirements of performance and reliability, but that they nevertheless believe the Commission should reveal its expectations as to the level of reliability the Commission expects manufacturers to meet. As one commentator asks, will it be a 250 hour life cycle with periodic maintenance allowed, or a 400 hour cycle with no maintenance, or 100 percent reliability for as long as the product is used?

The Commission's technical staff has not performed nor sponsored development of test methods and procedures for laboratory or field tests designed to establish statistically valid predictions of the life of a lawn mower or of a brake-clutch equipped lawn mower. The standard does not state an operating life objective for lawn mowers nor does it state a reliability value which manufacturers must meet. Rather, the standard states the

performance the mower must achieve to comply with the standard.

As stated above, manufacturers design their mowers with different operating life objectives. A brake-clutch used on a mower would therefore be expected to provide reliable service for the operating life selected by the manufacturer. Achieving this objective is ultimately the responsibility of the manufacturer. It would not advance the safety objectives of the standard for the Commission to establish an operating life objective of the mower and therefore of the brake-clutch used on the mower. Rather, the Commission concludes from the available data and from an awareness of the state-of-the-art that it is technically feasible to design, develop, and produce a brake-clutch or other means which, when properly installed and maintained, will stop the blade in the manner required by the standard for a reasonable period of time. What is a reasonable period of time in any given case depends on the expected operating life of the other components of the mower, which is ultimately controlled by the mower manufacturer.

Three lawn mower manufacturers report that they currently manufacture mowers equipped with a brake-clutch that will comply with the final standard and which they believe is reliable. Two of these three lawn mower manufacturers state that they are willing to provide their brake-clutches to other manufacturers. One of these manufacturers has provided some data supporting the reliability of mowers equipped with their brake-clutch, including field testing data showing some mowers reliably functioning after over 370 hours of field use. At least one other lawn mower manufacturer agrees that it would be possible to develop brake-clutches for mowers.

Two brake-clutch manufacturers also claim that reliable brake-clutches are technically feasible. One believes that the laboratory and field data previously shared with the Commission and augmented by additional data submitted with these current comments confirms that their brake-clutch is reliable for the life of the mower. The other brake-clutch manufacturer believes they have "solved all the problems likely to be encountered in mower operation." Indeed, they state that their testing is hampered by engine failure occurring before brake-clutch failure. Both these manufacturers state they are capable of meeting the brake-clutch needs of the mower industry. However, one of these is planning some additional field tests to complete their effort.

Several other mower manufacturers, engine manufacturers, and an inventor questioned the feasibility of designing a reliable brake-clutch. These reserva-

tions were largely expressed in terms of cost and in terms of the difficulty of defining the life of the mower (including all environmental factors and human factors) and the difficulty of defining reliability for a specific lawn mower, for a model produced in quantity, and for all lawn mowers. Some speculated on possible ways mowers with brake-clutches might fail (safely or hazardously) because of design problems, production problems, assembly problems, post-sale maintenance or lack thereof, consumer use and abuse, and the effects of time, weather, storage, moisture, and fertilizer on the mower. Others discussed the data provided the Commission by brake-clutch manufacturers and some of the results of their own experience in testing. The consensus of this group is, essentially, that the technical feasibility of designing a reliable brake-clutch has not been statistically proven based on laboratory testing, field testing, and consumer or user testing of a very large number of mowers over a long period of time. In one case, the inference was that data would be needed on as many as 100,000 mowers over at least several years of customer use. In considering these comments, the Commission notes that very little concrete data was supplied supporting these views. To explain this lack of data, commentators indicated that:

a. Providing data on in-house testing of concepts might compromise valuable proprietary information.

b. They have not yet designed or evaluated a system they believe to be reliable.

c. They have no data on brake-clutch systems designed by others since they view that as the responsibility of the marketer of the brake-clutch. A consumer testing organization, based on a review of the available record and their own knowledge, concluded that it is possible to design and produce lawn mower brake-clutch mechanisms with a high degree of reliability. A private testing laboratory, university professors, and a government agency further supported the feasibility of brake-clutch devices.

A large retail sales organization, a rental firm, and other interested parties question whether the available data support a conclusion that reliable brake-clutches are feasible. These comments are either unsupported by data or speculative.

The Commission itself has not designed or performed reliability testing on brake-clutch equipped mowers. However, the Commission has considered all the data and opinions generated during the standard's development period, including all materials offered in response to the November 2 and 29, 1978, FEDERAL REGISTER notices. The Commission also considered the state-

of-the-art of brake-clutch usage in chainsaws, existing walk-behind rotary mowers, vehicles, and industrial applications. In addition, the Commission considered the questions concerning brake-clutch reliability raised by some commentators and the confidence expressed by other commentators that designing a reliable brake-clutch for the rotary lawn mower is technically feasible.

For the reasons given in the discussion of question 1, the Commission is persuaded that it is both technically feasible and within the state-of-the-art to design, develop, and produce a brake-clutch equipped rotary mower which, when properly assembled and maintained, will reliably stop the blade as required by the standard for a preselected period of time which the manufacturer can relate to the expected life of the mower.

4. *Would it be desirable to include a requirement in any final lawn mower standard issued by the Commission requiring that if a brake-clutch system fails in such a way that the blades continue to turn, there must be an audible or visual warning signal that the blade is still turning?* The Commission received numerous comments regarding the desirability of an audible and/or visible warning to indicate failure if a brake-clutch should fail in an unsafe mode. Some commentators found this to be a desirable feature, and others felt it to be unnecessary. Some commentators felt that resources for developing such a device would be better used to improve on present brake-clutch development. Others suggested that a more satisfactory approach would be to use an allegedly inexpensive device which would sense when an unsafe failure occurred and then stop the mower engine. Some said that an audible or visible warning would be very expensive to adopt, and others stated that it involved nominal expense.

Since the Commission believes that a reliable brake-clutch is technologically feasible and can be designed to last for the expected life of the mower, and that injuries resulting from unsafe failure would be infrequent, it would not appear necessary to require that manufacturers of reliable devices incorporate a device to warn the users in the event of unsafe failures. Also, commentators noted that other equally effective protection methods, such as engine-kill in the event of clutch-brake failure, could be incorporated at nominal expense. A requirement for warning devices, when other equally promising designs are available, does not seem to be appropriate. The Commission also agrees with those commentators who say that delaying the issuance of the major requirements of this standard for the period necessary to develop appropri-

ate requirements offering protection from such an unexpected occurrence would not be in the interest of consumers. The Commission notes that other commentors stated that the changes in air flow, noise, and vibration that occur when the blade stops provide an indication from which the user could determine if the brake-clutch device has failed.

In not requiring these warning devices, however, the Commission does not mean to imply agreement with the comments which allege that such a warning system could lead to injury if the unusual actuation of such a device created curiosity and thus invited access to the blade.

In addition to the specific questions on which comment was solicited by the Commission, comments were submitted on a number of other issues.

Commentors have raised a number of questions about the relationship between the use of a blade brake-clutch and the speed or revolutions per minute (rpm) of the rotary lawn mower engine. Gasoline engines designed for use on rotary mowers may be roughly divided into two categories based on the speed at which they operate. The high speed engines generally operate at 3000 to 3500 rpm. The low speed engines generally operate at about 2400 to 2600 rpm. The concerns of these commentors are discussed below.

1. A retail sales organization, the industry trade association, and two lawn mower manufacturers state that brake-clutches have not yet been developed to operate reliably on low speed (2600 rpm) engines. They state that low speed engines are now used to reduce noise levels and to reduce the potential for thrown object injuries. They also state that future noise regulations by the Environmental Protection Agency and power mower regulations the Commission may issue to address hazards from thrown objects may require the use of low speed engines to comply with these potential regulations. These commentors argue that the brake-clutch requires use of a high speed engine, thereby preventing them from using a low speed engine to comply with potential regulations on noise levels and thrown objects.

This concern that brake-clutches have not yet been developed to operate on low speed engines is based on tests conducted by two mower manufacturers on one centrifugal type clutch design. These tests indicated unsatisfactory operation at the lower rpm (2600). One manufacturer presented a film of tests at the December 12, 1978, oral presentations. The other manufacturer presented test results as part of the comments on the proposal. This manufacturer restated the conclusions from the previously submitted

comment at the December, 1978, oral presentation.

These concerns would only be valid if (1) centrifugal clutches were the only feasible way to meet the blade stop requirements of the standard and if (2) centrifugal clutches could not be designed to operate at low speeds.

In the first place, the centrifugal clutch is not the only type of brake-clutch that can be used to comply with the standard. There are brake-clutches which are not of the centrifugal type, such as the ramp cam clutch currently being developed for use on the rotary lawn mower. Also, one manufacturer of both brake-clutches and lawn mowers states that its centrifugal brake-clutch (1) is readily adaptable to any lawn mower design being manufactured today, (2) can handle virtually any torque and horsepower combination, and (3) can be adapted to engage at speeds as low as 300 rpm. This manufacturer states that, for this clutch, engagement speeds are scientifically determined by formulation of clutch rotors, variations in rotor geometry and the total amount of weight used.

The manufacturer of the clutches which were tested by the two mower manufacturers that furnished data to support their concern about centrifugal clutch operation on low speed engines agrees that his *standard* clutch would not give satisfactory performance on those low speed engines. However, this clutch manufacturer states that "we are confident that by working together with these lawn mower manufacturers, we can, without any great difficulty, alter our standard clutch to provide satisfactory performance on low speed engines."

The Commission notes that the two centrifugal clutch manufacturers mentioned above have furnished the vast majority of the laboratory and field test data which has been presented to the Commission during the development of the standard.

Therefore, after considering all these issues, the Commission is persuaded that, while some technical efforts may be necessary to adapt the centrifugal clutch to a low speed engine, a centrifugal clutch for such engines is technologically feasible. Moreover, it appears that other types of clutches have been used successfully with low speed engines.

2. An engine manufacturer stated at the oral presentation that the idle speed of the mower increases between 600 and 800 rpm as the internal friction of the engine decreases due to wear. The Commission surmises that the commentor's concern is that the claimed increase in idle speed due to wear will cause unplanned engagement of a centrifugal clutch.

As stated previously, centrifugal clutches are not the only way to comply with the standard. Centrifugal clutch manufacturers have stated that their clutches can be adapted to any lawn mower design being manufactured today. The data provided to date by these brake-clutch manufacturers has not revealed large changes (600-800 rpm) in engine idle speed.

Further, one of the centrifugal brake-clutch equipped rotary power lawn mowers currently being manufactured and offered for sale is equipped with a governor to regulate the speed of the engine at both idle and normal operating speeds. Therefore, it would appear that if an engine were to have large increases or decreases in idle speed as the engine breaks in and wears out, technology is available to overcome this alleged difficulty.

OPEI contends warranty costs or costs to the consumer might rise if mowers with brake-clutches had to be brought back for adjustments. One manufacturer (Honda) expressed the opinion that their brake-clutch unit would require little maintenance, and that such maintenance as would be required could be performed by many consumers. The amount of maintenance required for a blade control system may be highly dependent on the particular design of the system. Inferior design might lead to high warranty costs, but manufacturers will balance the costs of better components and quality control against warranty costs. Honda's brake-clutch mower is priced \$35 to \$40 above its conventional mower, and the Commission can only assume that all expected associated costs are included in this amount. Statements by two brake-clutch producers indicate that the devices would last as long as the mower without any maintenance required.

OPEI further states that industry in general, and small manufacturers in particular, will experience heavy costs in developing and teaching proper servicing procedures to the dealer network. This statement seems to presume that there will be a large number of brake-clutch devices or that there will be many different interactions between blade controls and power designs. The Commission does not expect a large number of brake-clutch designs to be marketed. The basis for this expectation is the small number of engine manufacturers for the walk-behind mower market. The two major engine manufacturers, Briggs and Stratton and Tecumseh, along with Lawn Boy, which manufactures its own engines, probably produce more than 95 percent of all walk-behind mower gasoline engines. The Commission expects that small mower manufacturers will rely on engine brake-clutch device combinations recom-

mended by their suppliers, and that the suppliers will provide much of the service support in order to sell their brake-clutch devices. One brake-clutch manufacturer has indicated it will provide this kind of support.

OPEI also contends that the Commission's Economic Impact Statement does not take into account price increases caused by certification costs. However, these are not expected to be significant, since the great majority of all mower manufacturers already conform to the voluntary ANSI standard. Since most of the firms have testing, recordkeeping, and labeling activities related to the ANSI standard requirements, the certification rule should have minimal additional impacts on those firms that comply with the ANSI standard. Those firms that do not comply with the ANSI standard may find the rule will have a relatively greater impact, but in absolute terms the impact should be small. The certification rule which is proposed elsewhere in this issue of the *FEDERAL REGISTER* will leave a great deal of discretion to the individual manufacturer in designing a testing program, which should enable the manufacturer to minimize certification costs.

OPEI also raises the issue of product liability costs, which it finds difficult to quantify but believes will be passed on the consumer. OPEI does not identify the source of the product liability costs. Product liability costs would appear to be a function of the reliability of the device. As discussed above, the Commission has concluded that reliable brake-clutch devices are feasible.

Furthermore, the Commission believes that certification costs and research and development are primarily fixed costs. These costs will be spread over many years of production, and the ability of the individual manufacturer to pass these costs along will be determined by competitive pressures. The costs mentioned by the OPEI were not felt to be large enough to warrant inclusion in the Commission staff's Economic Impact Statement.

Both the trade association and an engine manufacturer commented that January, 1982, is a misleading effective date, since, to fit normal production cycles, the industry would have to comply by October, 1981. The Commission is aware of the normal production cycle and discusses the factors relating to the effective date in Section F of this notice. Although the Commission believes that firms can comply with the standard by October 1, 1981, the additional time may be important to firms that encounter unforeseen difficulties.

OPEI suggests that the effective date should be October, 1983. The Commission believes this suggestion is

not warranted. The December 31, 1981 effective date of the standard will allow two full mowing seasons for testing. An October, 1983, effective date would penalize the suppliers and manufacturers who have already made substantial investments toward complying with the standard and would subject consumers to unnecessary injuries.

Many commentators addressed the question of whether a brake-clutch device would perform in the manner which would be expected. For discussion purposes, these comments can be divided into two basic categories, although in reality the two categories are interrelated.

One category involves consumer acceptance. That is, certain characteristics of a brake-clutch system could be such that consumers might be dissatisfied with the product which incorporates that system. Examples of such characteristics that were noted included controls which are difficult to hold for extended periods, slipping of the clutch while starting or mowing, repair which could be required, and required maintenance which the user might be unable to perform.

The second category relates to the potential effectiveness of a blade-control system if a brake-clutch is used on the mower to meet the requirements of the standard. These comments generally assert that the standard will not be as effective as anticipated because injuries could occur due to certain potential characteristics of a brake-clutch system. Such possible characteristics noted by the commentators are failure of the brake-clutch device, failure of individual components of the system associated with a brake-clutch, failures resulting from improper maintenance, accidental actuation of a brake-clutch, defects resulting from improper assembly, poor design, manufacturer intent, and defeat of the system by retailers or consumers.

Insofar as the characteristics noted above involve consumer acceptance as separate from safety considerations, the Commission believes that mowers incorporating a brake-clutch can be designed so that they are both reliable and acceptable to the user. Naturally, those mowers which are more convenient to use will have the advantage of greater acceptance and could enjoy a greater share of the mower market than less acceptable mowers.

As explained elsewhere in this notice, the Commission believes that controls can be designed which are not difficult to hold down during normal mowing operations.

While slipping of the clutch while mowing is viewed by some commentators as a disadvantage, this is not necessarily always a disadvantage. A brake-clutch designed to permit slipping

under heavy mowing conditions could result in increased utility. Clutches (and thus blades) have been reported to slip when mowing heavy or tall grass. Whereas the engines of presently produced mowers might stall under such conditions, the engine of a mower equipped with a brake-clutch could continue to run even though the blade stopped. The operator of such a mower would need only to raise the mower long enough for the blade to re-engage without having to restart the engine. Even though some comments report this slipping characteristic for some brake-clutch designs, the Commission does not view this as a disadvantage if the point at which slippage occurs serves to protect against stalling that could otherwise occur. It is significant that users of mowers supplied by the General Services Administration (discussed above) did not report dissatisfaction caused by clutch slipping.

Some comments also argued that excessive clutch slippage could result in failure leading to bypass or expensive repair. However, such failure can be avoided by the proper choice of design. Brake-clutch manufacturers have submitted information which they feel demonstrates that both brakes and clutches have lasted beyond the expected life of the mower. The avoidance of undesirable slipping is basically a problem in reliability. As discussed above, the Commission has concluded that reliable brake-clutches are feasible. The Commission notes that disabling the system to avoid clutch slipping would probably require more than simply tying down the blade control, since the clutch would still slip under this condition.

Several commentators claim that some expected repair and required maintenance of brake-clutches, and related systems would be outside the capabilities or inclinations of mower users. This appears to be a matter of consumer acceptance not necessarily related to the safety of the mower. One manufacturer of a presently produced mower which incorporates a brake-clutch uses a device for adjusting its mower cable controls similar to those used for periodic adjustment of the caliper brakes of a bicycle. This adjustment does not appear to be excessively burdensome or difficult, and it is assumed that the manufacturer of such a control would supply adequate instructions to the buyer. Another manufacturer of brake-clutches claims that his device does not require adjustment or other maintenance over the life of the mower. Thus, it appears that excessive maintenance need not be a problem with brake-clutches. Regarding repair, the Commission believes, as stated elsewhere in this

notice, that a brake-clutch can be designed which will be reliable for the life of the mower.

Some commentators described failures which have occurred or might occur and which could cause dissatisfaction or require repairs that could not be reasonably expected to be within the capabilities of the average user. Such noted failures involved cables breaking and failure of internal parts of the brake-clutch device. Again, such failures are preventable through proper system design and selection of components.

Regarding brake-clutch and other system failures, the Commission has determined, as discussed elsewhere, that development of a reliable brake clutch and related components is well within the capabilities of manufacturers. As noted by some commentators, no mechanical system can be expected to be completely safe from failure. Still, the likelihood of failure, and of injury when failure occurs, is expected to be small compared to the numbers of injuries which occur from presently produced mowers.

Some commentators warn that users of brake-clutch type mowers could become so accustomed to the blade stopping when the control is released that they will routinely and confidently approach the blade path when the engine is running. The manufacturers' instructions and common sense might warn against such action. However, users are currently being injured in numbers greatly exceeding what might reasonably be expected to result from unexpected brake-clutch failure. While manufacturers of mowers using brake-clutches would very legitimately be concerned about the product liability considerations of a design which fails and leads to injuries, the Commission must ultimately consider the protection of the great majority of those users whose systems do not fail in a manner or situation which results in injury. It is the Commission's considered belief that the potential for reliable brake-clutches is such that the injuries caused by presently produced mowers far outnumber any injuries which might occur from unwarranted reliance on the continued performance of safety systems which are intended to stop the mower blade.

Although the comments raised the possibility, intentional non-compliance by manufacturers or the possibility that retailers might offer system defeat as an unadvertised promotional method are not expected to be significant problems in view of the fact that the sale or offering for sale of such mowers would be a prohibited act under the CPSA.

Users might conceivably bypass a brake-clutch system for any number of reasons. However, the Commission be-

lieves this will not be a common occurrence since proper choice of design and selection of components can insure that the device is sufficiently reliable that users are not tempted to bypass it.

A number of other comments were received that were identical to comments that had been received in response to the proposal and that are outside the subject matter for which the additional comment period was provided. The Commission's staff has considered these comments but finds nothing in them that would warrant any change in the Commission's conclusion concerning these issues. The Commission's decisions on these matters are explained at the appropriate portions of the remainder of this preamble.

After considering all of the data available to it, including all the comments received, the Commission concludes that, by December 31, 1981, rotary power lawn mower manufacturers will be able to incorporate reliable and safe brake-clutch mechanisms into their products, if they choose that method of complying with the requirements of the standard.

(ii) *Effect of fertilizers and of storage on brake-clutch system.* Several commentators express the view that fertilizers on the grass may cause brake-clutch failures and that not enough is known about the effect of fertilizers on brake-clutch systems to allow mower manufacturers to use such systems. Other commentators suggest that a mower manufacturer must consider the effects of periods of storage and nonuse of mowers on the reliability of brake-clutches.

These comments are speculative at best. A manufacturer of mowers must take many things into consideration when designing a lawn mower. The effect of fertilizers and nonuse are merely two of the conditions that must be considered. Furthermore, there is no evidence in the test data submitted to the Commission that fertilizers or nonuse of a mower will have an adverse effect on brake-clutch systems if they are used in mowers. The Commission also notes that at least two mower manufacturers are currently manufacturing mowers that include a brake-clutch mechanism.

(iii) *Defeat of brake-clutch mechanisms.* One commentator has suggested that, if the brake-clutch control device is tiring to hold, consumers are just as likely to defeat a brake-clutch mechanism as they are to defeat an engine kill with manual start mechanism. Other commentators have expressed the view that it is unlikely that consumers will defeat such a system.

The Commission does not agree that consumers are as likely to defeat a brake-clutch mechanism because it is

tiring to hold as they are to defeat a blade control system that uses an engine kill system with a manual start mechanism. If the brake-clutch mechanism is tiring, all an operator need do is release the control lever for a few seconds. Further, manufacturers can be expected to be aware of the need to make operating controls, particularly frequently used ones, acceptable to the consumer. Lack of such acceptability could reasonably be expected to have an adverse effect on sales.

The 50 mowers tested by the GSA, mentioned above, were supplied to five federal agencies in various locations to provide a broad cross section of user demands. The mowers were used both by light users (those who operated the mower 2 hours or less per day) and heavy users (those who operated the mower for over 4 hours per day.) 72% of the users responded to a GSA questionnaire. Of those responding, 72% indicated that they cut the grass when it was high or very high. In regard to the performance of the brake-clutch, 66% of the light users stated the clutch was easy or very easy to use. Another 33% stated it was neither easy nor hard to use. 50% of the heavy users stated the clutch was either easy to use or neither hard nor easy. While 33% of the heavy users stated the clutch was hard to use and 17% said it was very hard to use, it must be recognized that, these persons used the mower for 4 hours or more at a time and it is questionable whether consumers mowing the grass around their house would use a walk-behind mower for that length of time. Moreover, 100% of the light users and 66% of the heavy users in the GSA tests stated that they liked the brake-clutch as a safety feature.

A second manufacturer demonstrated his brake clutch equipped mower to the Commission staff in September 1978. As part of the field demonstration, a small area covered with extremely high grass was mowed by several persons unconnected with the manufacturer. None of these users indicated any dissatisfaction with the force required to actuate the brake-clutch lever or keep it actuated.

The president of the mower industry trade association, OPEI, who is also the Chairman of the Board of Directors of a major power mower manufacturer, has stated that the problem of the blade control being too hard to hold was simply one of providing sufficient mechanical advantage in the control and should not pose any significant problem for manufacturers to solve (meeting with CPSC Chairman, October 17, 1978).

In view of existing data on brake-clutch mechanisms, the Commission is unable to conclude that mower operators are likely to defeat the brake-

clutch system because they may find it tiring. Also, the Commission has no reason to expect that during the 3 years prior to the effective date of Subpart A, the mower industry will not insure that brake-clutch control levers are easy to use if brake-clutch mechanisms are the means chosen to meet the blade stop time requirements of the standard.

(iv) *Warning of brake-clutch failure.* One commentator suggested that the commission should require mowers that incorporate a brake-clutch system to also include a device that produces an audible or visual warning if the clutch fails to disengage the blade and the blade continues to rotate when it should have stopped.

The Commission believes that manufacturers who are concerned that their brake-clutch system may fail in such a way that the mower blade is rotating when it should have stopped may wish to incorporate such a feature in their lawn mower. One mower manufacturer already incorporates in its mower a visual warning that the blade is rotating, and the Occupational Safety and Health Administration requires such a device in agricultural tractors (29 CFR 1928.57). The Commission, however, has decided not to require such a mechanism in the standard it is issuing at this time. The data available to the Commission on brake-clutch mechanisms does not include any data clearly indicating that a clutch mechanism has failed in mode where the blade is rotating when it should have stopped. The Commission believes that manufacturers have the technology to develop brake-clutch systems that will "fail safely", that is, if they fail to operate they will do so in a manner where the blade does not turn. Therefore, the Commission sees no reason to conclude that brake-clutch mechanisms will fail in a manner that would require a visual or audible warning. Further, the effectiveness of such a warning is speculative in that the consumer may not realize the meaning of a warning which occurs only in the event of an infrequent equipment failure.

On this same topic, a mower manufacturer stated that there would be 1 brake-clutch malfunction for every 1000 brake-clutch engagements, that for every 1000 brake-clutch malfunctions there would be 1 injury, and that in 10 years brake-clutch failures would therefore be associated with over 16,000 injuries per year. These figures, however, appear to be assumptions on the part of the manufacturer and not based on any data. The Commission has no reason to believe that these figures are valid, particularly since the brake-clutch data supplied to the Commission show that brake-clutches

are capable of a much lower malfunction rate.

f. *Momentary release of blade control lever.* Several commentators believe the blade stop time requirements of § 1205.5(a)(1)(iii) of the proposal provide that if the operator momentarily released the blade control system, the engine could not be immediately reactivated. The Commission did not intend this result. The Commission interprets this provision, now found at § 1205.5(a)(1)(iii) of the final standard, as not preventing the blade from immediately resuming normal operating speed if the operator reactivates the blade control. Of course, the mower must meet the blade-stop time requirements of the standard if the blade control is not reactivated.

g. *Actuation of controls.* Several commentators believe proposed § 1205.5(a)(3) is unduly restrictive because it requires the operator to actuate two separate controls, one of which must be the blade control, before blade operation may resume. The commentators suggest rewording this section to allow the operator to make two separate motions by the same actuating means.

The purpose of this requirement is to prevent the operator from unintentionally restarting the mower blade, for example by accidentally coming into contact with the blade control. This provision does not require manufacturers to install a second separate mechanical device on the mower. They may incorporate this second "control," as it was referred to in the proposal, into the blade control system if two distinct and separate actions are necessary to restart the blade. The intent of the requirement, that accidental or unwitting contact with the blade control will not restart the blade, can be achieved by using a separate device or by incorporating a double-action feature into the blade control. This requirement, which now appears in § 1201.4(a)(2), has been reworded to make it clear that this alternative is permissible.

h. *Location of controls.* One commentator disagrees with the requirement of § 1205.5(e)(1) of the proposed standard that, for lawn mowers whose blades start rotating when the power source starts, the starting controls must be in the operating control zone. The commentator states that the purpose of this provision is to place the operator in the "operator position" when the mower is started and that whatever design the manufacturer elects to use to accomplish this objective should be allowed.

From Commission injury data, it is estimated that over 2000 injuries are treated each year in hospital emergency rooms due to foot contact with the mower blade when the mower is being

started. These injuries generally occur when the operator's foot slips under the mower housing in starting the mower. These injuries should be eliminated, if the starter controls for mowers whose blades start rotating when the mower is started are located in the operator control zone, because the operator will be separated from the blade.

It should be kept in mind that, since the Commission is not including the "easy restart" criteria as part of the final standard, the only mowers that are likely to have the blade start when the power source starts are mowers with power restart, because all other mowers will have some means for disconnecting the blade from the power source. Some presently produced power restart mowers have a key start located on the engine. Since the Commission is not requiring 360° foot probing of the mower, if a person attempted to start the mower from this position (while holding the blade control), their foot could come into contact with the blade from the side of the mower. These power restart controls should be relatively easy to relocate, and the Commission believes that it is preferable (and less of a burden on the manufacturer) to insure that these controls are relocated than it would be to require foot probing of the sides of the mower. Tests performed for the Commission by NBS (NBS memorandum, September 14, 1976) show that the area on the mower engine where key starts could be located is within the area which can be reached by a person who is also contacting the blade control.

The Commission has not accepted this comment because it does not indicate what other provisions could address this hazard. The Commission does not know of any, and the comment does not define "operator position" or suggest criteria for determining that the operator would remain in it while starting the mower. In addition, starting effort and recoil should not be a problem with power restart mowers, which are the only ones to which the requirement is likely to apply. Therefore, the Commission sees no need to change this requirement. Of course, any manufacturer who does develop a design that addresses this hazard could petition the Commission to amend the requirement.

i. *Shut-off control.* Commentors stated that proposed § 1205.5(d), which required the inclusion of a shut-off control, is not necessary since all mowers produced today already contain a shut-off control.

The Commission agrees that since virtually every mower produced today has a shut-off control, this provision is not necessary. Therefore, this require-

ment is not included in the final standard.

WARNING LABEL (§ 1205.6)

A number of comments were received concerning the proposed label warning of the danger of blade contact.

The proposed standard would have required rotary mowers to have 2 labels, one near the discharge chute and another where it could be seen by the operator from the normal operating position. One comment suggested that one label should suffice. The Commission agrees that one label located as near as possible to the discharge chute should be sufficient. This area is perhaps the most likely area of the mower that the operator would intentionally approach, and the Commission believes that a label located so that it is likely to be seen by users as they approach that area would be likely to come to the attention of the operator. The Commission realizes that the blade control should protect operators who intentionally approach the discharge chute, unless the blade is still turning because they continue to hold the blade control or approach in less than three seconds. However, the Commission believes that if the label is in this location the user will be more aware of it than if it is in other locations. If the mower has no discharge chute, the label may be located in any position that is conspicuous to the operator from the normal operating position.

It was also suggested that the pointed area of the label be changed from the top of the label to the bottom. This would have the effect of having the label point toward the hazard of the discharge chute and housing edge. The Commission agrees that this is a desirable feature that should increase the effectiveness of the label by directing attention to the most hazardous area, and it is incorporated in the label requirement for the final standard.

A commentor submitted a suggested alternative label. Instead of the proposed label's showing of a hand with a red diagonal line across it, the suggested label depicts a blade-like object cutting into the forefinger of the hand. A majority of the Commission believed that the label suggested by the commentor would be more graphic and potentially more effective than the label depicted in the proposal. Accordingly, the label required by the final standard shows a blade cutting into the forefinger of the hand, instead of the proposed red line across the hand, but does not show the blood that was considered to be objectionable in the label that was recommended to the Com-

mission by Consumers Union, who did the initial development work on the standard. The cost to manufacturers to provide either the proposed label or the final label of Fig. 7 should be the same.

MISCELLANEOUS COMMENTS

a. *Applicability of NEISS data.* One commentor states that the Commission's proposed standard is based on injury data accumulated during the 1974-75 mowing seasons. It argues that "these data—which were generated while mowers complying with the new voluntary safety standard ANSI B71.1-1972, and supplements, were just coming onstream—are now unacceptable for use in the current evaluative process." The data that the Commission has received since the proposal confirms the need for the blade control requirements, and the most recent voluntary standard does not appear to contain additional provisions to protect against blade contact injuries to

the hand. The voluntary industry standard, ANSI B71.1, was first issued in 1960. The latest revision was in 1972, with supplements in 1974 and again in 1977. The provisions of that standard as they affect contact between a mower operator's hand and the rotating blade were not changed in the 1974 and 1977 versions of the standard. In fact, the voluntary standard does not directly address the hazard of the hand coming into contact with the blade. Since 1972, the voluntary standard has been modified to address foot contact injuries by the addition of requirements for a rear trailing shield strength test and a handle strength test.

The Commission has compared National Electronic Injury Surveillance System (NEISS) data for 1975 to NEISS data for 1977. The following table shows that there is no statistically significant difference in the injury data concerning the numbers or percentages of hand and foot injuries:

BODY PART INJURIES

	Hand	Foot	Other
1975.....	32,766 (49%)	14,928 (22.5%)	18,525 (28%)
1977.....	33,229 (50.6%)	13,686 (20.8%)	18,779 (28.4%)

Also, because there has been no change in the ability of voluntary standard to reduce blade contact hand injuries, there is no reason to believe that the data for later years will show a reduction in this type of injury.

Because lawn mowers that comply with the 1977 voluntary standard are just now coming "on-stream," the Commission has not been able to use injury data to establish how effective that standard might be in reducing foot contact injuries. (The additional requirements that appear most related to foot injuries are requirements for the strength of shields and handles.) However, the Commission has considered the provisions of that standard in deciding on the requirements of the mandatory standard.

It is possible that the rear shield required by the voluntary standard may meet the Commission's requirement for foot probing the rear of the mower. However, since the voluntary standard does not require a blade control, it does not specifically protect against foot injuries at the side and front of the mower. Also, the Commission considers the voluntary standard's requirements for foot probing the discharge chute to provide less protection than the Commission's mandatory requirement.

b. *Blade stop time measurement.* A few commentors state that visual ob-

servation of blade stop time allowed in the blade stop time test in proposed § 1205.5(b) is not sufficiently accurate and that a more accurate means of determining blade stop time should be used.

The Commission agrees that for enforcement purposes visual observation of blade stop time is probably inadequate since there may be slight variability among testing personnel. Therefore, in the final standard, no specific means for measuring blade stop time is required. The Commission intends to test for blade stop time through an electronic system that has an accuracy of 0.1 second with a high order of repeatability. Manufacturers, however, are not restricted as to the means they must use to measure blade stop time, as long as the blade in fact stops within 3 seconds after the blade control lever is released.

c. *Wear and tear on engines.* One comment states that, if engine kill is used as a method of meeting the standard, the increased amount of engine restarting that will occur will increase the rate of wear on the engine and will require more frequent replacement of the mower.

No data were provided by the commentor to support the comment, and the Commission is unaware of any supporting data. No comments addressing this contention were received from the lawn mower industry. More-

over, lawn mower instruction booklets accompanying lawn mowers produced today frequently recommend that the mower be turned off, for example, when the operator empties a grass catcher or the operator leaves the mower. A lawn mower presumably is designed with these instructions in mind. Accordingly, it can be concluded that the starting of mowers does not cause unreasonable wear rates. Furthermore, manufacturers are free to use means other than engine kill to comply with the blade stop requirements.

d. *Useful life of mowers.* In its preliminary economic analysis of the proposed lawn mower standard dated February, 1977, the Commission estimated consumers retain power mowers for 7 years, on the average. A mower manufacturer comments that based on a 1976 survey of previous mower ownership, a significant number of people keep mowers beyond that time, and only 22% of mowers are scrapped when they are replaced. It suggests that in view of this data it may take 20 years before all mowers are replaced with mowers that meet the standard. The manufacturer implies that no standard should be issued since it will take so long before mowers that comply with the Commission's standard saturate the marketplace.

The Commission disagrees with the implied suggestion that because it may take a number of years before mowers that meet the Commission's standard are in the marketplace, no standard should be issued. The Commission currently estimates that lawn mowers are kept an average of 8 years before they are replaced (memorandum from CPSC's Division of Economic Analysis dated September 9, 1978). Even if this time frame were longer, that would not be an adequate reason for never issuing a standard. While achieving the full potential for injury reduction or elimination would take some time, injury reduction would occur once the mowers were finally purchased by consumers. In addition, to the extent that any longer mowing life data would also apply to complying mowers, the cost attributable to the standard's requirements would be less for each year of use of the complying mower.

e. *Change in position of power mowers in CPSC Hazard Index.* A number of commentators observed that, from 1975 to 1976, power mowers moved from 3rd place on the CPSC Hazard Index to 17th place. They contend that this indicates the voluntary standard has been effective in making power mowers safer.

The Hazard Index is a numerical ranking of products based solely upon NEISS injury frequency and severity surveillance data, adjusted to give greater weight to injuries to children

under 15 years of age. It was originally developed as a management tool to generate a list of potentially hazardous products for further study. However there is a tendency for the public to use the index for purposes for which it was not designed. A change in the ranking of a given product category from one year to another may be the result of a real difference in the estimated number and/or severity of injuries for a product category, either for the total population or for the population less than 15 years old. But it could also be due to random variation in the injury frequency and severity associated with a product category. In particular, it could be caused by the weighing procedure used in the computation of the Age-adjusted Frequency Severity Index (AFSI) value.

From 1975 to 1976, the NEISS estimate for the number of power mower injuries (from all types of mowers) treated in hospital emergency rooms decreased from 63,306 to 56,681 injuries. The Commission does not believe this change is statistically significant, since it is well within one standard error of the estimate and, therefore, within the range of a chance variation in the data.

In order to determine some of the characteristics of the computation of the AFSI which may have contributed to the change in ranking for power mowers reflected in the Hazard Index, the Commission conducted an analysis of the power mower data. In order to compute the AFSI, injuries of a particular diagnosis, body part, and case disposition are assigned a severity value. This severity value, which is based upon the judgment of a panel of medical personnel, can be one of eight incremental values. These values increase exponentially, each value being double the value below it. After being assigned an initial severity value, the severity value of an injury may then be increased $2\frac{1}{2}$ times if the victim is less than 15 years old. This results in a possible severity value ranging from 10 to 6290. This value is then multiplied by the statistical weight of the particular NEISS hospital in which the injury was treated. NEISS hospital weights range from 2 to 500. This increases the range of possible severity values to 20 to 3,145,000. These attributes of computing the AFSI may result in exaggerated movement of products on the Hazard Index from one fiscal year to the next. After an exhaustive examination of power mower data, it was found that chance variations of injuries in the highest severity groups were the primary reasons for the drop of power mowers in the Hazard Index from 1975 to 1976. In 1975, the average hospital weight for these injuries was 50.2. In 1976, the average hospital weight was 17.4.

Averages for all product categories in these severity categories for those years were 27.9 and 26.1, respectively.

This explains the apparently dramatic shift of power mowers in the Hazard Index. It should be noted that for 1977, power mowers moved to 6th place in the CPSC Hazard Index with an estimated 67,070 injuries treated in emergency rooms (for all types of mowers). This would seem to reflect a more moderate distribution of hospital weights among severity categories.

f. *Shock device.* A comment suggested that instead of the blade control requirements, the Commission should allow the use of a device that would apply an electric shock to persons who reached under the mower or into the discharge chute. After considering this comment, the Commission concludes that it is not feasible. First, no apparatus capable of achieving this result has been suggested so that the Commission could more specifically evaluate all aspects of the idea. Generally, the Commission believes that it is preferable to have protective safety requirements rather than punitive ones. In this case, there is no established level for the intensity of the shock that would be required to deter the user without subjecting the user to a risk of injury associated with the shock itself. Also the effect of wet ground or possible malfunctions that could increase the intensity of the shock cannot be predicted. For these reasons, the Commission believes that such a requirement would not be as effective or reliable as the blade control requirements that are included in the final standard.

g. *Key requirement.* One commentator questions why a particular requirement which was recommended by the offeror was not included in the proposed standard. This requirement was essentially that a lock and key system must be incorporated in the mower design in order to prevent unauthorized use of the mower. The Commission is aware that some present mowers incorporate such a design and recognizes that this design can prevent unauthorized use. However, the Commission does not know of any significant injury pattern caused by unauthorized use of unlocked mowers. Although the Commission can appreciate the possibility that an unauthorized child may occasionally start a mower, the Commission has no data showing that this risk is sufficient to warrant a mandatory requirement.

h. *Economic effects of the standard.* The Commission received a number of comments on the economic effects of the proposed standard. The findings of the Commission's staff concerning the economic aspects of the final standard are contained in the CPSC report, *Economic Impact of Blade*

Contact Requirements for Power Mowers, January 1979. This report is a revision and updating of an earlier staff report that was referenced in the proposal, and the conclusions of the earlier report relevant to the blade contact requirements have not significantly changed.

1. *Cost and price effects.* The changes in manufacturing costs and retail prices that are expected to accompany the power mower rule evoked a number of specific comments. The mower industry trade association expressed the view that consumers, when given the choice, will not pay a premium for safety, implying that the price changes expected to accompany the rules would not be acceptable to consumers. This sentiment was expressed by other commentators who said that the expected price increases due to the standard were excessive.

The American Rental Association (ARA), a national trade association of rental firms, said that, since the price increases will fall more heavily on the lower priced mowers, the standard imposes the greatest financial hardship on those consumers who can least afford it.

The Commission estimates that the average retail price increase caused by compliance with the requirements of the standard would be about 24 percent.

In general, the expected price increases estimated by Stanford Research Institute (SRI) for the mower industry trade association are not significantly different from the estimates made by the Commission. The issues of increased costs and prices are therefore not centered on how much the expected increase might be, but rather on whether the increase is accompanied by corresponding safety value and, secondly, on the issue of whether the proposal impacts relatively more adversely on lower income groups.

The legislative history of the CPSA indicates that unreasonable risk of injury is to be determined by balancing the nature and degree of the risk against a rule's effect on the product's utility, cost, and availability to the consumer. (H.R. Rep. No. 1153, 92nd Cong., 2nd Sess. 33 (1972).) Section 9(c) of the act, furthermore, requires the Commission to make certain findings for inclusion in consumer product safety rules, including findings concerning the nature and degree of the risk of injury, the need of the public for the products subject to the rule and the rule's effect upon the utility, cost, and availability of such products, and any means of achieving the objective of the rule while minimizing adverse effects on competition or disruption of manufacturing and other commercial practices.

As a matter of policy, the Commission considers the costs and benefits before issuing regulations under the acts it administers. The Commission also considers on a preliminary basis the costs and benefits of its actions in setting project and program priorities. (See—Commission Policy on Establishing Priorities for Commission Action, 16 CFR 1009.8).

With this background in mind, the Commission questions the utility of quantitative cost-benefit analysis in the health and safety area. While it is desirable that benefits exceed costs, it is not always necessary or possible to show that they do through the calculation of a precise numerical ratio. Although it is often helpful to do cost benefit analysis, it is simply too crude an instrument at its present state of development in the fields of health and safety for a ratio of less than one to be a necessary condition for regulation. As stated in the legislative history of the Consumer Product Safety Act, "[t]here should be no implication . . . that the Commission would be required to conduct and complete a cost-benefit analysis prior to promulgating standards . . ." (H.R. Rep. No. 1153, 92nd Cong., 2nd Sess. 33 (1972)).

It is difficult to assign monetary values to human suffering in a meaningful way for regulatory purposes. The issues involved in issuing health and safety regulations are likely to require judgments based on values rather than numerical weights. Therefore, while quantified cost-benefit analyses are sometimes used as a decisional tool, the Commission bases its decision to issue consumer product safety rules on a non-numerical balancing of the benefits and costs. However, the following discussion is included to address (1) the comments that contend the standard's benefits will not justify its costs and (2) the Council on Wage and Price Stability's comment that only "those segments of the CU standard which can be shown to have benefits larger than costs should be implemented."

Retail prices of walk-behind mowers are expected to rise an average of \$35 due to the regulations. Since the average life of a mower is estimated to be about eight years, a complying mower will cost about \$4.40 more per year. The Commission estimates the cost of blade contact injuries associated with walk-behind mowers at \$253 million per year, exclusive of pain and suffering. Since there are about 77,000 such injuries occurring each year, each injury results in average costs of about \$3,300. Since there are 40 million mowers in use by consumers, there is a 1 in 520 chance of incurring an injury that will cost about \$3,300, exclusive of pain and suffering. The expected value of the injury cost associated

with each mower is thus about \$6.35 per year. If the standard is effective in eliminating 77 percent of the injuries that account for 83 percent of injury costs (CPSC estimates, see Appendix of *Economic Impact of Blade Contact Requirements for Power Mowers*, January, 1979), then each year, for an average of \$4.40 additional cost per mower, a savings of about \$5.30 can be expected. If we include a factor for pain and suffering, the savings would be much greater. The above analysis demonstrates that the additional price increases that may accompany the standard are more than justified in terms of safety.

In its August, 1977, comments, the Council on Wage and Price Stability states that, "Both the CPSC and the SRI cost estimates neglect two important aspects of costs:—first, since the increase in mower prices would result in a decline in sales, a cost would be incurred by those individuals who would have purchased mowers at the lower prices . . ." and—"Secondly, both the SRI and the CPSC analyses mention, but do not address, the possibility of decreased mower utility which would result from the standard."

The first point that the Council attempts to make is not valid because a consumer will not be faced with the decision to purchase the same product at a higher price. Due to the standard, mowers will incorporate safety features. Although the Council states that consumer demand will decline due to the standard, demand may increase under certain conditions. If consumers perceive power mowers to be safer due to the standard, the demand for mowers, as reflected in the willingness of some consumers to pay more for safety, may increase enough to offset any reduction in demand caused by any price increase.

The second cost estimate that the Council claims the Commission neglected is that of "the possibility of decreased mower utility which would result from the standard." An estimate of the cost of lost utility was not made because such losses were not considered to be significant. It has been stated that if blade controls were not accompanied by brake-clutch devices or easy restart devices as specified in the proposal, cutting time might be increased because of the time required to restart the mower on numerous occasions during each cutting session. However, since the final standard does not permit the blade stopping by engine kill if only manual restart is available, any increase in cutting time should be insignificant.

The Commission's analysis of the expected economic impact of the blade contact provisions is intended to identify all the adverse economic effects that could be caused by the standard.

All of these adverse impacts may not be applicable to any one manufacturer, and manufacturers may develop solutions to the performance criteria of the standard that are cheaper than those that are presently foreseen. Even now, mowers that appear to meet the blade contact requirements are becoming available in the marketplace. It is likely that the costs of compliance will decline as economies of scale are achieved in the production of safety-related components and as manufacturers gain experience with the standard. A more detailed discussion of the costs associated with the various provisions of the standard is given under the section of this notice concerned with the findings required by section 9(c) of the CPSA ("STATUTORY FINDINGS") and in the Commission staff's Economic Impact Statement.

The ARA claims that since the proposed standard would result in the greatest price increases among the lowest price mowers, the standard imposes the greatest financial hardship on those consumers who can least afford it. Although this may be true in some cases, it is not as significant an objection to the proposals as price considerations alone might suggest.

Generally speaking, it will cost more to bring mowers that currently sell for relatively low prices into compliance with the standard than it will for mowers that currently sell for higher prices. This is because more features on these lower priced mowers will have to be changed in order for the mowers to comply. The reason for this is thought to be that low priced mowers are often produced by small firms that do not have the engineering expertise that may be available to large firms. In addition, the firms may be unwilling to incur the costs of instituting safety-related changes in a competitive price market. However, to the extent that the standard is cost effective in relation to costs of injury, it would be to the purchaser's economic advantage, on the average and at any income level, to purchase a safer mower.

The ARA claims that the Commission understates the total cost of the proposals because it "fails to adequately represent the full consumer cost and fully ignores manufacturing and societal costs." This claim is erroneous. If anything, the costs to the consumer may be overstated since competitive forces may lead to lower retail price increases than those estimated by the Commission. In addition, not all the adverse effects identified by the Commission may be applicable to a particular manufacturer. The Commission's estimates of price increases for mowers assume that the manufacturer and the distributor will set their

prices using their customary markups over costs for the safety features required by the standard.

The claim that manufacturing costs were ignored is also incorrect. The Commission's preliminary economic assessment discussed the effects of the different requirements on manufacturing costs. Manufacturing costs were the prime consideration behind the expected change in prices. The Commission's final report on the economic impact of the blade contact requirements confirms its earlier preliminary assessment.

Societal costs were also considered. Although costs such as effects on small businesses, changes in employment, effects on customary business practices, changes in competition, and the like are hard to express in monetary terms, they have been brought to the attention of the Commission in staff studies of the economic impact of the regulation and are discussed above in the section relating to the findings required by section 9(c) of the CPSA ("STATUTORY FINDINGS").

2. *Small firm considerations.* The impact of the proposed standard on smaller manufacturers was addressed by seven commentors. Most of the comments stated that small firms with less volume over which to spread the increased capital costs would be at a cost, and therefore price, disadvantage and perhaps be forced out of business. Some of the commentors indicated that needed capital would be difficult for many smaller firms to acquire. Some said that the exit of small firms would result in greater concentration of the industry among the larger manufacturers.

The most important factor that will determine how much costs will change is how many changes to current production are necessary to comply with the requirements of the standard. The degree of deviation from compliance is not necessarily related to the size of the firm involved. Although some small firms may be at a disadvantage because their output is not in compliance, it is also true that those small firms producing a mower close to compliance will have a relative advantage. Similarly, a larger firm with many models out of compliance will have a burden that small firms with few models may not have.

Acquisition of capital to redesign products to comply with the standard may not be relatively more difficult for smaller firms. The financial condition of a firm will be affected by many factors. A firm that is in financial difficulties may find that the standard adds to those difficulties, regardless of size. Exit of small firms from the industry is not expected to occur on a scale that will significantly affect industry concentration.

3. *Inflationary impact.* In a series of related comments, the Council of Wage and Price Stability (CWPS) expressed concern about the alleged inflationary impact of a power lawn mower safety standard. (See: (1) CWPS comments on CU's recommended standard (CWPS-91; October 14, 1975); (2) CWPS comments on the proposed standard; August 12, 1977; and (3) CWPS comments on CPSC's Policy on Establishing Priorities (CWPS-178; August 17, 1976).)

Although the Council's comments of October, 1975, and August, 1976, are not directly applicable to the May 1977, proposal, they provide some insight into the assumptions upon which the August, 1977, comments are based. The comments on the CU recommended standard review the CU economic analysis that accompanied the CU standard and also review an economic analysis of the CU standard that was prepared by Stanford Research Institute (SRI), for the Outdoor Power Equipment Institute (OPEI).

Many of the comments submitted by CWPS concerning the standard's potential for inflationary impact relate to technical economic concepts. Their arguments have been fully answered by the Commission's staff (memorandum dated February 13, 1978; Review of Comments to the Proposed Lower Lawn Mower Regulations). Basically, the Commission believes that the increased cost of complying mowers, which is estimated to be \$4.40 per year over the expected life of the mower, will have no significant effect on the general price level. As explained above in Section E of this preamble ("STATUTORY FINDINGS"), the anticipated costs of the standard are reasonable in relation to, the expected benefits. It should be kept in mind that although the standard can be expected to increase the price of mowers, consumers will not be paying the higher price for the same mower as before. The mowers that comply with the standard will incorporate safety features that were not previously provided, and the increased value received should more than offset the increase in price.

G. APPLICATION OF THE STANDARD TO RENTAL MOWERS

Under the Consumer Product Safety Act, it is unlawful for any person to distribute in commerce or offer for sale any product which does not conform with an applicable consumer product safety standard. In view of the definitions of "to distribute in commerce" and "commerce" in section 3(a)(11) and 3(a)(12) of the act, the Commission considers that each time a consumer product is rented, the product is distributed in commerce. Therefore, a rental firm that rents a consumer product manufactured after the

effective date of an applicable consumer product safety standard would commit an unlawful act if the product did not comply with the standard.

The Commission realizes, however, that it may be impractical from an economic standpoint to require that rental mowers be tested for compliance with all the requirements of the standard throughout the entire rental life of the mower. It may be that the economic burden on rental firms to frequently test their rental mowers to ensure that they still comply would be unreasonable in relation to the safety benefits to be obtained. In the first place, only a small portion of the total lawn mower production is used for rental purposes. In addition, there is no evidence available to the Commission that the safety-related characteristics of either rental or consumer-owned mowers are likely to deteriorate over time. (When the mowers are sold to the rental firm, they must comply with the standard.)

Another question applicable to rental mowers is the extent to which the rental firm should be responsible for insuring that the mower complies with Part 1205 at the time the mower is sold by the firm.

Since the standard only applies to walk-behind mowers that are manufactured after the effective date of the standard (December 31, 1981), the rentals and sales of old rental mowers that may be affected by the standard will not occur for nearly 3 years. Accordingly, the Commission intends to propose at a later time for public comment an amendment to the standard concerning the applicability of the standard to rental transactions and to the sale of used rental mowers. After considering any comments that are received on the proposed policy, the Commission will issue a final rule concerning rentals and sales of rental mowers. This would be issued a sufficient time before the effective date of the standard that rental firms would have adequate time to institute whatever procedures might be appropriate for their degree of responsibility under the standard. In the meantime, the standard being issued at this time will not apply to rental transactions or to the resale of used rental mowers by rental firms.

H. PRODUCT CERTIFICATION AND TESTING

Section 14(a) of the CPSA requires every manufacturer and private labeler of a product which is subject to a consumer product safety standard to issue a certificate which shall certify that the product conforms to all applicable consumer product safety standards, shall specify any standard that is applicable, shall state the name of the manufacturer or private labeler issu-

ing the certificate, and shall include the date and place of manufacture. The certificate is required to accompany the product or be otherwise furnished to any distributor or retailer to whom the product is delivered.

Section 14(a) also requires that the certification that the product conforms to all applicable consumer product safety standards must be based on a test of each product or upon a reasonable testing program. Section 14(b) of the CPSA provides that the Commission may issue rules that require a specified reasonable testing program. In the case of the safety standard for walk-behind rotary power lawn mowers, however, the Commission has considered the need for requiring a specific testing program and has concluded that it is unnecessary. Power lawn mowers are a precision device, and the manufacturers' normal quality control procedures should be sufficient to determine that the products that are being manufactured at any particular time comply with the standard. Even for the potentially variable characteristic of blade stopping time, the manufacturers can be expected to continue to test their production periodically to determine that their products will not be subject to recall by the Commission for violations of the standard.

Section 14(c) of the CPSA authorizes the Commission to issue rules requiring the product to bear a label containing information similar to that required to be on the certificate. In addition, section 16 of the CPSA authorizes the Commission to issue rules requiring manufacturers, private labelers, and distributors of consumer products to establish and maintain records reasonably required to determine compliance with rules or orders prescribed under the CPSA.

Elsewhere in this issue of the FEDERAL REGISTER, the Commission is proposing a rule that will require walk-behind rotary power lawn mowers to bear a label for certification purposes containing the following:

1. The statement "Meets CPSC blade safety requirements for walk-behind rotary power mowers."
2. Model identification (except when model identification appears elsewhere on the mower).
3. The name of the person or firm issuing the certificate.
4. The location where the product was principally assembled.
5. The month and year the product was manufactured.

The proposed rule will also require manufacturers and private labelers of walk-behind rotary power lawn mowers to maintain records sufficient to show that their certification is based on a reasonable testing program or on a test of each product.

An explanation of the need for these requirements is contained in the preamble of the proposed labeling and recordkeeping rule.

I. DATE OF PROMULGATION

Section 11 of the CPSA (15 U.S.C. 2060) indicates that petitions for judicial review of consumer product safety rules must be filed within 60 days of the date the rule is "promulgated". The courts have indicated that agencies have considerable discretion in determining the manner in which their rules or actions are "promulgated". *Industrial Union Dept., AFL-CIO v. Bingham*, 570 F. 2d 965 (D.C. Cir. 1977). In the absence of any indication by the agency of a particular time for promulgation, however, a rule could be considered to be promulgated when it is voted on by the Commission in a public meeting or when the FEDERAL REGISTER notice announcing the rule is signed by the Commission's Secretary. Since there can be certain perceived advantages in being the first party to file for judicial review of a standard, it sometimes happens that there is a "race to the courthouse" to file petitions for review as soon as possible after a standard is issued by the agency.

The Commission believes that a better procedure to give the maximum amount of guidance possible to the courts and interested persons is for the Commission to designate a time of promulgation that is at a time after all parties have had an opportunity to review the text of the FEDERAL REGISTER notice that issues the standard. This procedure would provide all interested persons—including those that might not be located in Washington or be able to afford to send a representative to Washington—an equal opportunity to review the final standard as published in the FEDERAL REGISTER and then determine in an orderly fashion whether to seek judicial review. For this reason, the Commission specifically announced at its January 25, 1979, meeting that the standard would be "promulgated" on the tenth day after it is published in the FEDERAL REGISTER.

Despite the Commission's announcement of the promulgation date, however, 2 petitions for review were filed immediately after the Commission vote on the standard on January 25, 1979. (*Hayward v. CPSC*, D.C. Cir. No. 79-1100; *Southland Mower co., et al. v. CPSC*, 5th Cir. Civil Action 79-1203). The Commission believes that these petitions were not filed within the period of time provided by the statute governing such petitions. Accordingly, for the policy reasons stated above, and because some parties may have delayed filing petitions in reliance on the Commission's statement that pro-

mulgation would not take place until 10 days after publication, the Commission intends to oppose as untimely any petitions for review that are filed prior to noon EST on the tenth day after publication of the final standard in the FEDERAL REGISTER. The Commission believes that the decision on which forum considers review of the Commission's action is more appropriately based on the convenience of the parties and the orderly administration of justice under applicable legal standards than on an unseemly "race to the courthouse."

For the reasons given above, the Commission designates the time of promulgation of Part 1205 as 12:00 noon, Eastern Standard Time, on February 26, 1979.

Section 9(a)(1) of the Consumer Product Safety Act (15 U.S.C. 2058(a)(1)) requires that within 60 days after the publication of a proposed consumer product safety rule, the Commission shall either (1) promulgate a rule respecting the risk of injury associated with such product or (2) withdraw the applicable notice of proceeding, unless the Commission extends the 60-day period for good cause and publishes its reasons in the FEDERAL REGISTER. In the power mower proceeding, the Commission has previously extended the time for either issuing a final standard or withdrawing the proposal to February 15, 1979, for requirements addressing blade contact with walk-behind mowers, and to December 31, 1979, for other risks of injury addressed by the proposed standard, such as those for thrown objects and for riding mowers (May 5, 1977, 42 FR 23052; October 7, 1977, 42 FR 54573; June 7, 1978; 43 FR 24097; 43 FR 60955, December 29, 1978).

For the reasons stated above, the Commission finds that good cause exists for extending, and hereby extends, the promulgation date of the blade contact standard until February 26, 1979. The period ending December 31, 1979, for other requirements of the proposal is not affected by this extension. However, the Commission may in the future, for good cause shown, extend either of these periods as appropriate.

J. ENVIRONMENTAL IMPACT

At the time of the proposal, the Commission determined that there were no significant potentially adverse environmental effects associated with the proposed standard. No comments were received disputing this conclusion, and the Commission reaffirms its preliminary determination with respect to the final standard. Accordingly, it is not necessary to prepare either a draft or a final environmental impact statement.

K. CONCLUSION

Therefore, having considered the comments on the proposal and the other data available to it, and having made the findings required by sections 9 and 27 of the Consumer Product Safety Act, the Commission concludes that the requirements of Part 1205 set forth below are reasonably necessary to reduce an unreasonable risk of injury from contact with the blades of walk-behind power lawn mowers and that, as far as is feasible, the requirements are expressed in terms of performance requirements. Accordingly, the Commission has decided to issue Part 1205 as a consumer product safety standard, combined with a section 27(e) rule for labeling.

Therefore, the Consumer Product Safety Commission amends Title 16, Chapter II, Subchapter B, of the Code of Federal Regulations by promulgating, at 12:00 noon, Eastern Standard Time, on February 26, 1979, a new Part 1205 Subpart A, reading as follows:

PART 1205—SAFETY STANDARD FOR WALK-BEHIND POWER LAWN MOWERS

Subpart A—The Standard

Sec.

- 1205.1 Scope of the standard.
- 1205.2 Effective date.
- 1205.3 Definitions.
- 1205.4 Walk-behind rotary power mower protective shields.
- 1205.5 Walk-behind rotary power mower controls.
- 1205.6 Warning labels for reel-type and rotary power mowers.
- 1205.7 Prohibited stockpiling.
- 1205.8 Findings.

AUTHORITY: Secs. 2, 3, 7, 9, 14, 19, 27, Pub. L. 92-573, 86 Stat. 1207, 1208, 1212-1217, 1220, 1224, 1228; 15 U.S.C. 2051, 2052, 2056, 2058, 2063, 2068, 2076.

Subpart A—The Standard

§ 1205.1 Scope of the standard.

(a) *General.* This Subpart A of Part 1205 is a consumer product safety standard which prescribes safety requirements for certain walk-behind power lawn mowers, including labeling and performance requirements. The performance requirements of the standard apply to rotary mowers. The labeling requirements apply to both rotary and reel-type mowers. The standard is intended to reduce the risk of injury to consumers caused by contact, primarily of the foot and hand, with the rotating blade of the mower. A detailed discussion of the risk of injury and of the anticipated costs, benefits, and other factors associated with the standard is contained in § 1205.8 *Findings*.

(b) *Scope.* (1) Except as provided in paragraph (c) of this section, all walk-behind rotary and reel-type power lawn mowers manufactured or imported on or after the effective date of the standard are subject to the requirements of this standard if they are "consumer products". "Walk behind power lawn mower" is defined as a grass cutting machine with a minimum cutting width of 12 in (305 mm) that employs an engine or motor as a power source. Section 3(a)(1) of the Consumer Product Safety Act ("CPSA"), 15 U.S.C. 2052(a)(1), defines the term "consumer product" as an "article, or component part thereof, produced or distributed (i) for sale to a consumer for use in or around a permanent or temporary household or residence, a school, in recreation, or otherwise, or (ii) for the personal use, consumption or enjoyment of a consumer in or around a permanent or temporary household or residence, a school, in recreation, or otherwise." The term does not include products that are not customarily produced or distributed for sale to, or for the use or consumption by, or enjoyment of, a consumer.

(2) It is unlawful to manufacture for sale, offer for sale, distribute in commerce, or import into the United States any product subject to this standard that is not in conformity with the standard. The Commission is not applying the standard to rental transactions or to the ultimate sale of used rental mowers by rental firms.

(c) *Exclusions*—(1) *General.* Mowers that have all three of the following characteristics are not covered by the standard:

- (i) A cutting width of 30 in (762 mm) or greater,
- (ii) A weight of 200 lb (90.7 kg) or more, and
- (iii) For engine-powered mowers, an engine of 8 horsepower (6 kw) or more.

(2) *Reel-type mowers.* Reel-type power lawn mowers need not meet the performance requirements of the standard but they must be labeled as required by § 1205.6.

§ 1205.2 Effective date.

This standard applies to all rotary walk behind power lawn mowers manufactured after December 31, 1981, except § 1205.6 *Warning labels*, applies to rotary and reel-type walk-behind power lawn mowers manufactured after December 31, 1979.

§ 1205.3 Definitions.

(a) As used in this Part 1205:

- (1) "Blade" means any rigid or semi-rigid device or means that is intended to cut grass during mowing operations and includes all blades of a multi-bladed mower.

(2) "Blade tip circle" means the path described by the outermost point of the blade as it moves about its axis.

(3) "Crack" means a visible external fissure in a solid body caused by tensile, compressive, or shear forces.

(4) "Cutting width" means the blade tip circle diameter or, for a multi-bladed mower, the width, measured perpendicular to the forward direction, of a composite of all blade tip circles.

(5) "Deform" means any visible alteration of shape or dimension of a body caused by stresses induced by external forces.

(6) "Engine" means a power producing device which converts thermal energy from a fuel into mechanical energy.

(7) "Manual starting" means starting the mower engine with power obtained from the physical efforts of the operator.

(8) "Maximum operating speed" means the maximum revolutions per minute (rpm) obtainable by the engine or motor under the conditions of the particular test where the term is used. For an electrically powered mower, it is the speed attained when the mower is energized from a 60 Hz alternating current source that delivers a voltage no greater than 120 V and no less than 115 V at the power input to the mower, with the mower running. For a battery-powered mower, it is the speed attained after the battery has been fully charged in accordance with the mower manufacturer's instructions.

(9) "Motor" means a power producing device that converts electrical energy into mechanical energy.

(10) "Normal starting means" is the primary mechanism intended to be actuated by the operator to start a mower's engine or motor (e.g., the cord mechanism of a manual start engine, the switch of an electric motor, or a power start mechanism).

(11) "Operating control zone" means the space enclosed by a cylinder with a radius of 15 in (381 mm) having a horizontal axis that is (1) perpendicular to the fore-aft centerline of the mower and (2) tangent to the rearmost part of the mower handle, extending 4 in (102 mm) beyond the outermost portion of each side of the handle (See Fig. 1).

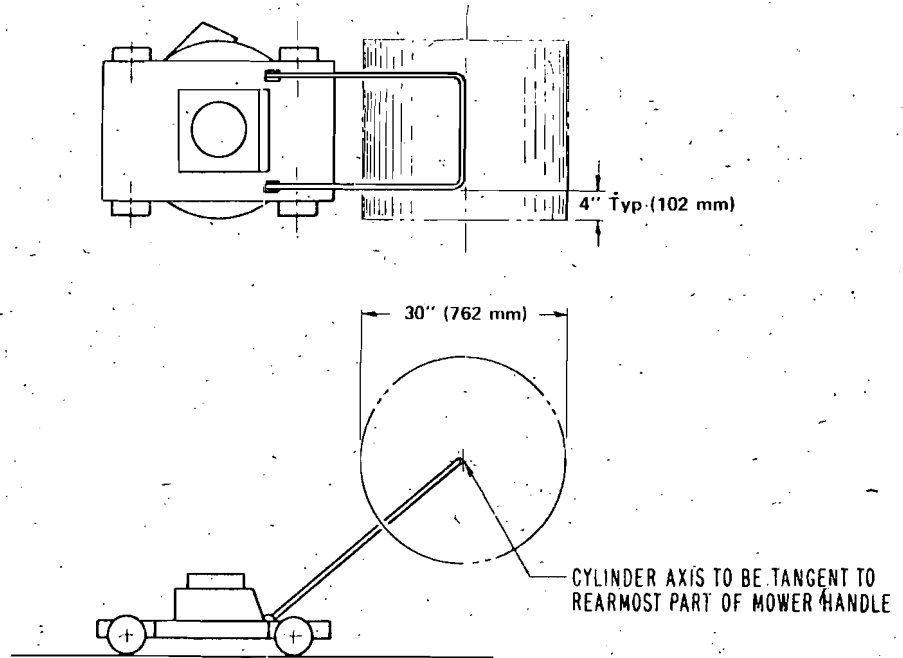


FIGURE 1 - OPERATING CONTROL ZONE

(12) "Power source" means an engine or motor.

(13) Reel-type mower means a lawn mower which cuts grass by rotating one or more helically formed blades about a horizontal axis to provide a shearing action with a stationary cutter bar or bed knife.

(14) "Rotary mower" means a power lawn mower in which one or more cutting blades rotate in essentially a horizontal plane about at least one vertical axis.

(15) "Separate" means to cause to have any apparent relative displacement induced by external forces.

(16) "Shield" means a part or an assembly which restricts access to a hazardous area. For the purposes of this Part 1205, the blade housing is considered a shield.

(17) "Stress" means a force acting across a unit area in a solid material in resisting separation, compacting, or sliding that tends to be induced by external forces.

(18) "Walk-behind power lawn mower" means a grass cutting machine either pushed or self-propelled, with a minimum cutting width of 12 in (305 mm) that employs an engine or a motor as a power source and is normally controlled by an operator walking behind the mower.

(b) Where applicable, the definitions in section 3 of the Consumer Product Safety Act (15 U.S.C. 2052) apply to this Part 1205.

§ 1205.4 Walk-behind rotary power mower protective shields.

(a) *General requirements.* Walk-behind rotary power mowers shall meet the following requirements:

(1) When the foot probe of Fig. 2 is inserted under any point within the areas to be probed during the foot probe test of paragraph (b)(1) of this section, the shields shall prevent the foot probe from entering the path of the blade or causing any part of the mower to enter the path of the blade.

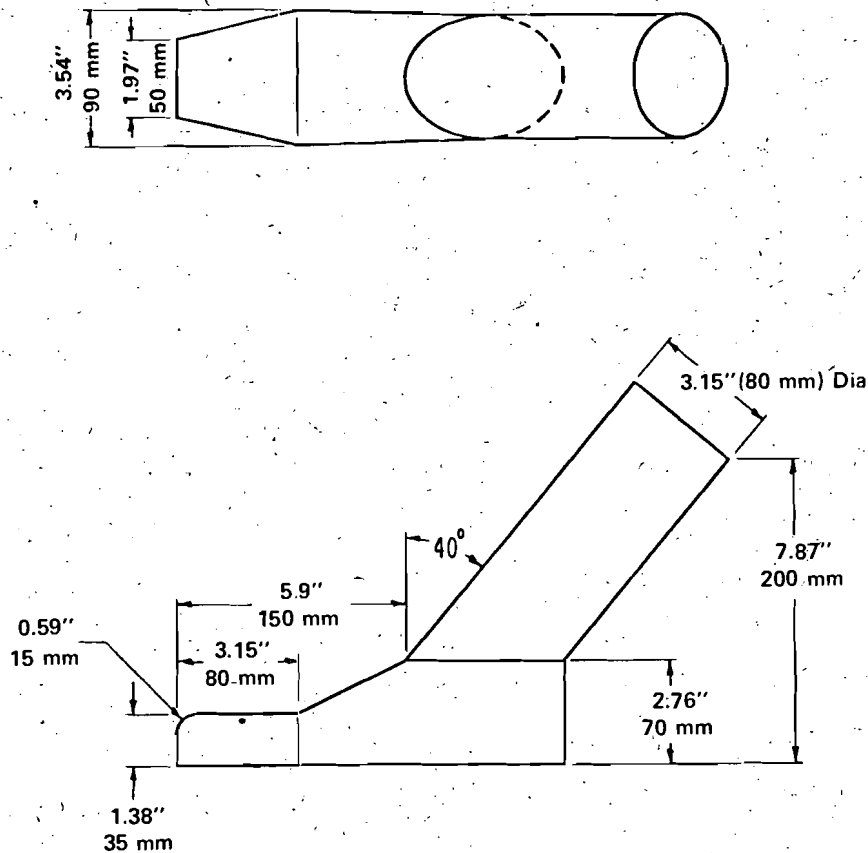


FIGURE 2 — FOOT PROBE

(2) Any shield located totally or partly within the areas to be probed, as defined in paragraph (b)(1)(ii) of this section, shall not permanently separate, crack, or deform when the shield is subjected to a 50 lb (222 N) static tensile force, uniformly distributed over not less than half the length of the shield. The force shall be applied for at least 10 seconds in the direction which produces the maximum stress on the shield. While being tested, a shield shall be attached to the mower in the manner in which it is intended to be used. (This requirement does not apply to the housing.)

(3) During the obstruction test of paragraph (b)(2) of this section, shields shall not (i) stop the mower as a result of contact with the raised obstacle, (ii) enter the path of the blade, or (iii) cause more than one wheel at a time to be lifted from the fixture surface.

(b) *Shield tests—general*—(1) *Foot probe test.* (i) The following test conditions shall be observed:

(A) The test shall be performed on a smooth level surface.

(B) Pneumatic tires, when present, shall be inflated to the cold pressures recommended by the mower manufacturer.

(C) The mower housing shall be adjusted to its highest setting relative to the ground.

(D) The blade shall be adjusted to its lowest position relative to the blade housing.

(E) The mower shall be secured so that the mower may not move horizontally but is free to move vertically.

(ii) *Areas to be probed.* (A) The minimum area to be probed shall include any discharge opening and an area both 60 degrees to the right and 60 degrees to the left of the rear of the fore-aft centerline of the cutting width. For single-blade mowers, these angles shall be measured from a point on this fore-aft centerline which is at the center of the blade tip circle (see Fig. 3). For multi-blade mowers, these angles shall be measured from a point on the fore-aft centerline of the cutting width which is one half of the cutting width forward of the rearmost point of the composite of all the blade tip circles (See Fig. 4).

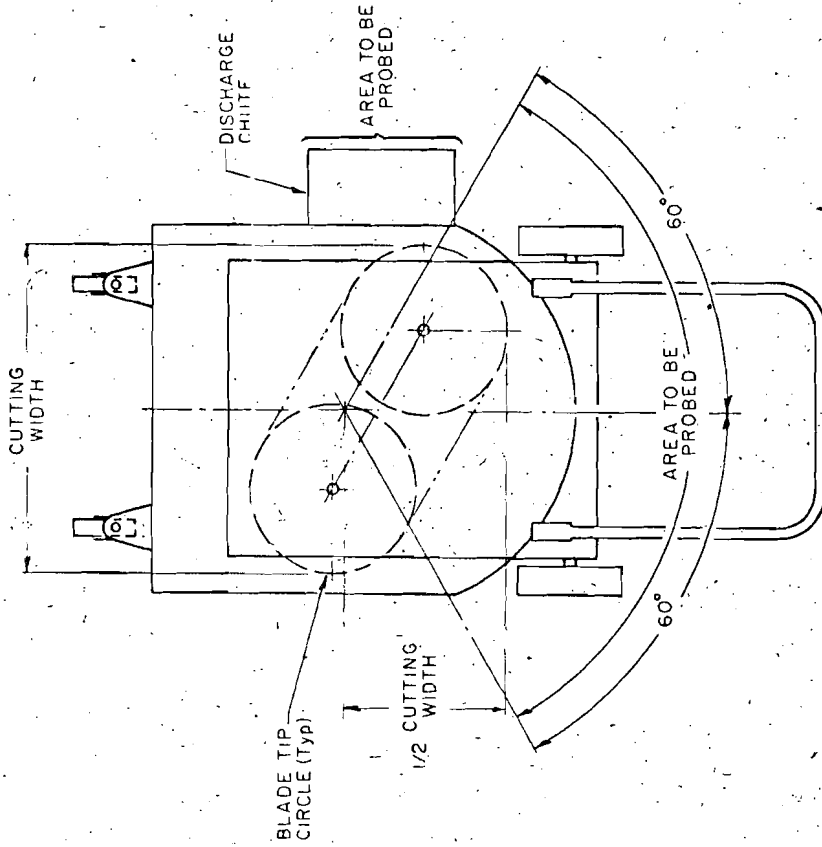


FIGURE 4 – AREA TO BE PROBED
MULTI-BLADE MOWERS

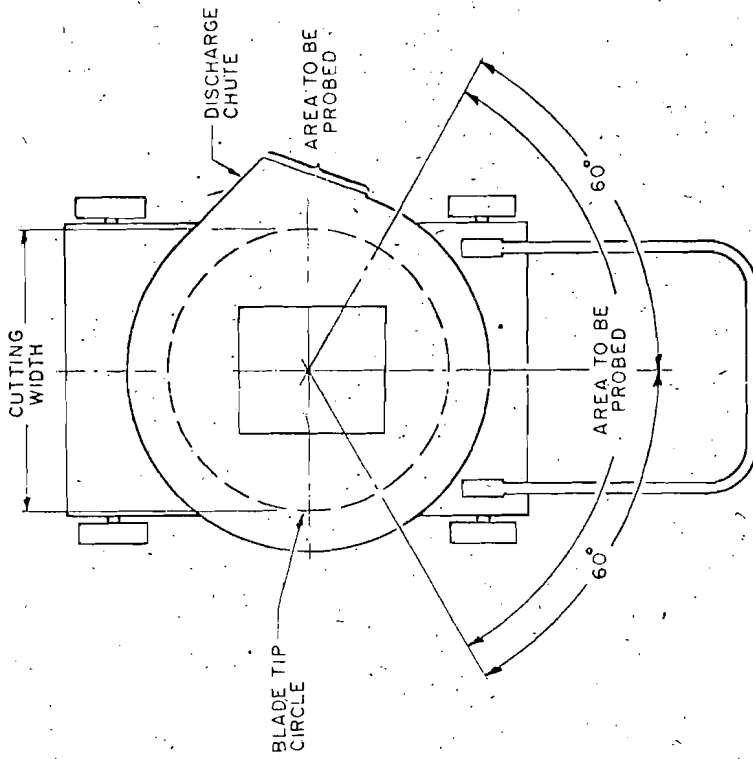


FIGURE 3 – AREA TO BE PROBED

[6355-01-C]

[6355-01-M]

(B) For a mower with a swing-over handle, the areas to be probed shall be determined as in paragraph

(b)(1)(ii)(A) of this section from both possible rear positions and shall include any discharge opening. (See Fig. 5).

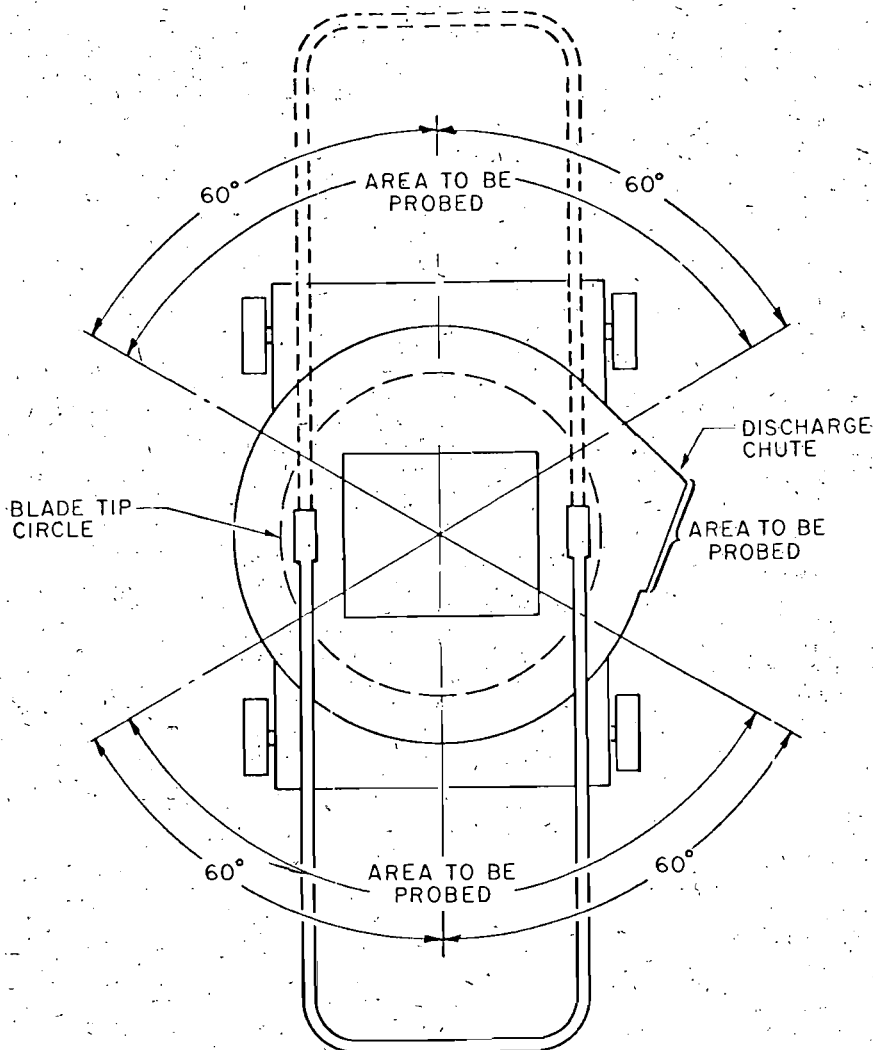


**FIGURE 5 — AREA TO BE PROBED
SWINGOVER HANDLE**

(iii) *Procedure.* Within the areas specified in paragraph (b)(1)(ii), the foot probe of Fig. 2 shall be inserted under the bottom edge of the blade housing and shields. During each insertion, the "sole" of the probe shall be kept in contact with the supporting surface. Insertion shall stop when the mower housing lifts or the horizontal force used to insert the probe reaches 4 lb (17.8 N), whichever occurs first. As the foot probe is withdrawn after each insertion, the "toe" shall be pivoted upward around the "heel" as much as possible without lifting the mower.

(2) *Obstruction test.* (i) The following test conditions shall be observed:

(A) Pneumatic tires, when present, shall be inflated to the cold pressure

recommended by the mower manufacturer.

(B) The mower housing shall be at its highest setting relative to the ground.

(ii) The test shall be performed on the fixture of Fig. 6, which consists of a level surface having (A) a 0.99 in (25 mm) deep depression with a 5.90 in (150 mm) radius of curvature and (B) a raised obstacle 0.60 in (15 mm) square, each extending the full width of the fixture. The depression shall be lined with a material having a surface equivalent to a 16- to 36-grit abrasive. The depression and the obstacle shall be located a sufficient distance apart so that the mower contacts only one at a time.

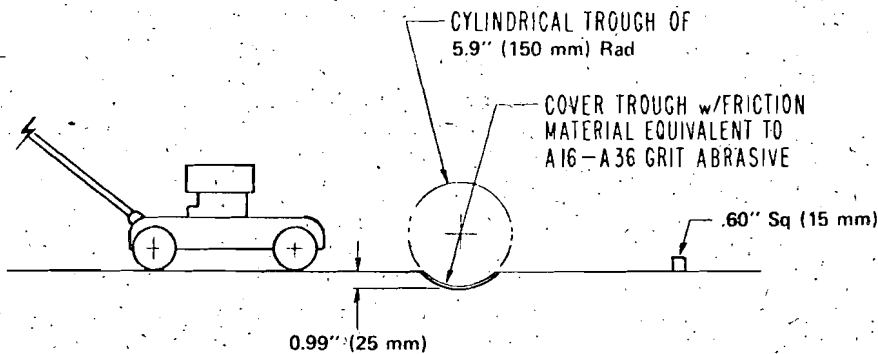


FIGURE 6 – OBSTRUCTION TEST FIXTURE

(iii) The test fixture may be relieved, only to the extent necessary, to prevent interference with any blade retaining device.

(iv) The mower shall be pushed forward and pulled rearward perpendicular to and across the depression and the raised obstacle on the fixture. The mower shall be pulled and pushed, without lifting, with a horizontal force sufficient to transit the obstruction fixture at a speed not to exceed 2.2 ft/sec (0.7 m/sec).

(c) *Movable shields.*—(1) *General.* Movable shields must meet the general shield requirements of paragraph (a) of this section. In addition, movable shields which are in any of the areas to be probed defined in paragraph (b)(1)(ii) of this section and which are intended to be movable for the purpose of attaching auxiliary equipment, when deflected to their extreme open position in the manner intended by the manufacturer and released, shall either:

(i) return automatically to a position that meets the requirements of Subpart A of this Part 1205 when the attached equipment is not present, or

(ii) prevent operation of the blade(s) unless the attached equipment is present or the movable shield is returned to a position that meets the requirements of Subpart A of this Part 1205.

(2) *Tests.* (i) Automatic return of a movable shield shall be determined by manually deflecting the shield to its extreme open position, then releasing the shield and visually observing that it immediately returns to the closed position.

(ii) Prevention of operation of the blade(s) shall be determined, first by manually deflecting the shield to its extreme open position, then, following the appropriate manufacturer's instructions, completing the procedures necessary to operate the blade. Observe, using any safe method, that the blade(s) has been prevented from operating.

§ 1205.5 Walk-behind rotary power mower controls.

(a) *Blade control systems.*—(1) *Requirements for blade control.* A walk-behind rotary power mower shall have a blade control system that will perform the following functions:

(i) Prevent the blade from operating unless the operator actuates the control.

(ii) Require continuous contact with the control in order for the blade to continue to be driven.

(iii) Cause the blade motion in the normal direction of travel to come to a complete stop within 3.0 seconds after release of the control.

(iv) For a mower with an engine and with only manual starting controls, this blade control shall stop the blade without stopping the engine.

(2) All walk-behind rotary power mowers shall have, in addition to any blade control required by paragraph (a)(1) of this section, another means

which must be manually actuated before a stopped blade can be restarted. This additional means may be either a control which is separate from the control required by paragraph (a)(1) of this section, or may be incorporated into the control required by paragraph (a)(1) of this section as a double-action device requiring two distinct actions to restart the blade.

(b) *Blade stopping test.*—(1) *General.* Any test method that will determine the time between the release of the blade control and the complete stop of the blade motion in the normal direction of travel may be used.

(2) *Conditions.* (i) The mower shall be operated at maximum operating speed for at least 6 minutes immediately prior to the test.

(ii) The blade must be at maximum operating speed when the blade control is released.

(c) *Starting controls location.* Walk-behind mowers with blades that begin operation when the power source starts shall have their normal starting means located within the operating control zone.

§ 1205.6 Warning label for reel-type and rotary power mowers.

(a) *General.* Walk-behind power lawn mowers shall be labeled on the blade housing or, in the absence of a blade housing, on other blade shielding or on an adjacent supporting structure or assembly, with the warning label shown in Fig. 7. The label shall be at least 3.25 in (82.5 mm) high and 4 in (102 mm) wide, and the lettering and symbol shall retain the same size relation to each other and to the label as shown in Fig. 7.



FIGURE 7

(b) *Rotary Mowers.* Walk-behind rotary mowers shall have one label as shown in Fig. 7, on the blade housing. The label shall be located as close as possible to any discharge opening, or, if there is no discharge opening, in a position that is conspicuous to an operator in the normal operating position.

(c) *Reel-type Mowers.* Walk-behind power reel-type mowers shall have one label as shown in Fig. 7, located as close to the center of the cutting width of the blade as possible. However, in the absence of a suitable mounting surface near the center of the cutting width, the label shall be placed on the nearest suitable mounting surface to the center of the cutting width.

§ 1205.7 Prohibited stockpiling.

(a) *Stockpiling.* "Stockpiling" means manufacturing or importing a product which is the subject of a consumer product safety rule between the date of issuance of the rule and its effective date at a rate that is significantly greater than the rate at which such product was produced or imported during a base period prescribed by the Consumer Product Safety Commission.

(b) *Prohibited acts.* Stockpiling of power lawn mowers that do not comply with this Subpart A of Part 1205 at a rate that exceeds by 20% the rate at which the product was produced or imported during the base period described in paragraph (c) of this section is prohibited.

(c) *Base period.* The base period for power lawn mowers is, at the option of each manufacturer or importer, any period of 365 consecutive days beginning on or after September 1, 1971, and ending on or before August 31, 1978.

§ 1205.8 Findings.

(a) *General.* In order to issue a rule such as Part 1205, the Consumer Product Safety Act requires the Commission to consider and make appropriate findings with respect to a number of topics. These findings are discussed below.

(b) *The degree and nature of the risk of injury Part 1205 is designed to eliminate or reduce.* (1) The Commission estimates that there are approximately 77,000 injuries to consumers each year caused by contact with the blades of power lawn mowers. From 1977

data, the Commission estimates that each year there are approximately 7,300 finger amputations, 2,600 toe amputations, 2,400 avulsions (the tearing of flesh or a body part), 11,450 fractures, 51,400 lacerations, and 2,300 contusions. Among the lacerations and avulsions, 35,800 were to hands and fingers and 18,000 were to toes and feet. The estimated costs caused by these injuries are \$253 million, not counting any monetary damages for pain and suffering. These injuries are caused when consumers accidentally contact the blade, either inadvertently while in the vicinity of the mower, or while intentionally performing some task which they erroneously believe will not bring their hand or foot into the path of the blade.

(2) Part 1205 is expected to eliminate or reduce the severity of about 60,000 blade contact injuries per year, or 77% of all such injuries. The Commission estimates that if all mowers had been in compliance with the standard in 1977, about 6,800 finger amputations, 1,500 toe amputations, 11,000 fractures, 1,800 avulsions, 38,400 lacerations, and several hundred contusions would not have occurred. Of the lacerations and avulsions, 28,300 were finger injuries and 9,400 were toe injuries.

(c) *Consumer products subject to the rule.* The products subject to this standard are walk-behind power mowers. Power mowers with rigid or semi-rigid rotary blades are subject to all the provisions of the standard while reel-type and rotary mowers are subject to the labeling requirements. Mowers that in combination have engines of 8 hp or greater, weigh 200 lb or more, and have a cutting width of 30 in or more are excluded from the standard. The Commission estimates that at least 98% of the total annual market (by unit volume) for walk-behind mowers will be affected by the standard, and the Commission estimates that in 1978 this market was 5.4 million units.

(d) *Need of the public for the products subject to the rule.* The Commission finds that the public need for walk-behind power mowers, which provide a relatively quick and effective way to cut grass, is substantial. Riding mowers, lawn and garden tractors, hand reel mowers, trimmers and edgers, and sickle-bar mowers also provide grass-cutting services, but walk-behind power rotary mowers are by far the most commonly used devices

for maintaining household lawns. There are no devices that can completely substitute for walk-behind power mowers as a group, since they have applications for which other products are not as suitable. Each type of walk-behind power mower has individual properties which meet public needs, although one type of walk-behind is often an acceptable substitute for another. The newly developed monofilament line mower is not included within the scope of the standard and could be a substitute for mowers using rigid or semi-rigid blades under some conditions.

(e) *Probable effect of the rule upon the utility of the product.* (1) The Commission finds that the probable overall effect of the standard on the utility of mowers should be to increase their utility. In the first place, consumers are likely to experience an increased sense of security from having a safer mower. A study of brake-clutch mowers conducted by the Federal Supply Service (GSA) shows that almost all users appreciated the safety features on brake-clutch mowers. In addition, by releasing the blade control and stopping the blade, the operator can then travel over gravel or other surfaces without fear of thrown objects or of the blade striking objects that might damage the mower. Brake-clutch type mowers would also give an increase in utility by virtue of enabling the operator to use the clutch to prevent stalling when the mower bogs down in heavy grass. On the other hand, there may be some minor adverse effects on utility caused by some aspects of complying mowers. For example, in very heavy mowing conditions, there may be some difficulty in engaging the blade in a blade-clutch mower. (However, mowers that are currently on the market that are not equipped with a blade clutch may have difficulty in starting the engine in heavy grass.) Complying mowers may require slightly more time and a few additional actions to operate. Since complying mowers may have more electrical and mechanical parts than current mowers, they may weigh more and require more maintenance than current mowers. No significant increase in mowing time is expected if a brake-clutch device is used to comply with the standard since each engagement of the blade would require only a few seconds. The amount of additional time and expense required for maintenance, if any, will be dependent on the design solution used. Such disutilities

are expected to be slight and to be more than balanced by the increased sense of security consumers are likely to experience from having a safer mower.

(2) During the development of the rule, questions were raised about whether changes in the shields necessitated by the foot probe requirements would adversely affect utility by causing mowers to be hard to push in grass or to be unable to mow close to walls. At the time of issuance of this rule, mowers are available that will pass a 360° foot probe and others are available that will pass rear and side foot probing without any significant loss of utility caused by shielding. Therefore, the Commission concludes that this requirement will not adversely affect the utility of mowers. Mowers with swing-over handles, however, may be more difficult to design in this regard, since 120° at each end of the mower, plus the discharge chute, are subject to the foot probe requirement. However, since mowers meeting this requirement have already been built without apparent loss of utility, the Commission concludes that shielding can be designed so that there should be no loss of utility even for mowers with swing-over handles.

(3) As required by section 9(b) of the CPSA, the Commission, in considering the issues involved in issuing a power lawn mower safety standard, has considered and taken into account the special needs of elderly and handicapped persons to determine the extent to which such persons may be adversely affected by the rule. The Commission has determined that there will be no significant adverse effect on such persons as a result of this Part 1205. In the first place, the rule can affect only those persons who are physically capable of using a power lawn mower. None of the rule's provisions will make it more difficult to operate a mower that complies with the standard. On the contrary, complying mowers should be easier to use because the need for manually restarting the mower will be less and because, if the mower uses a brake-clutch to comply with the blade control requirement, use of the brake-clutch can reduce the tendency of the engine to stall in heavy grass. Although a person's ability to hold a device such as a blade control for a long period of time will decline with age, the force required to hold the blade control can be made low enough that it will not be a problem during the length of time that it takes for consumers to mow a lawn.

(4) After considering the possible adverse effects on mowers that could be caused by the standard and balancing them against the increase in utility that is expected, the Commission con-

cludes that, for a typical consumer, the increases in utility should more than offset any decreases.

(f) *Probable effect of the rule upon the cost of the product.* The Commission estimates that the retail price impact of the standard will be about \$35 for the average walk-behind mower. Based on an average useful mower-life of about 8 years, the additional annual cost to the purchaser is expected to average about \$4.40. The probable effect of the standard will differ on the various types of mowers within its scope. Percentage increases in price will vary from about a 7 percent increase for power-restart self-propelled mowers to about a 30 percent increase for gasoline-powered manual start push mowers. The costs attributable to individual requirements of the standard are discussed in paragraph (i) of this section.

(g) *Probable effect of the rule upon the availability of the product.* (1) The Commission finds that the standard is not expected to have a significant impact on the availability of walk-behind rotary mowers, since domestic production capacity appears to be sufficient to handle any increased demand for safety-related components or materials. Although adapting some types of power mowers to the standard may be more costly than others, the effects of the standard on the price or utility of a particular category of power mowers are not expected to cause radical shifts in demand among types of mowers. The Commission finds that all types of power mowers subject to the standard will be available, although some, such as house-current-powered mowers, may increase their market shares because they can be brought into compliance with the standard at a lesser cost.

(2) Because some manufacturers may not revise their entire product line before the effective date of the standard, individual mower manufacturers may initially have less varied lines than at present, but there should be no decrease in the overall types and features of mowers available to consumers.

(h) *Alternative methods.* (1) The Commission has considered other means of achieving the objective of the standard. For example, alternatives were considered such as hand probes, "blade harmless" tests, and blade control by engine kill but allowing manual restart. These alternatives have been rejected by the Commission as being either unfeasible or not as effective as the rule which is being issued.

(2) Similarly, the Commission has found no alternative means of achieving the objective of the standard that it believes would have fewer adverse effects on competition or that would

cause less disruption or dislocation of manufacturing and other commercial practices, consistent with the public health and safety.

(i) *Unreasonable risk of injury.* (1) The determination of whether a consumer product safety rule is reasonably necessary to reduce an unreasonable risk of injury involves a balancing of the degree and nature of risk of injury addressed by the rule against the probable effect of the rule on the utility, cost, or availability of the product. The factors of utility and availability of the products, adverse effects on competition, and disruption or dislocation of manufacturing and other commercial practices have been discussed above. The following discussion concerns the relationship of anticipated injury reduction and costs for various requirements of the standard. (See the report, *Economic Impact of Blade Contact Requirements for Power Mowers*, January 1979, for a detailed analysis of the possible effects of discounting and inflation on the computation of the quantifiable benefits associated with this regulation.)

(2) The foot probe and related requirements are expected to reduce the number of blade contact injuries to the foot by 13,000 each year. It is not possible to apportion this injury reduction among the respective requirements. The cost of these requirements is estimated to be about \$4.00 per mower, mostly for redesign of the shields. The shield strength requirement is similar to a requirement in the existing voluntary standard that is almost universally complied with, and should comprise only a small portion of the \$4.00 retail cost increase compared to pre-standard mowers that is attributable to this related group of requirements. Also, shields complying with the movable shield requirement are featured in some currently produced mowers.

(3) The foot probe and related requirements should result in a cost increase of about \$22,000,000 and undiscounted injury savings of about \$46,000,000, exclusive of any allowance for pain and suffering.

(4) The starting location control requirement would apply only to mowers with a power restart capability using engine kill to stop the blade. The cost for relocating the power restart switch, if necessary, should be very minor, and more than offset by the elimination of a clutch, as discussed below.

(5) The requirement that the blade stop within 3 seconds of the release of the blade control is supported by (1) the requirement that those mowers that stop the blade by stopping the engine must have a power restart (to remove the motivation to disable the blade control because of the inconven-

ience of manually starting the mower each time the control is released) and by (ii) the requirement for an additional control that must be actuated before the blade can resume operation (to prevent accidental starting of the blade). Together, these requirements are expected to reduce the number of blade contact injuries by 46,500 per year for an undiscounted savings in injury costs of about \$165,000,000 per year, exclusive of pain and suffering.

(6) Virtually all mowers will be subjected to a cost increase of about \$3 for the blade control actuating means and \$1 for the second control required to restart the blade. (The \$1 cost could be eliminated for power restart-engine kill mowers that do not start when the blade control is actuated.)

(7) Also, most mowers would require a brake for the blade in order to achieve a 3 second stop time. This would add another \$6.50-\$8.50, depending on the type of mower. Mowers with power restart capability could stop the blade by killing the engine and thus would not need to provide a clutch to disconnect the engine from the blade. Mowers using manual restart would have to provide a clutch or other blade disengagement devices, which would probably be combined with the brake in a unitary brake-clutch mechanism.

(8) The following are the Commission's estimates of the probable retail price increases associated with certain types of currently produced mowers that will be caused by the blade control requirements.

Type of mower	Blade control retail
	Price increases
Electric mowers (house current or battery powered)	\$15.00
Present Electric start gasoline mowers.....	13.00-19.50
Present Manual start gasoline mowers brake clutch approach.....	32.50
Power restart approach.....	29.00-39.50

(9) The weighted average retail price increase of the blade stop requirements is expected to be about \$31 per mower for a total retail cost increase of \$167,000,000.

(10) The foot probe and blade stop requirements of the standard will obviously not completely protect the users of mowers under all circumstances. It is still essential for consumers to be aware of the hazard of blade contact and take the proper precautions to

protect themselves. It is especially important that users not become complacent with the knowledge that the mower incorporates blade contact safety requirements. Accordingly, the Commission has determined that it is desirable that mowers complying with the standard bear a label warning of the danger of blade contact. Such a requirement would result in practically no effect on the retail price of mowers since labels are very inexpensive and practically all currently produced mowers bear some type of warning label. In view of the hazard that will be associated with power mowers even after the effective date of the standard, and the low cost of the label, the Commission concludes there is an unreasonable risk of injury that can be addressed by the label requirements in this Part 1205.

(11) Labeling requirements under the CPSA may be issued under the authority of either section 7 of the act or section 27(e), or both. Under section 7, the Commission must find that the label is reasonably necessary to prevent or reduce an unreasonable risk of injury. Under section 27(e), the Commission must determine that the label conveys performance and technical data required to carry out the purposes of the act, one of which is "to protect the public against unreasonable risks of injury associated with consumer products." The Commission concludes it has authority to issue the labeling requirement of Part 1205 under both section 7 and 27(e) and finds that issuance of the requirement is necessary to convey the performance and technical data concerning the blade contact hazard, in accordance with section 27(e), for the purpose of the act mentioned above.

(j) *Conclusion.* Therefore, after considering the anticipated costs and benefits of Part 1205 and the other factors discussed above, and having taken into account the special needs of elderly and handicapped persons to determine the extent to which such persons may be adversely affected by the rule, the Commission finds that Part 1205 (including the effective dates) is reasonably necessary to eliminate or reduce the unreasonable risk of injury associated with walk-behind power lawn mowers and that promulgation of the rule is in the public interest.

Dated: February 12, 1979.

SADYE E. DUNN,
Secretary, Consumer
Product Safety Commission.

[FR Doc. 79-4994 Filed 2-14-79; 8:45 am]

[6355-01-M]

**CONSUMER PRODUCT SAFETY
COMMISSION**

[16 CFR Part 1205]

**SAFETY STANDARD FOR WALK-BEHIND
POWER LAWN MOWERS**

Proposed Certification Rule

AGENCY: Consumer Product Safety Commission.

ACTION: Proposed rule.

SUMMARY: In this document, the Commission proposes regulations that manufacturers, private labelers, and importers must follow to certify that their walk-behind rotary power lawn mowers comply with the Commission's Safety Standard for Walk-Behind Power Lawn Mowers. The proposal contains requirements for certifying rotary power mowers with a permanent label and for recordkeeping. The labeling and recordkeeping requirements are needed to help the Commission monitor compliance with the lawn mower safety standard. The labeling requirement will also enable consumers to distinguish complying from non-complying mowers.

DATES: The Commission proposes that the rule be applicable to all walk-behind rotary power lawn mowers manufactured after December 31, 1981.

Written comments on the proposed rule, preferably in 5 copies, should be submitted to the Commission by April 16, 1979.

ADDRESS: Written comments should be submitted to the Office of the Secretary, Consumer Product Safety Commission, 1111 18th Street, NW., Third Floor, Washington, D.C. 20207. All comments received and other information relating to this proceeding may be viewed in the Office of Secretary.

**FOR FURTHER INFORMATION
CONTACT:**

Allen Brauning, Directorate for Compliance and Enforcement, Consumer Product Safety Commission, Washington, D.C. 20207, 301-492-6629.

SUPPLEMENTARY INFORMATION:

BACKGROUND

Elsewhere in this Part of the FEDERAL REGISTER, the Commission has published a final consumer product safety standard for power operated walk-behind rotary and reel-type lawn mowers. (16 CFR Part 1205 Subpart A). The standard contains performance and labeling requirements intended to reduce the risk of injury to consumers caused by contact, primar-

ily of the foot and hand, with the rotating blade of a mower. The performance requirements of the standard apply only to rotary mowers. The labeling requirements apply to both rotary and reel-type mowers. The standard contains two main performance requirements applicable to rotary power lawn mowers. The first is designed to protect against foot contact injuries that occur while the operator is in the normal mowing position. This requirement states that the rear and discharge chute areas of the mower shall be capable of being probed with a specified foot probe that simulates the action of a human foot, without the probe contacting the blade. The second main requirement is intended to protect against hand or foot injuries that occur after the operator has left the normal mowing position. This protection is provided by requiring the blade to stop within 3 seconds of the time the operator lets go of the mower. A more detailed explanation of the standard's requirements, rationale, and background is given in the preamble to the final power lawn mower safety standard.

The Commission is proposing to issue this certification and recordkeeping regulation to inform manufacturers, private labelers, and importers of the procedures to use in certifying that their products comply with the safety standard once the standard becomes effective. The certification proposal applies to walk-behind rotary power lawn mowers and not to reel-type mowers, since the latter are subject only to the labeling requirements of the standard. Under the proposed certification rule, manufacturers, private labelers, and importers are responsible for (1) issuing a certificate of compliance in the form of a permanent label attached to each mower which states that the mower complies with the standard and supplies other specified information, and (2) keeping or assuring the availability of records which demonstrate that the certificates are based on a test of each mower or on a reasonable testing program. These requirements are discussed in detail below.

PROPOSED CERTIFICATION RULE

1. CERTIFICATION TESTING

Section 14(a)(1) of the Consumer Product Safety Act (CPSA) (15 U.S.C. 2063(a)(1)) requires manufacturers (defined in the act to include importers) and private labelers of a product subject to a consumer product safety standard to issue a certificate which states that the product conforms to all applicable consumer product safety standards, specifies the applicable standard, states the name of the manufacturer or private labeler issuing the certificate, and includes the date and

place of manufacture. The certificate must accompany the product or be furnished to any distributor or retailer to whom the product is delivered. Section 14(a) also requires that the certificate be based on a test of each product or upon a reasonable testing program.

The certification rule proposed below provides that manufacturers (defined at § 1205.32(a) to include importers and assemblers) and private labelers must either test individual rotary walk-behind power lawn mowers or devise "reasonable testing programs." A "reasonable testing program" is defined in the proposal as one which demonstrates that the mowers comply with the standard. The proposal allows manufacturers, private labelers, and importers to define their own reasonable testing programs.

Prior to issuance of this proposal, the Commission concluded that it was unnecessary for it to specify the testing program for the manufacturers. The Commission notes that the power lawn mower's ability to meet the performance requirements (except for blade stopping time) is controlled by the mower's design, materials, and method of production. Initial tests made on mowers of a specific design should be sufficient to determine that the product manufactured at a later date to essentially the same design complies with the standard. Because blade stopping time may vary from one mower to another of essentially the same design, the Commission believes that a prudent manufacturer would test production mowers of essentially the same design periodically for the blade stopping time requirement.

The proposed certification rule states at § 1205.33(b)(2) that the Commission will test for compliance with the standards by using the test procedures set forth in Subpart A of Part 1205 (published elsewhere in this Part of the FEDERAL REGISTER). (Within a year, the Commission will develop a compliance test manual which will describe in detail the procedures the Commission will follow in testing mowers for compliance. The compliance test manual will be available to all interested persons upon request.) The proposed rule emphasizes, however, that manufacturers are free to use any reasonable test procedures. Manufacturers may wish to perform more stringent tests than those described in the standard to ensure that their mowers will meet any Commission tests. (For example, the shield strength test provided for in the standard at § 1205.4 requires the application of 50 lb of force. Manufacturers may wish to apply higher force levels.)

This proposed rule explains at § 1205.33(b)(1) how a reasonable testing program is conducted. For certification testing, the mowers should be grouped into "production lots," defined at § 1205.32(b) to be a quantity of mowers from which certain mowers are selected for testing prior to certifying the lot. All mowers in a production lot are required to be essentially identical in those design, construction, and material features which relate to the ability of a mower to comply with the standard. Sample mowers are then selected from the production lot for testing in accordance with the reasonable testing program.

If the production lot has been properly limited as to number and design of mowers, it should be possible for a manufacturer to test samples from the lot for certification and not to test again as long as the production lot mowers are identical to the mowers tested for certification in all respects relating to the ability of the mower to meet the requirements of the standard. After a lot has been established, if there are any changes in lot specifications which would affect mower performance in relation to the requirements of the standard, the manufacturer should establish a new production lot for testing. In the event of changes in parts, suppliers of parts, or production methods which would affect the ability of the mower to comply with the standard, the manufacturer should establish a new production lot for testing. Furthermore, if the reasonable testing program shows that a mower does not comply with any requirement of the standard, no mower in the production lot can be certified as complying until the mowers have been altered by repair, redesign, or use of a different material or components to the extent necessary to bring them into conformance with the standard.

2. RECORDKEEPING

Proposed § 1205.34 requires that manufacturers, private labelers, and importers of walk-behind rotary power lawn mowers subject to the standard maintain or take responsibility for written records demonstrating that compliance certificates are based on tests of each mower or a reasonable testing program.

No specific format is prescribed for the records, but the records are required to contain sufficient information to enable a Commission investigator to determine the nature of a firm's testing procedures, including the nature of the production lot chosen, and to determine whether the mowers which are being marketed and certified to comply with the standard are identical (in every respect that relates to compliance with the standard) to

the mowers that were tested for conformance. The records are also required to indicate exactly which mowers or production lots of mowers are covered by particular certificates. The records are required to be maintained for a minimum of 3 years from the date of certification of each mower or each production lot. This is because the Commission staff estimates that some mowers can reasonably be expected to remain in inventory and not reach consumers for a period of three years, and Commission enforcement personnel are particularly interested in being able to check the records concerning any mowers held in inventory. The Commission would like to receive comment on the appropriateness of this 3 year period and any other time periods commenters believe would be reasonable and proper for maintenance of records.

These records, besides aiding Commission enforcement of the standard and the certification rule, could be helpful to a manufacturer in limiting the scope of a possible recall order under section 15 of the CPSA. (The Commission is authorized under section 15 to order a manufacturer of a product which is found, after a hearing, to present a "substantial product hazard" to elect one of the following remedies: repair the defective product, replace the product with a non-defective product, or refund the purchase price of the product. "Substantial product hazard" is defined in section 15 to mean a failure to comply with an applicable consumer product safety rule or a product defect, which creates a substantial risk of injury to the public.) Records of dates and locations of production of various models; dates of changes in specifications, parts, suppliers, or manufacturing procedures; and the dates and results of quality control or recertification testing are examples of the types of information which could serve to identify the period of time during which non-complying or defective mowers were manufactured. In the absence of such information, the entire production of a particular type of mower could be subject to a recall order.

The Commission is authorized under section 16(b) of the CPSA to require the establishment and maintenance of records that are necessary to implement the act or to determine compliance with regulations issued under the Act. Section 16(b) further provides that the records must be made available for inspection by duly designated agents of the Commission upon request. The Commission believes the records required to be maintained by proposed § 1205.34 are necessary to monitor compliance with the power lawn mower standard. In accordance with section 16(b), these records are

required under the proposed rule to be available to officers or employees of the Commission upon request.

The Commission is particularly interested in receiving comment on whether the records required to be maintained by proposed § 1205.34 are the type of records manufacturers would normally keep to support certificates of compliance, even if the records were not specifically required. The Commission is also interested in whether the information required for the records under proposed § 1205.34 could easily be incorporated into other records manufacturers normally keep.

3. PRODUCT CERTIFICATION AND LABELING

Proposed § 1205.35 of the regulations published below requires manufacturers of walk-behind rotary power law mowers manufactured after the effective date of the lawn mower standard to affix permanent labels to mowers which shall be considered a "certificates" of compliance, as that term is used in section 14(a) of the CPSA.

(NOTE: Section 14(c) authorizes the Commission to issue rules requiring a product to bear a label containing information similar to that required by section 14(a) for certificates).

The certification label is required to include the following information:

1. The statement "Meets CPSC blade safety requirements for walk-behind rotary power mowers."
2. An identification of the production lot.
3. The name of the manufacturer or private labeler issuing the certification label.
4. The location where the product was principally assembled.
5. The month and year the product was completed and in the form intended to be supplied to the consumer, except where the production lot is based on a period of less than one month, in which case a more specific date relating to the production lot is required.

All of this information, except for the statement and the name of the person issuing the certificate, may be in code if an interpretation of the coding system is available to consumers, persons in the chain of distribution, and the Commission.

The certification label is required to be visible and legible to the ultimate consumer. However, where the permanent label is not immediately visible to the consumer at the time of sale because of packaging or other marketing practices, a second temporary label stating "Meets CPSC blade safety requirements for walk-behind rotary power mowers" is required on the container or promotional material used with the sale of the mowers.

In deciding that certification for lawn mowers should be in the form of

a permanent label rather than a separate certificate supplied to persons in the distribution chain, the Commission points out that the label will be visible to all in the distribution chain, and the certification will be immediately available if any questions concerning compliance with the standard arise about a particular mower. The Commission believes that a permanent label will benefit consumers and industry, as well as the Commission, in the following ways:

1. For a period of time after the mower standard goes into effect, both complying and noncomplying mowers will be available on the retail market. A label affixed to the individual mower, in contrast to a certificate covering a group of mowers supplied to the retailer, will help consumers purchasing mowers to make an informed choice between complying and noncomplying mowers.

2. A permanent label will make it easier to determine whether a particular mower was certified to comply with the standard. In the event a power mower is involved in an injury, for example, a CPSC investigator or the victim of the injury can tell immediately if the mower was certified.

3. The Commission may amend the walk-behind power mower standard in the future to add new requirements or to modify the existing requirements. A label stating the date of manufacture will make it immediately apparent which requirements apply to a particular mower, thereby aiding Commission investigation of particular mower-related accidents.

4. A permanent label will enable CPSC investigators screening mowers for compliance to distinguish between mowers manufactured before and those manufactured after the standard without examining retailers' or distributors' shipping records. Such an examination can be time-consuming and difficult. The label will also permit Commission investigators to readily identify the firm responsible for the certification and the place of manufacture, thereby expediting compliance follow-up.

5. A permanent label with an identification of the production lot and the date and location of manufacture will be advantageous to manufacturers, distributors, retailers, and consumers in the event of a recall order under section 15 of the CPSA. If the recall is limited to a certain production period or manufacturing location, the label will help in identifying and limiting those mowers which are subject to the recall.

The last two sections of the proposal deal with certification labeling by private labelers and importers. Proposed § 1205.36 provides that when a private labeler distributes a rotary walk-

behind power lawn mower subject to the standard, under the private labeler's name, the private labeler must issue the certificate of compliance but may rely on the manufacturer's tests to support the certification label. However, the private labeler has the responsibility for assuring that the tests used to support the certification (even though performed by the manufacturer) are proper and that the records of the tests being held by the manufacturer are accurate and complete.

Proposed § 1205.37 contains similar provisions for importers of mowers. The importers are required to issue the certification labels, but may rely on the foreign manufacturer's tests to support the certification if the records of the tests are maintained in the United States and the importer is a resident of the U.S. or has a resident agent in the U.S. The records must be maintained in the U.S. and the importer must reside, or maintain a resident agent, in this country to enable the Commission investigators to inspect the records and monitor compliance with the standard. Like private labelers, importers who certify are responsible for assuring that all testing has been performed properly with acceptable results and that the records of the tests are accurate and complete.

Under proposed § 1205.36, if there is more than one party otherwise subject to the requirements of the proposed rule for a given mower, only the party closest to the consumer in the distribution chain need issue a certificate.

There are three issues involving the certification label on which the Commission is particularly interested in receiving comment. The first is the wording of the certification statement, which has been phrased to indicate that only walk-behind rotary power lawn mowers are subject to the performance requirements of the lawn mower standard. This is so that consumers will not be inclined to think that mowers outside the scope of the performance standard (i.e., reel-type or riding mowers) are noncomplying. The Commission would appreciate any suggestions from commenters for alternate wordings which would adequately inform consumers of the certification and would also help to reduce confusion concerning the coverage of the standard.

The second issue concerns the fact that the Commission is proposing this Part 1205 to require two labels on lawn mowers—the certification label required by this Subpart B and the warning label on the blade housing required by the standard. While the two labels serve entirely different purposes, the Commission would appreciate comment on the issue of whether it might be appropriate to permit persons or firms issuing certification

labels to append the information needed for those labels to the warning label required by the standard. The Commission is considering permitting this as an alternative to two separate labels, but is concerned that the certification information be presented in such a way so as not to detract from the safety message of the warning label.

The third issue is whether distributors and retailers would prefer to be provided with a separate certificate for lawn mowers they receive, in addition to the label on the mower. Distributors and retailers can retain a separate certificate after they have sold the certified products and can produce the certificate as a possible defense in an enforcement action for violation of the standard (15 U.S.C. 2068(b)). Without a separate certificate, distributors and retailers might want to maintain their own records indicating that the products they received and sold were labeled as complying. The Commission is considering requiring the issuance of separate certificates, in addition to the certification labels, and is interested in receiving comments on this issue.

ANTICIPATED IMPACT OF THE PROPOSED CERTIFICATION RULE

The Commission believes that the retail price impact of the labeling and recordkeeping requirements of the proposed certification rule will be approximately a \$0.50 increase per mower subject to the proposed rule. The Commission notes that the proposed rule mandates a label, and recordkeeping, but allows manufacturers a great deal of flexibility as to testing and recordkeeping.

Commission points out that while the labeling specified in the proposed rule will require more information on lawn mowers than is currently provided on lawn mower housings, most manufacturers already have the voluntary standard seal, the model number, and a serial number on the mower housing. Considering the amount of time until the certification rule is proposed to become effective, it should be relatively easy and inexpensive for manufacturers, importers, or private labelers to incorporate complying labels on mowers.

Furthermore, certification recordkeeping expenses should not be significant, especially for firms with relatively large production runs. Substantial recordkeeping is already done in connection with the voluntary standard and manufacturers' normal quality control procedures. Since the certification rule allows manufacturers a great deal of latitude in the format of their recordkeeping, manufacturers should be able to incorporate certification recordkeeping into their present sys-

tems with little difficulty. There may be one-time-only costs associated with changing labels, forms, and possibly computer programs for those firms with such programs to accommodate certification information, but these costs should make only a miniscule contribution to increases in the price of mowers.

Based on this information, the Commission concludes that the costs of the proposed certification rule will not be significant.

ENVIRONMENTAL CONSIDERATIONS

The Commission's interim rules for carrying out its responsibilities under the National Environmental Policy Act (see 16 CFR Part 1021; 42 FR 25494) provide that product certification or labeling rules normally have no potential for affecting the environment and environmental review of such rules is, therefore, generally not required. (Section 1021.5(b)(2)).

With respect to this lawn mower certification rule, the Commission finds that the proposed rule will have no significant effect on the human environment and that no environmental review of the proposal is necessary.

PROPOSED EFFECTIVE DATE

In § 1205.31 as published below, it is proposed that the certification rule be applicable to walk-behind rotary power lawn mowers manufactured after December 31, 1981. This date corresponds to the effective date for the performance requirements of the lawn mower standard (see Part 1205, Subpart A).

CONCLUSION AND PROPOSAL

Having considered the need for and the economic impact of the certification requirements set forth below, the Commission concludes that the proposed requirements are reasonable and not unduly burdensome in light of the need for the rule. Therefore, pursuant to sections 14, 16, and 27(e) of the CPSA (15 U.S.C. 2063, 2065, and 2076), the Commission proposes to amend Title 16, Chapter II, Subchapter B, by adding a new Subpart B to Part 1205, reading as follows:

PART 1205—SAFETY STANDARD FOR WALK-BEHIND LAWN MOWERS

Subpart B—Certification Rule

Sec.

- 1205.30 Purpose, scope and application.
- 1205.31 Effective date.
- 1205.32 Definitions.
- 1205.33 Certification testing.
- 1205.34 Recordkeeping requirements.
- 1205.35 Product certification and labeling by manufacturers.
- 1205.36 Product certification and labeling by private labelers.
- 1205.37 Product certification and labeling by importers.

1205.38 Certification responsibility; multiple parties.

AUTHORITY: Secs. 14, 16, 27(e); 86 Stat. 1220, 1222, 1228; (15 U.S.C. 2063, 2065, 2076).

Subpart B—Certification Rule

§ 1205.30 Purpose, scope and application.

(a) *Purpose.* Section 14(a) of the Consumer Product Safety Act ("Act"), 15 U.S.C. 2063(a), requires every manufacturer (including importer) and private labeler of a product which is subject to a consumer product safety standard to issue a certificate that the product conforms to the applicable standard, and to base that certificate either on a test of each product or on a "reasonable testing program." The purpose of this Subpart B of Part 1205 is to establish requirements that manufacturers, importers, and private labelers of walk-behind rotary power lawn mowers subject to the Safety Standard for Walk-Behind Power Lawn Mowers (16 CFR Part 1205, Subpart A), shall issue certificates of compliance in the form of specified labeling and shall keep records of the testing program on which the certificates are based.

(b) *Scope and application.* The provisions of this rule apply to all rotary walk-behind power lawn mowers which are subject to the requirements of the Safety Standard for Walk-Behind Power Lawn Mowers. This rule does not apply to reel-type mowers, which are subject only to the labeling requirements of the standard.

§ 1205.31 Effective date.

Any walk-behind rotary power mower manufactured after December 31, 1981 must meet the standard and must be certified as complying with the standard, in accordance with this rule.

§ 1205.32 Definitions.

In addition to the definitions set forth in section 3 of the act (15 U.S.C. 2052) and in § 1205.3 of the standard, the following definitions shall apply to this Subpart B of this Part 1205:

(a) "Manufacturer" means any person or firm that manufactures or imports power lawn mowers subject to this standard, and includes those that assemble power lawn mowers from parts manufactured by other firms.

(b) "Private labeler" means an owner of a brand or trademark which is used on the label of a power lawn mower subject to the standard which bears a private label as defined in section 3(a)(7) of the act (15 U.S.C. 2052(a)(7)).

(c) "Production lot" means a quantity of mowers from which certain mowers are selected for testing prior to certifying the lot. All mowers in a lot must be essentially identical in

those design, construction, and material features which relate to the ability of a mower to comply with the standard.

(d) "Reasonable testing program" means any test or series of tests which are identical or equivalent to, or more stringent than the tests defined in the standard and which are performed on one or more mowers of the production lot for the purpose of determining whether the mowers of that lot comply with the requirements of the standard.

§ 1205.33 Certification testing.

(a) *General.* Manufacturers, importers, and private labelers shall either test individual rotary walk-behind power lawn mowers or shall rely upon a reasonable testing program to demonstrate compliance with the requirements of the standard.

(b) *Reasonable testing program.* A reasonable testing program for rotary walk-behind power mowers is one that demonstrates that the mowers comply with the standard. Manufacturers, importers, and private labelers may define their own reasonable testing programs.

(1) To conduct a reasonable testing program, the mowers shall be divided into production lots. Sample mowers from each production lot shall be tested in accordance with the reasonable testing program. Production lots shall be limited as to the number and design of mowers to ensure that if the mowers selected for testing meet the standard, all mowers in the lot will meet the standard. Where there is a change in parts, suppliers of parts, or production methods that could affect the ability of the mower to comply with the requirements of the standard, the manufacturer should establish a new production lot for testing.

(2) The Commission will test for compliance with the standard by using the test procedures contained in the standard. However, a reasonable testing program may include either tests prescribed in the standard or any other reasonable test procedures. (For example, in the shield strength test (§ 1205.4), the manufacturer, importer, or private labeler might choose to use a force higher than the 50 lb. force specified in the standard.)

(3) If the reasonable testing program shows that a mower does not comply with one or more requirements of the standard, no mower in the production lot can be certified as complying until mowers in the lot have been altered by repair, redesign, or use of a different material or components to the extent necessary to bring them into conformance with the standard. Mowers that do not comply with the standard cannot be sold or offered for sale.

§ 1205.34 Recordkeeping requirements.

(a) *General.* Every person issuing certificates of compliance for walk-behind rotary power lawn mowers subject to the standard shall maintain written records which show that the certificates are based on a test of each mower or on a reasonable testing program. The records shall be maintained for a period of at least 3 years from the date of certification of each mower or each production lot. These records shall be available to any designated officer or employee of the Commission upon request in accordance with section 16(b) of the act (15 U.S.C. 2065(b)).

(b) *Content of records.* Records shall describe the tests the mowers have been subjected to, the results of the tests, and, if applicable, shall explain what production lot has been chosen as the basis for the reasonable testing program. The records shall also indicate exactly which mowers or production lots of mowers are covered by particular certificates of compliance.

(c) *Format for records.* The records required to be maintained by this section may be in any appropriate form or format that clearly provides the information this section requires.

§ 1205.35 Product certification and labeling by manufacturers.

(a) *Form of permanent label of certification.* Manufacturers shall issue certificates of compliance for walk-behind rotary power lawn mowers manufactured after the effective date of the mower standard in the form of a label which can reasonably be expected to remain affixed to the mower during the period the mower is capable of being used. Such labeling shall be deemed to be a "certificate" of compliance as that term is used in section 14 of the act. (15 U.S.C. 2063).

(b) *Contents of certification label.* The certification labels required by this section shall clearly and legibly set forth the following information:

(1) The statement "Meets CPSC blade safety requirements for walk-behind rotary power mowers."

(2) An identification of the production lot.

(3) The name of the person or firm issuing the certificate. (See §§ 1205.36 and 1205.37, below).

(4) The location where the product was principally assembled.

(5) The month and year the product was manufactured or if the production lot is based on a period of less than one month, then a more specific date

which relates to the production lot. (If this information has been included on the label under paragraph (b)(2) of this section, it need not be repeated).

(c) *Coding.* Except for the requirements of paragraphs (b)(1) and (b)(3) of this section, all of the information required by § 1205.35 may be in code, provided the person or firm issuing the certificate maintains a written record of the meaning of each symbol used in the code that can be made available to the distributor, retailer, consumer, and the Commission upon request.

(d) *Placement of label.* The label required by this section must be visible and legible to the ultimate purchaser of the lawn mower prior to purchase. Where the label is not visible to the consumer at the time of sale because of packaging or marketing practices, an additional or temporary label or notice stating "Meets CPSC blade safety requirements for walk-behind rotary power mowers" shall also appear on the container and promotional material used in connection with the sale of the mowers.

§ 1205.36 Product certification and labeling by private labelers.

(a) *General.* A private labeler who distributes a rotary walk-behind power lawn mower subject to the standard which is manufactured by another person or firm but which is sold under the private labeler's brand or trademark must issue the certificate of compliance required by section 14 of the Consumer Product Safety Act and § 1205.35 of this regulation. If the testing or reasonable testing program required by this Subpart B of this Part 1205 has been performed by or for the manufacturer of the product, the private labeler may rely on any such tests to support the certificate of compliance provided the private labeler assumes responsibility for the integrity of the manufacturer's records in accordance with paragraph (b) of this section.

(b) *Responsibility of private labeler.* The private labeler bears responsibility for assuring that all testing required to support the certificate of compliance has been performed properly with passing or acceptable results, and that all records of such tests are accurate and complete.

§ 1205.37 Product certification and labeling by importers.

(a) *General.* The importer of any rotary walk-behind power lawn mower

subject to the standard must issue the certificate of compliance required by section 14(a) of the Act and § 1205.35 of this regulation. If the testing or reasonable testing program required by this Subpart B of Part 1205 has been performed by or for the overseas manufacturer of the product, the importer may rely on any such tests to support the certificate of compliance if the importer is a resident of the United States or has a resident agent in the U.S. and the records are maintained in the United States in accordance with § 1205.34 above.

(b) *Responsibility of importer.* The importer bears responsibility for assuring that all testing required to support the certificate of compliance has been performed properly with passing or acceptable results, and that all records of such tests are accurate and complete.

§ 1205.38 Certification responsibility; multiple parties.

If there is more than one party otherwise subject to the requirements of this Subpart B of Part 1205 for a given mower, only the party closest to the consumer in the distribution chain need issue a certificate.

Interested persons are invited to submit written comments regarding these regulations on or before April 16, 1979.

Comments received after this date will be considered to the extent practicable. Such comments should be accompanied, to the extent possible, by supporting data or documentation. Requests for confidentiality of documentation will be handled in accordance with the Freedom of Information Act, as amended, 5 U.S.C. 552; the Commission's interim regulations issued under that act (16 CFR Part 1015); and the provisions of section 6(a)(2) of the Consumer Product Safety Act (15 U.S.C. 2055(a)(2)).

Written comments and any accompanying materials should be submitted preferably in five copies, to the Secretary, Consumer Product Safety Commission, Washington, D.C. 20207. Comments received in response to this proposal will be available for public inspection in the Office of the Secretary 3d Floor, 1111 18th Street, NW., Washington, D.C. during working hours, Monday through Friday.

Dated: February 12, 1979.

SADYE E. DUNN,
Secretary, Consumer Product
Safety Commission.

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