

The “Mr. Good Egg Farmer” Model Tractor Overturn Activity Instructor’s Guide and Activity Materials

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Promoting ROPS and Seat Belts on Family Farm Tractors
Project

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The "Mr. Good Egg Farmer" Model Tractor Overturn Activity

Instructor's Guide and Activity Materials

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Overview

During a tractor overturn a rollover protective structure (ROPS) and seat belt is 99% effective in preventing injury to the operator. It is estimated that when tractors without ROPS overturn, the operator is killed about one-fifth of the time or more. Some farmers survive these overturns, but many are injured, some severely and sometimes these injuries result in permanent disabilities. A ROPS and a fastened seat belt can prevent nearly all of these injuries and deaths.

This activity demonstrates the effectiveness of a rollover protective structure (ROPS) and seat belt. It uses a 1/16 scale model tractor without a ROPS and seat belt, and the same tractor (or a second tractor) fitted with a ROPS and seat belt. The tractor operators are simulated with a raw eggs with faces drawn on them with felt tipped pens. The eggs are called "Mr. Good Egg farmers."

The demonstration involves three steps. First, a "Mr. Good Egg farmer is placed on the tractor seat of the model tractor without a ROPS and seat belt. The tractor is then run across a cardboard bridge placed on the floor or the top of a large table. A portion of the bridge side fails under the weight of the tractor and a sideways overturn results. (The bridge represents the bank along a stream or gully and the failure represents the slumping of the edge of the bank under the weight of the tractor.) The overturn almost always results in the Mr. Good Egg farmer being crushed.

Second, the tractor is then retrofitted with a ROPS (or a second similar model tractor equipped with a ROPS is substituted for the first tractor). The procedure is repeated. As the tractor runs across the cardboard bridge and the "bank" fails, a sideways overturn results. The ROPS keeps the tractor from rolling on top of and crushing the second Mr. Good Egg farmer, but the egg is thrown from the tractor during the overturn and usually breaks during its impact with the surface of the floor or desk.

A third Mr. Good Egg farmer is then attached to the seat of the tractor ROPS-equipped tractor. Two pieces of Velcro sticky-backed tape are attached to the tractor seat back and bottom. Then two pieces of the matching Velcro tape is stuck to the back and bottom of the egg. When the egg is pressed into place on the tractor seat, the Velcro acts like a seat belt. It holds the egg firmly in place on the tractor seat even when the tractor is turned upside down and shaken.

Next, the tractor is run across the cardboard bridge, the "bank" fails, and a sideways overturn results. But this Mr. Good Egg farmer is almost always undamaged because it stays in the tractor seat and within the frame of safety provided by the ROPS.

This activity requires a minimum of effort and equipment on the part of the instructor. A list of all the materials needed and instructions for their assembly are provided in this

document. All of these materials are easily available and once assembled can be reused many times with a minimum of preparation time. The only consumables are the raw eggs which can be replenished at any supermarket. Gathering the materials, constructing the simple apparatus needed, and carrying out the demonstration is also a good class project for vocational agriculture students.

Once you have constructed the apparatus and gathered the materials, allow about one hour to complete the activity with 30 minutes for the demonstration and another 30 minutes for discussion and follow-up activities. A set of follow-up questions and materials are included in this instructor's copy.

Purpose and Objectives

The activity illustrates that tractor rollover protective structures (ROPS) and seat belts, while not capable of preventing overturns, are extremely effective in minimizing the terrible injury cost, and social consequences of tractor overturn events. The activity's learning outcomes or objectives for the participants are listed below.

1. Observe and describe the damage to the Mr. Good Egg farmer operators that result from overturns of a model tractor:
 - without a ROPS
 - with a ROPS but where the operator is unbelted
 - with a ROPS and where the operator is belted in place within "the frame of safety"
2. Generalize and describe how the model tractor and Mr. Good Egg farmer activity illustrate the protective value of ROPS to operators of real tractors.
3. Promote thoughts, favorable attitudes, and discussion about the value of ROPS in preventing injuries from tractor overturns.
4. Evaluate and discuss the cost effectiveness of ROPS and seat belts in terms of their potential for
 - saving money by preventing injury and death
 - providing peace of mind to tractor operators and their family members
 - ensuring the continued operation of family farms and a way of life
5. Promote farm family members' increased interest in and efforts to acquire ROPS for their tractors.
6. Promote farmers' increased frequency of wearing seat belts when operating ROPS equipped tractors
7. Involve farm youth vocational agriculture students in the construction and use of the Mr. Good Egg Farmer materials and activities to disseminate the educational messages to members of the farm community

Intended Audience

The activity is designed to be used with groups that range in age from farm youth in 4-H groups to farm community adults.

The activity is a simple concrete and graphic demonstration of the protection provided by ROPS and seat belts. The principles of how and why a ROPS and seat belt protects the tractor operator during an overturn are easily apparent to both children and adults.

The follow-up questions, discussion, and activities can help tailor the activity to the needs, interests, and capabilities of the group. For example, adult farmers who participate in the activity may be stimulated to learn more about how to obtain a ROPS and the costs involved. Children are not usually involved in such decisions, but they may be stimulated to think about and ask their parents to get ROPS on tractors and to wear the seat belts on these tractors. The children may also be more inclined to wear the seat belt when they drive ROPS-equipped tractors.

Instructions for Gathering and Preparing the Materials

All the materials needed for this activity are inexpensive, readily available, easily assembled, and once prepared can be used repeatedly with little effort and preparation time. However, about three or four hours are needed to gather and assemble the materials the first time. These instructions are broken into three parts. These include (a) obtaining and preparing the model tractor(s) with and without a ROPS, (b) constructing the cardboard(or 1/4 inch plywood if one wishes) bridge and ramp needed for the demonstration, and (c) gathering the other materials needed to complete the activity. Follow these steps to gather and assemble the materials needed for the activity. Note that the construction, preparation, and use of these materials is a good project for vocational agriculture students.

Preparing the Model Tractor(s)

Either one or two model tractors can be used for the activity. If one model tractor is used it must come without a ROPS and a model ROPS for the tractor must be constructed to retrofit the model tractor. If two model tractors are used, one must come without a ROPS and the other already fitted with a ROPS. Directions for both alternatives are provided.

1. Obtain a 1/16th scale model farm tractor without a ROPS. These are available from tractor equipment dealers and farm supply stores for about \$30. (Many farm safety instructors already have model tractors.) Make sure the real tractor that the model represents has a ROPS retrofit package available. (You don't want to convey false information to the participants.) Also make sure the scale model tractor you purchase has sufficient space on the rear axle between the tractor fenders and the tractor body to fit a small clamp (see Figure 1). Check to make sure that the seat is back far enough from the steering wheel that a medium size hen's egg can be placed in the seat (see Figure 2).

A 1/16th scale model of an International Fat-mall 856 works well because (a) there is 1/2 inch of space on the rear axle housing between the tractor fender and the tractor body, (b) the seat is large enough and back far enough from the steering wheel to accommodate even a large hen's egg, (c) the seat is large enough to attach two Velcro sticky back squares, one on the seat bottom and the other on the upright seat back, and (d) a retrofit ROPS package is available for actual Farmal 856 tractors. The instructions and drawings that follow explain how to construct a ROPS for this 1/16th inch scale tractor. If you use another tractor scale model, you will need to adjust the specifications given in Figures 1 - 9.

NOTE: An easier alternative is to obtain two similar size 1/16th scale model tractors, one that comes equipped with a ROPS and one that does not. Both

tractors must have a seat and operator's compartment large enough to seat a medium sized hen's egg. In this case two tractors are used to conduct the demonstration, one without a ROPS for the first demonstration, the second tractor with the ROPS and the unbelted Mr. Good Egg farmer for the second demonstrations, and the same ROPS-equipped model tractor with the belted egg operator for the third demonstration. If you choose this alternative, skip instructions 2 through 6 and go to the Constructing the Cardboard Bridge section (item 8).

2. If you decide to use one model tractor and a retrofit model ROPS, attach two 1/2 inch diameter vinyl coated steel wire harness clamps to the model tractor rear axle, placing each clamp between the fender and the tractor body as shown in Figure 3. These clamps can be purchased in nearly any automotive, hardware, or electrical supply store.

3. Obtain a 1/4 inch diameter steel rod 14.5 inches long. Using a tap and die set, thread one inch of both ends of the rod. Use a 1/4 inch x 20 threads per inch die (see Figure 4).

4. Make two marks on the same side of the steel rod 5 1/2 inches from each end. Place one end of the steel rod upright in a vice. Heat the rod with a torch at the 5 1/2 inch mark and bend the rod inward to achieve a 90 degree angle. Repeat the procedure for the other end of the rod. Bend the rod to the dimensions listed in Figure 5. Be careful to make the bends 90 degrees each and in the same plane to keep the upright portions of the two sides parallel in both planes. If it is bent properly, when it is laid down the U-shaped rod should lie flat on the workbench or table top. If you don't have a torch to heat the rod, notch the inside bend of the rod with a triangular file at the two marks 5 1/2 inches from each end of the rod. Then bend each 6 inch end of the rod to a 90 degree angle using a vice to hold the 6 inch upright portion close to the notch. Then bend and tap the rod with a ball peen hammer until a fairly tight rounded bend brings the top portion of the ROPS to a 90 degree angle with the 6 inch upright side. Repeat the process for the other side. Again, be careful to keep the upright portions of the two sides of the bent rod parallel in both planes.

5. Place one 1/4 inch nut on each end of the model ROPS you have just constructed. Screw each nut all the way up to the end of the threads on each side of the rod and tighten finger tight. (These two nuts act as spacers that keep the rod from falling through the holes in the clamp.) see Figure 6.

6. Place the ends of the model ROPS through the holes in the clamps (see Figure 7). Add a second 1/4 inch nut to each side of the model ROPS (see Figure 8.) Then tighten the nuts slightly and adjust the angle of the ROPS to the proper position by tilting it back or forward as needed (see Figure 8). Then tighten the second nuts sufficiently to hold the clamps on the axle in place. Finger tight is usually sufficient to hold the model ROPS firmly in place, especially if vinyl coated clamps are used. Otherwise a small socket wrench with a screwdriver handle works well.

7. Remove the model ROPS. Paint the unthreaded portion with a flat black paint. Don't paint the threaded ends (see Figure 5). Allow the paint to dry and then reinstall the ROPS on the model tractor.

Constructing the Cardboard Bridge

8. Constructing the cardboard bridge is the next step. First, find a large heavy corrugated cardboard box. Look at Figures 10 - 13 and follow these instructions

- Use a retractable blade knife and a straight edge to cut a rectangular piece of cardboard about 14 inches wide x 44 inches long.
- The 34 inch section of the bridge needs to be one-piece of cardboard with no folds. The 10 inch ramp with its fold can be cut from the cardboard box at the end of the box where the cardboard is folded upward. Leave the 10 inch ramp attached to the main part of the cardboard bridge (see Figure 10)).
- Using a retractable knife and a straight edge, cut a rectangle 16 inches long by 6 inches wide in the side of the 34 inch long cardboard bridge as shown in Figure 10. Cut the two 6 inch ends of this flap all the way through. Cut the 16 inch side of the rectangle from the top side and cut only the top layer of the cardboard leaving the lower layer as a hinge. When you have made this cut, fold the 16 inch long flap down.

9. Making the bridge supports is the next step. Cut two 12 inch sections and one 30 inch section from a 2 x 4 inch stud or use scrap. Place the pieces of 2 x 4s on a large tabletop or the floor as shown in Figure 11. Make one more 5 inch long section of 2 x 4. Attach a 2 foot length of string to one end of the block by using a screw or a nail, or by drilling a hole through one end of the block.

10. Place the cardboard bridge and ramp on top of the 2 x 4 supports as shown in Figure 12. You are almost ready to do the demonstration.

11. Place the 5 inch section of 2 x 4 with the string attached to it under the 16 inch hinged section of the bridge as shown in Figure 13. This section of the bridge simulates an embankment failure when the block is pulled out from under the cardboard flap.

12. Before you conduct the activity, test your apparatus. Set a model tractor on the bridge as shown in Figure 13. Then roll the tractor slowly onto the cardboard flap. When the rear wheel of the tractor is 2 inches out on the flap, pull the 5 inch supporting block out and away from the bridge. The tractor should overturn sideways with enough force to crush a Mr. Good Egg farmer who is not protected by a ROPS and seat belt.

Gathering the Other Materials

The other materials needed for the activity are available from many places and very easy to assemble.

13. Purchase a package or two of Velcro Sticky Back Squares, hook and loop fasteners. These are two-part 7/8 inch squares used to hold picture frames or other objects against a wall or some other surface. These fasteners can be purchased at a supermarket, hardware store, or in the home or hardware section of a general merchandise store. The Velcro sticky fasteners are used to hold the "belted" Mr. Good Egg farmer to the ROPS-equipped model tractor seat.

14. It's a good idea to have a roll of Scotch or masking tape. A strip of tape can be placed on the underside of the bridge to reinforce the hinge on the cardboard flap. Another piece of tape can be used to tape the lower end of the ramp to the table top or to the floor.

15. Obtain five or six different color felt pens. The pens are used to draw faces on the Mr. Good Egg farmers. These can be purchased in any drug store, supermarket, or general merchandise store.

16. Purchase a dozen raw, medium size hen's eggs from a grocery store or supermarket.

17. Obtain a 4 x 6 foot or larger sheet of clear plastic. The plastic sheet is taped to a large table top or to the floor to protect the surface from broken egg white and yolk. Clear plastic sheets are available from scrap wrapping, from hardware stores, farm or construction supply stores.

18. Have a roll of paper towels, a sponge, a bucket of water, and a spray bottle of countertop cleaner handy. These are used to clean up egg white and yolk from crushed Mr. Good Egg farmers who had the misfortune of overturning a model tractor that was not fitted with a ROPS, and/or who were on a ROPS-equipped tractor but who were not wearing a seat belt during the overturn.

Diagrams For Constructing the ROPS and Bridge

The six pages of figures that follow illustrate how to select a model tractor for the Mr. Good Egg activity, and how to fit this tractor with a model ROPS. Other diagrams also illustrate how to construct the cardboard bridge with its ramp and break-away embankment.

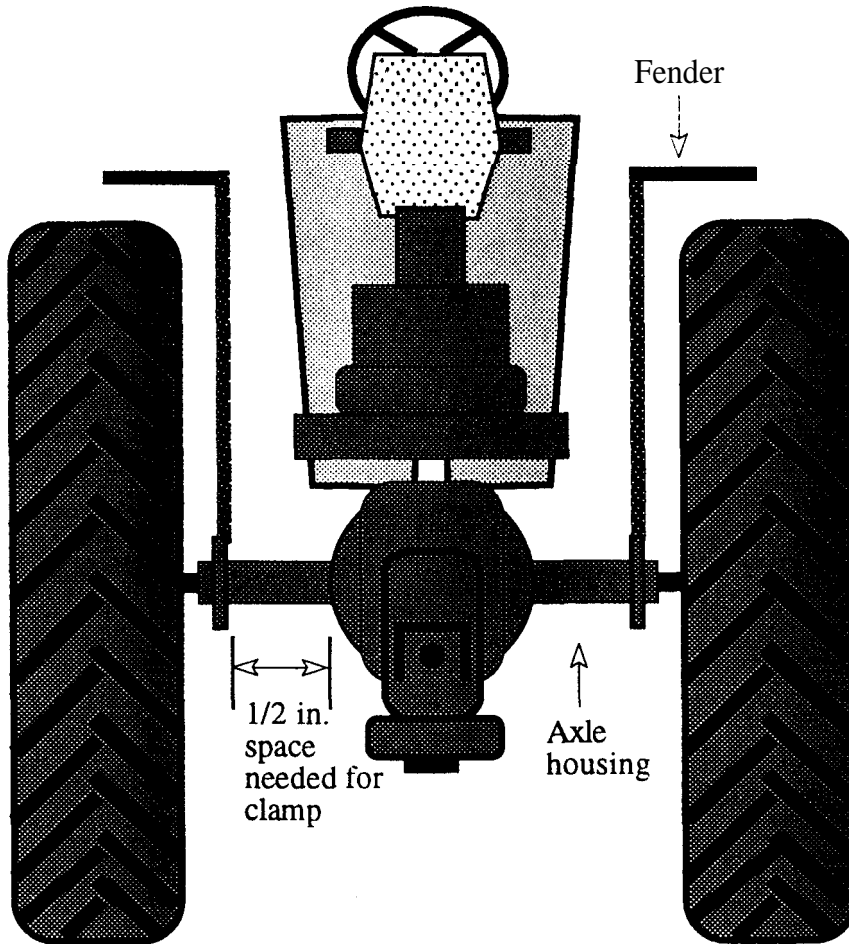


Figure 1: Back view of model tractor

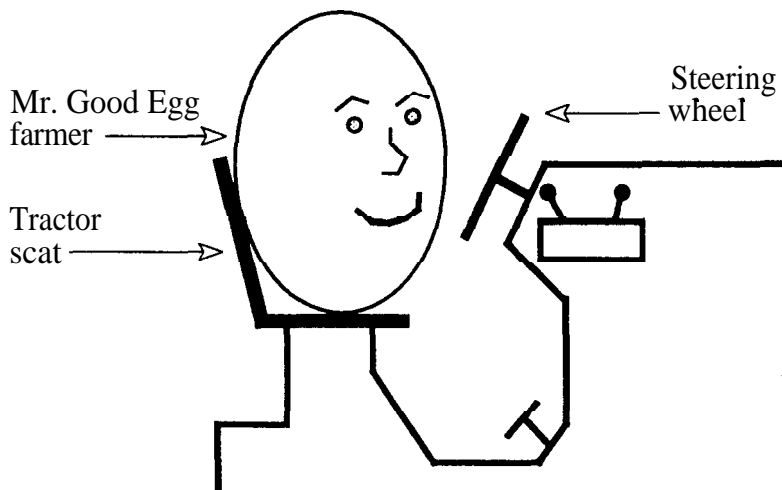


Figure 2: Mr. Good Egg farmer on tractor seat

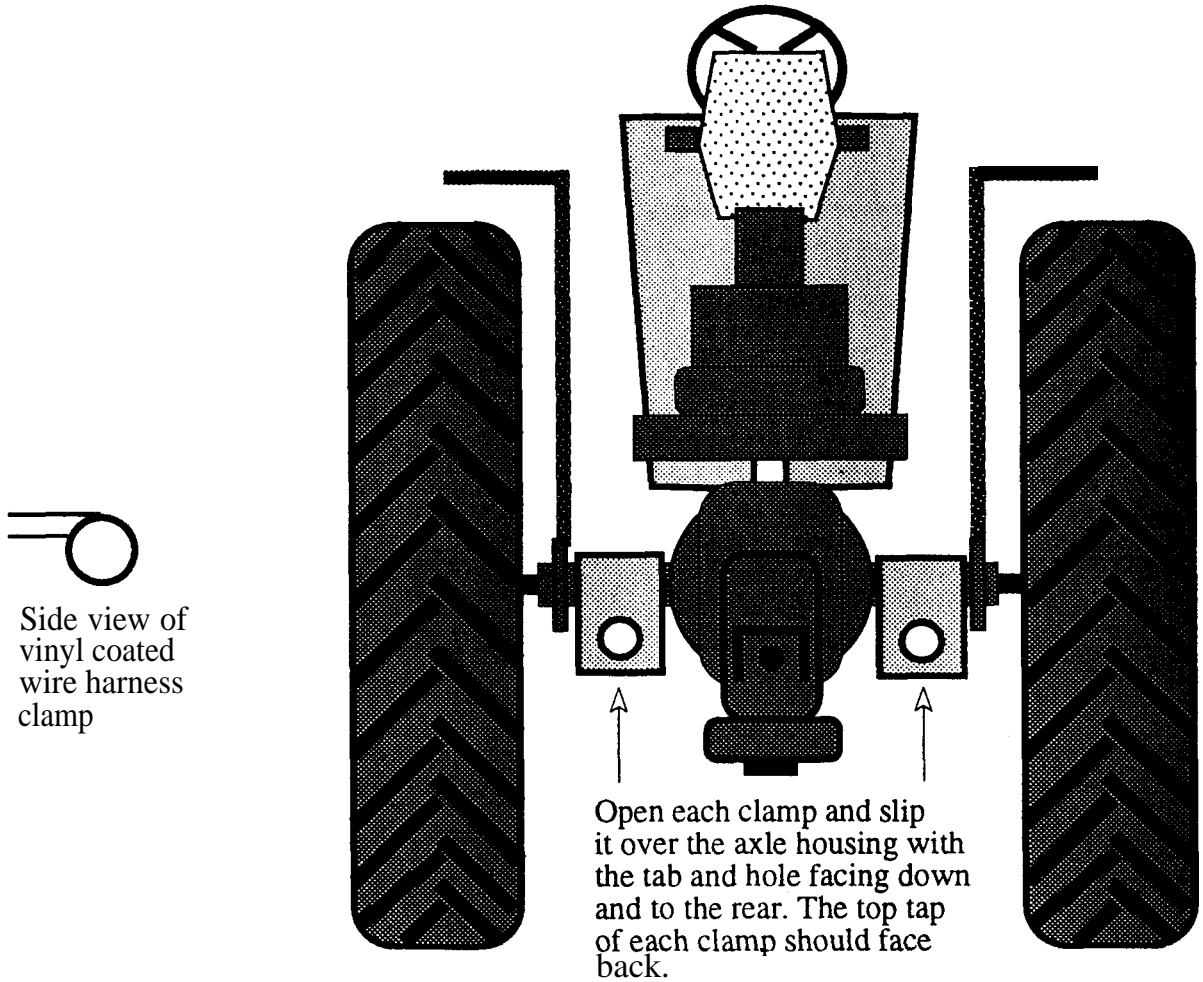


Figure 3: Positioning vinyl coated wire harness clamps on the axle housing

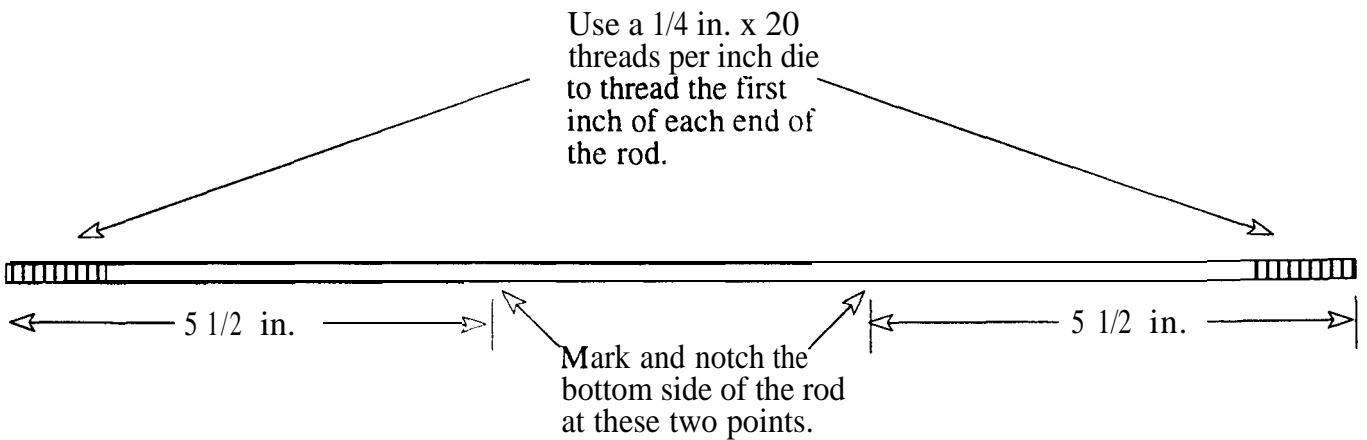
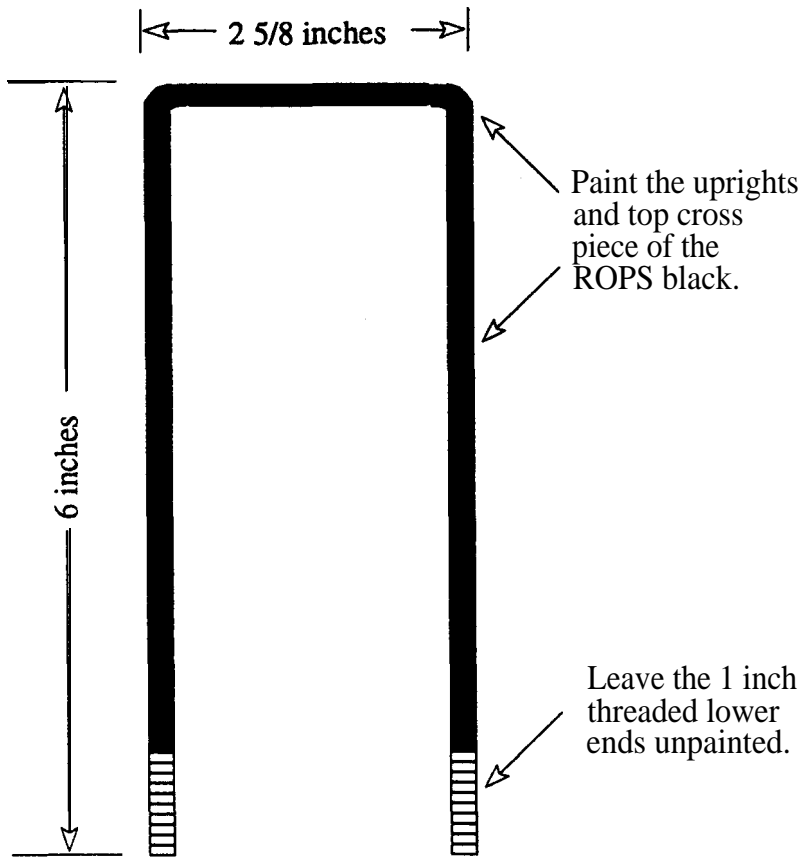


Figure 4: Steel rod 1/4 in. diameter x 14 in. long with threaded ends



Use a vise to bend the 1/4 inch steel bar at the points marked in Figure 4. It helps to heat the rod at the bend points until it is cherry red. Careful bending and peening at a deeper notch made by a triangular file also works well.

Figure 5: Dimensions of finished model ROPS

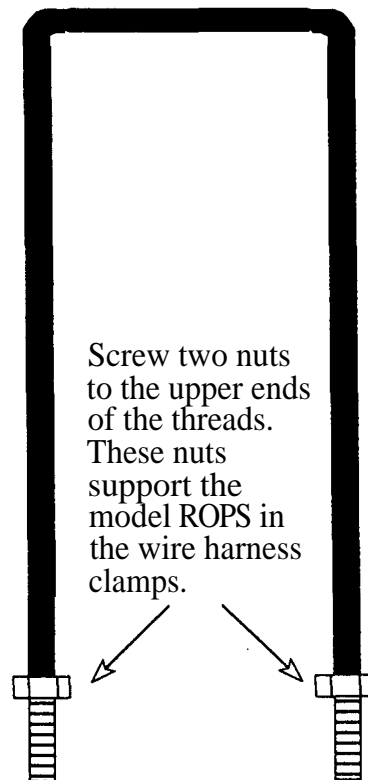


Figure 6: Position of support nuts

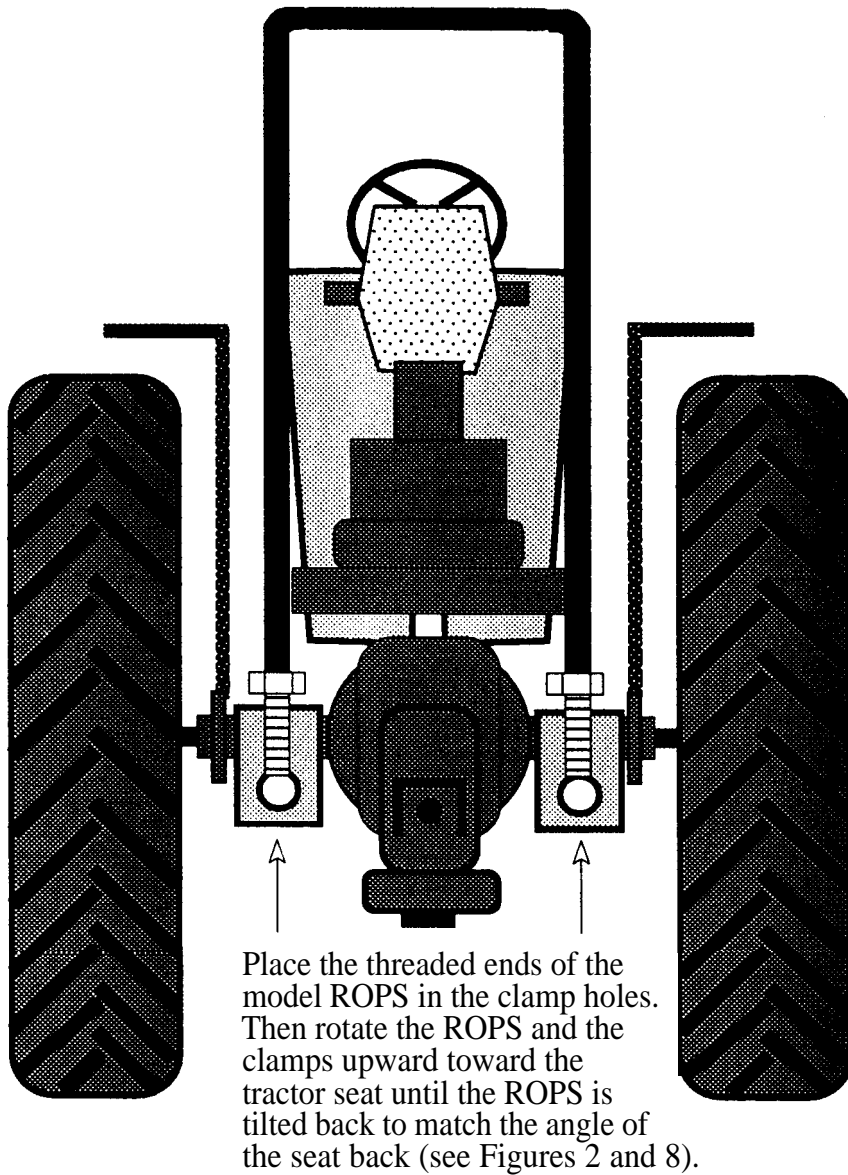


Figure 7: Placing the ROPS on the model tractor

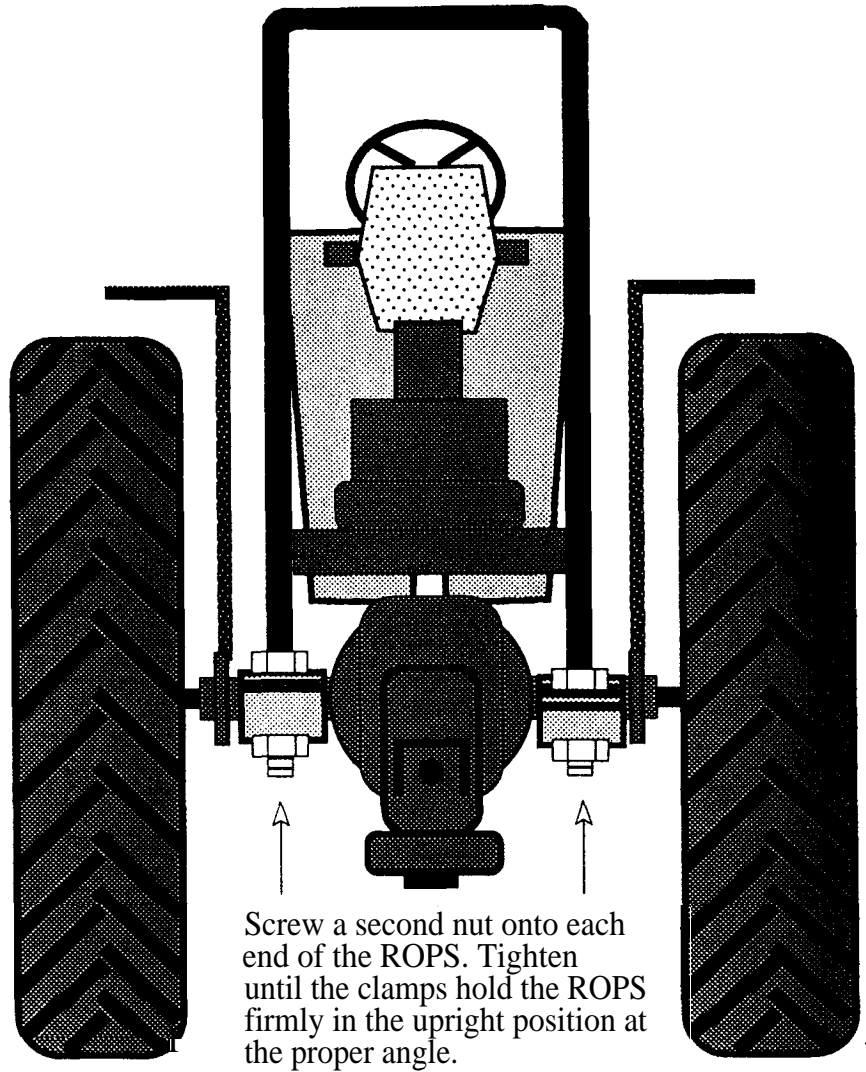


Figure 8: Attaching the ROPS to the model tractor

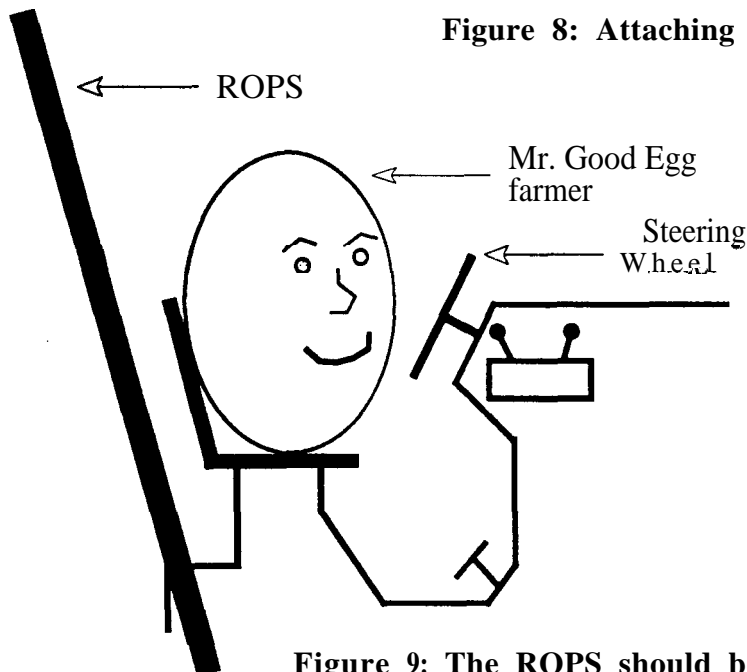


Figure 9: The ROPS should be angled back

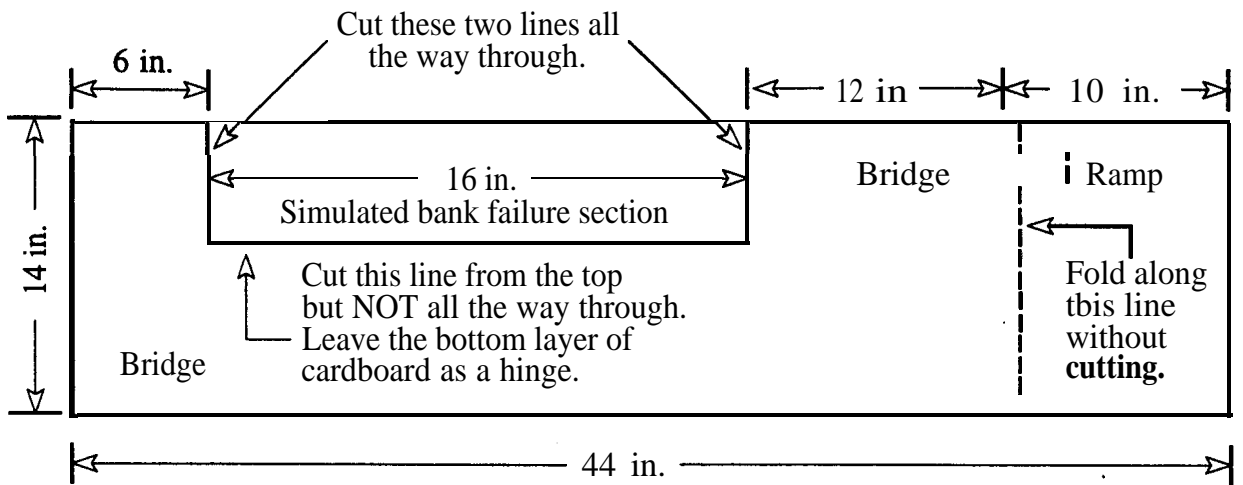


Figure 10: Top view of cardboard bridge

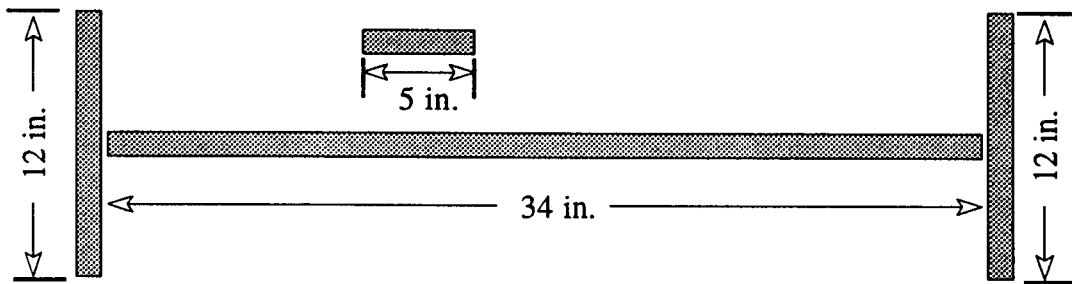


Figure 11: Top view of 2 x 4 bridge support pieces

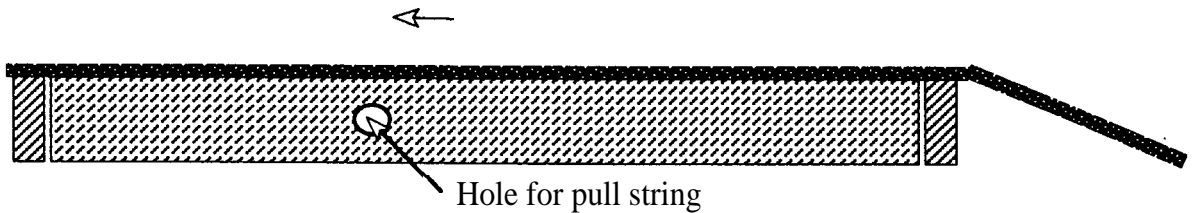


Figure 12: Side view of 2 x 4 bridge supports and cardboard bridge and ramp

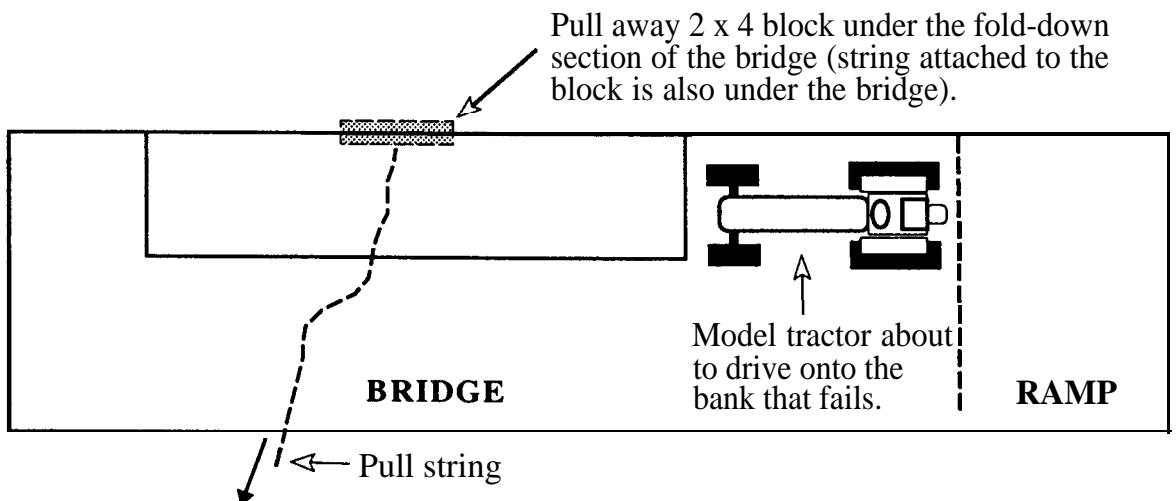


Figure 13: Top view of model tractor about to run onto a bank failure and overturn

How to Conduct the Mr. Good Egg Farmer Activity

These instructions are divided into three parts. These parts explain what to do before the demonstration, during the demonstration, and after the demonstration.

Before the Demonstration

1. Read through this entire instructor's copy. Decide which way you will conduct the activity (with one or two tractors).
2. Gather the materials, assemble the bridge, and get your ROPS-equipped and nonROPS-equipped tractor(s) ready.
3. Make copies of the activity evaluation form so that these can be completed by participants and collected following the activity.
4. Look through the follow-up notes and materials. Select and duplicate those materials you want to use during the discussion after the demonstration. It is a good idea to have most of these materials available. Participants' questions may arise for which various materials in the follow-up notes may be effective at "teachable moments."
5. Decide where and when you will conduct the activity. Plan to have a place large enough and open enough that all participants can see the demonstration.

During the Demonstration

6. Involve the participants when you conduct the activity. Begin by breaking the larger group of participants into smaller groups of three or four people. Give each one of these small groups a felt tipped marking and a raw hen's egg. Ask each group to draw a face on their Mr. Good Egg farmer, and to name their egg (Mr. Good Egg farmer Sam, or Joe, or Burt, etc.). If they wish, they can also add small paper hats to the eggs by using bits of colored paper and tape.
7. After the participants have finished drawing faces on their Mr. Good Egg farmers, have one person from each small groups draw straws. One straw should be short, one long, and one in-between. When a short straw is drawn that group's Mr. Good Egg gets to ride a tractor without a ROPS. A middle-length straw gets the Mr. Good Egg a ROPS-equipped tractor but no seat belt. The long straw gets the Mr. Good Egg farmer a ROPS-equipped tractor and a seat belt. If you have more than three groups, use the same three straws to redraw after one set of three groups completes drawing their straws.
8. Carry out the procedure in the following order.
 - First, place a "Mr. Good Egg farmer who drew a short straw on the seat of a model tractor without a ROPS and seat belt. Then run the tractor across the cardboard bridge placed on the top of a large table. As the tractor runs onto the flap, have one of the participants pull the block out after the right rear wheel of the tractor has run out onto the flap. The flap will drop and the tractor will overturn sideways: (Tell the participants that the flap represents the bank along a stream or gully giving way under the weight of the tractor. The overturn almost always results in the Mr. Good Egg farmer being crushed.

Repeat the procedure for any other groups who drew a short straw.

- Then, retrofit the tractor with the ROPS you constructed (or use a second similar model tractor equipped with a ROPS). The Mr. Good Egg farmers who drew a middle length straw are placed on this tractor, but are not belted in place on the seat. Then run the tractor across the cardboard bridge. When the "bank" gives way, a sideways overturn results. The ROPS keeps the tractor from rolling on top of and crushing the Mr. Good Egg farmer. However, the egg usually falls from the tractor seat during the overturn and usually breaks during its impact with the surface of the floor or desk.

- The Mr. Good Egg farmers who drew the long straw get the ROPS-equipped tractor and a simulated seat belt. Two Velcro squares of sticky backed fasteners are first attached to the tractor seat bottom and back. Two matching squares of Velcro fasteners are then stuck to the Mr. Good Egg's bottom and back. When the egg is pressed into place on the tractor seat, the Velcro acts like a seat belt. It holds the egg firmly in place on the tractor seat even when the tractor is turned upside down and shaken. Next, the tractor is run across the cardboard bridge, the "bank" fails, and a sideways overturn results. But this Mr. Good Egg farmer is almost always undamaged because it stays in the tractor seat and within the frame of safety provided by the ROPS.

8. Appoint a helper or two from each group to assist you with each demonstration. These include a person to push the tractor slowly across the bridge, a person to pull the support block, and a person to clean up the mess (after first letting everyone get a good look at it). You may also want to appoint a photographer or two so that close up color print photos of the tractors, ROPS, and results can be captured. These can be blown up to 8 x 10 inch prints and used as part of poster displays and demonstrations for school and community projects.

After the Demonstration

9. It is important to allow the participants to discuss the activity. The questions and activities that are included in the discussion notes can assist this process. More ideas, information, and discussion topics are included in the Notes than can be used in one session. Use those that you feel are most appropriate to the group you are working with. Consider using some of the other activities and materials at other sessions with the same group of participants. Don't read the Notes to the participants. Rather, use materials in the notes in the discussion of the activity. Have the participants read portions of the Notes as appropriate.

10. When you have completed the entire activity, give each participant a copy of the one-page evaluation form. Ask each participant to complete all the items on the form and then return the completed forms to you.

11. Please also complete the instructor's evaluation form. Put this on top of the participants' evaluation forms and bundle the whole set together with a rubber band or large envelope.

12. Then return the forms to Vickie Brandt (Barren County) or Joan Muehlbauer (Fleming County) or mail the materials directly to:

Henry Cole
 Southeast Center for Agricultural Health and Injury Prevention
 1141 Red Mile Road
 University of Kentucky
 Lexington, KY 40536-0084

Follow-up Notes, Questions, and Activities

Use these questions and notes when the participants have completed the Mr. Good Egg activity. The questions, notes, and illustrations provide additional information related to the activity. The instructor can also have handy and use many other graphs, tables, materials, and activities developed by the CPHF ROPS project and the TRAC-SAFE project. Having additional resources available is an effective way to provide information to participants at teachable moments "teachable" moments when they raise questions.

More follow-up activities than can be used in one session are included here. If an instructor has an opportunity to conduct a series of sessions with a group of participants, a program of activities can be developed around the Mr. Good Egg activity or other CPHF KY ROPS Project and TRAC-SAFE materials and activities. It is more effective to conduct a series of related shorter activities and presentations with a group of participants over several meetings than it is to try to cram too much into one longer session. It is also very important to allow time for the participants to interact, talk to one another, and collaborate as the activities are completed.

Discussion Questions

1. Are real farmers hurt and killed in overturns of real tractors?

Nearly 400 farmers die in tractor overturns in the United States Each year. In 1994-95 in Kentucky, 41 farmers died in tractor overturns. All would have lived if they had been on ROPS-equipped tractor and had been wearing a seat belt. (See the "A Tough Quiz" figure.)

2. Are ROPS and seat belts on real tractors really that helpful?

A ROPS and seat belt can't keep a person from tipping a tractor over, but they do protect a person from being hurt or killed. ROPS and seat belts used together are 99% effective in preventing injuries and fatalities during tractor overturns. Why do you think this is? What does it mean to say that a ROPS and a fastened seat belt is 99% effective? (It means that out of every 100 people who overturn a ROPS-equipped tractor, and who are wearing the seat belt, that only one of these persons is hurt.)

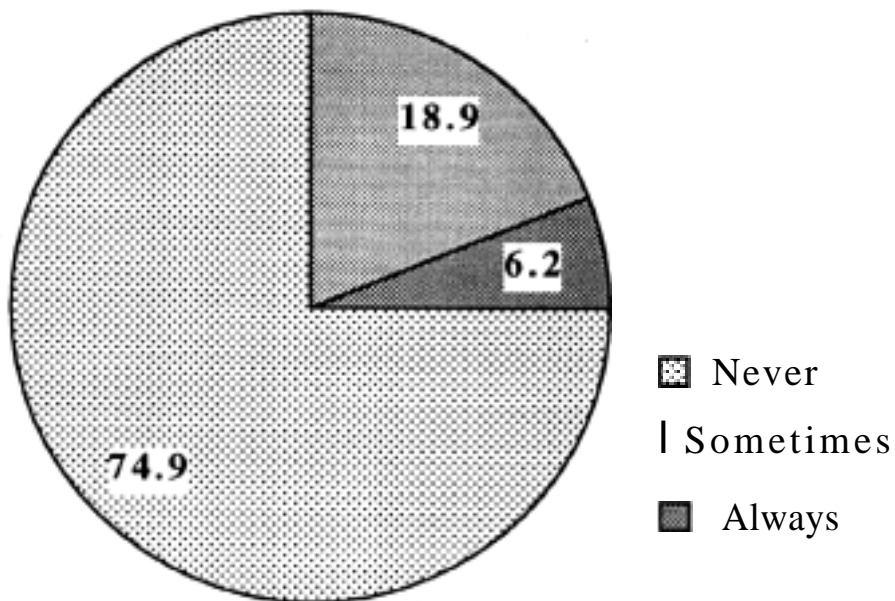
3. How many Kentucky farmers are protected by ROPS and seat belts?

This is a good time to show the three overhead transparencies titled, "100 Kentucky Mr. Good Egg Farmers on their Tractors." These drawings show 100 farmers. Only six of these 100 farmers are fully protected by a ROPS and seat belt. Another 24 farmers are partially protected by a ROPS, but don't wear the seat belt. The bad news is that 70 other farmers are completely unprotected by either a ROPS or a seat belt.

This information came from a study of Kentucky farmers and farms in two Central Kentucky counties. A more recent study of 1,648 Kentucky farms in four different counties suggests that these same percentages are about right.

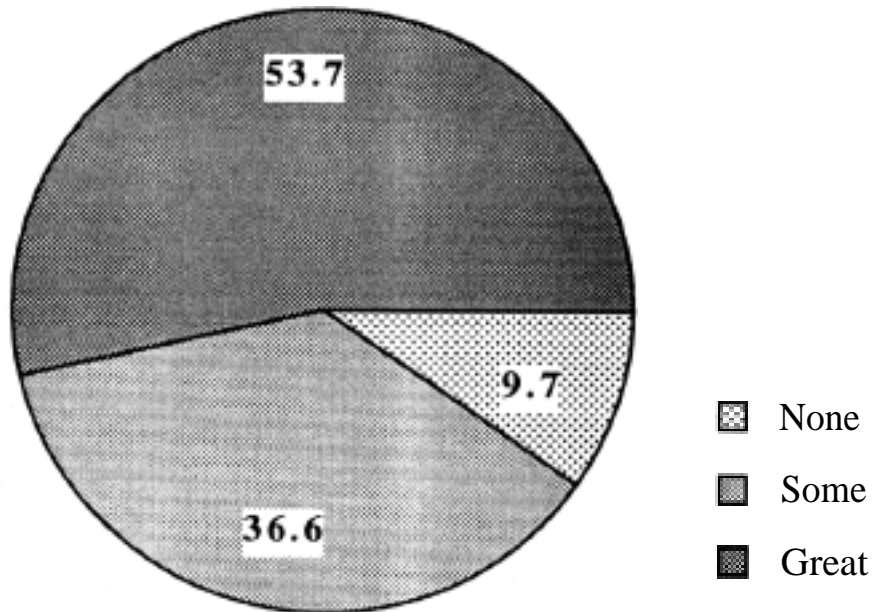
The more recent four county study found that 721 farmers had tractors with ROPS, but about 75% of these farmers said they never wore the seat belt. (See the figure below)

Kentucky Farmers' Seat Belt Wearing Behavior on ROPS Tractors (n = 721)



The same four county study also asked 1,448 farmers how much protection they thought a ROPS and fastened seat belt provided during a tractor overturn. Nearly 54% said that a ROPS and seat belt provide great protection and keep the operator from being hurt. But about 10% said that the ROPS and seat belt provided no protection. (See the graph on the next page.) Now that you have seen the Mr. Good Egg farmer demonstration how would you answer this question? Why?

Kentucky Farmers' Judgment of the Protective Value of a ROPS and Seat Belt (n = 1,515)



4. How can you tell which tractors and which tasks are the most likely to result in a tractor overturn, and which tractors are in most need of ROPS protection?

You can use the TRAC-SAFE "Tractor Risk Identification Factors" survey form. One form can be completed for each tractor on your farm. That way you can decide which tractors you want to retrofit with a ROPS first, although it is always a good idea to have ROPS and seat belts on all tractors. (Then the instructor can demonstrate how to use the TRIF sheet.)

5. Doesn't it cost too much to get a ROPS on a tractor? Most farmers don't have enough money to buy a ROPS.

*Most tractors manufactured after 1970 can be fitted with a ROPS for about \$600 to \$800. This sounds like a lot of money, but just think of the economic and health risks a farmer takes by not having a ROPS on a tractor. A recent study at the University of Kentucky estimated that a serious **injury** from a tractor overturn could cost \$140,000 in medical bills alone, plus lost production and other non-medical costs. In one third of the cases when a farm has this type of expensive injury (or a fatality) from a tractor overturn, the family farm is lost. Look at the graph on the next page that shows the cost of a ROPS compared to the medical costs that can result from a serious overturn injury. Doesn't it make sense to view a ROPS and seat belt as a good investment in saving lives, money and a way of life for the farmer?*

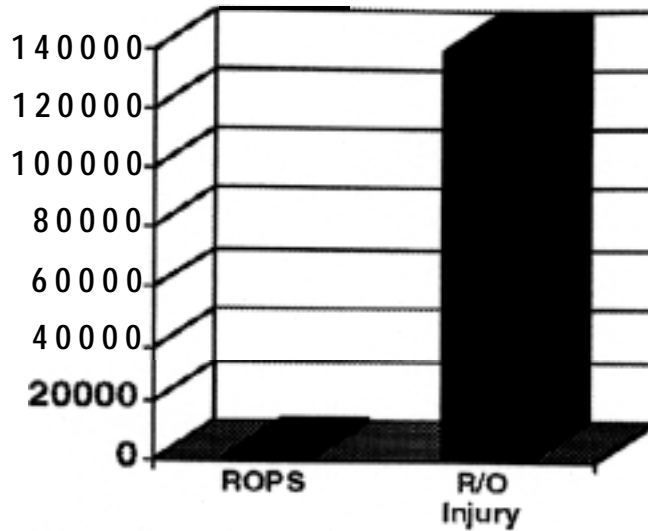


Figure 1: Dollar cost of a ROPS compared to the cost of a serious overturn injury

6. Won't a ROPS be a problem because it won't allow the tractor to fit into barns and sheds?

This can sometimes be a problem but is usually not. Fold-down ROPS are available for many tractors. These allow the ROPS to be folded down below the level of the tractor hood so the machine can be placed in a building with low clearance.

Many farmers also have the misconception that a ROPS is larger than its actual size and that a tractor with a ROPS won't fit into their barn. But this is usually not the case. This can be shown by measuring the size of the barn doors and the size of the tractor and ROPS. (This is a good place to demonstrate and distribute the TRAC-SAFE activity concerned with making and comparing the actual measurement of barn doorways and tractor dimensions with and without ROPS.)

7. How can I go about getting a ROPS?

This is a good point to handout and discuss the "How to Get a ROPS and Seat belt" flyer developed by the KY CPHF ROPS project. The flyer outlines the seven things to know and do to get a ROPS, and gives the names and phone numbers of local equipment dealers who have ROPS for various makes of tractors. It also provides reasons why ROPS are a good idea, as well as information about low interest loans for the purchase of ROPS.

8. What are some other reasons for getting ROPS and seat belts?

This is a good place to use some of the KY CPHF Public Service Announcements (PSAs) and skits with the group. Select PSAs and skits that are relevant to the group and the questions that have arisen in the discussion. Then ask groups of three or four people to read the PSAs and skits. For example- the Jim and Lisa Barnes serial six PSAs can be read orally by six different participants in 30 seconds each for a total time

of three minutes of class time. Participants like these PSAs and stories and are usually willing to read and discuss these.

9. *Can a fanner make a ROPS for his or her tractor and save time and money?*

*A single bolt from a set of I2 used to install a **ROPS** can costs \$26! The steel in the ROPS structure and in its bolts is made specially for this purpose. The steel is extra strong and without flaws, but not too brittle so that it is somewhat flexible.*

*Commercially manufactured ROPS are constructed to strict specifications and tested for strength and durability. It would cost the farmer far more to construct a homemade ROPS from the proper materials than it would to purchase a ready-made ROPS from the dealer. A farmer cannot easily obtain the expensive materials needed to construct a sound homemade ROPS that is properly engineered. It would also take many hours for the farmer to construct the ROPS, require good **precision** metal cutting, drilling, and welding equipment, as well as considerable skill in using this equipment.*

10. *How many Kentucky farmers overturn a tractor in their lifetimes?*

A large University of Kentucky study of more than 2,000 farmers from 60 Kentucky counties found that one out of every nine farmers age 55 or older had overturned a tractor once in their lifetimes and survived. Some of these farmers were not injured, some received minor injuries, others severe injuries, and some suffered permanent disabilities. During this same period of 50 years or so it is estimated that over 1,000 farmers also died in tractor overturns. if ROPS and seat belts had been available and worn, nearly all of these farmers would have ~~not~~ been injured or killed in overturns. (ROPS and seat belts on tractors did not become widely available until about 1990.)

11. *Do you have a story you would like to share about a tractor overturn close call or injury event.?*

This would be a good time to use the "My Experiences with Tractor Overturns" and the "My Story" activities developed by the CPHF KY ROPS Project. Note that you might want to conduct a second and follow-up session using this activity with the participants.

12. *What is the moral of the Mr. Good Egg farmer activity?*

Ask four participants to volunteer to read the following short passages to the whole group or to each other in their small groups. Then ask the participants to discuss and evaluate the material and the moral of the Mr. Good Egg farmer activity.

Narrator: You may have noticed that the Mr. Good Egg farmer activity has a lot in common with the story of the three little piggys and the wolf. You know the story. Remember?

First Reader: The first little piggy was a good guy. He worked hard, was always in a hurry, and didn't want to spend money if he didn't need to. He saved money and time by building his house out of straw. You know what happened to him when the wolf came calling!

Second Reader: The second little piggy was also a good guy who worked hard and tried to save his money. He also was in a hurry and saved time and money by

building his house out of sticks. He thought he would be safe when the wolf came calling, but you know what happened to him too.

Third Reader:

The third little piggy also worked hard and also had much to do and was careful with his money. But the experience of the other two little piggys made him think about his situation, his family, and his future. So he spent the extra time and money to build his house out of bricks. When the wolf came calling he was ready. He lived a long and happy life.

Narrator:

A farmer can be careful, but he can't keep the "wolf" of a tractor overturn away from his farm, especially in Kentucky with all its rollover hazards. But a farmer can spend a little of his precious time and money to get a ROPS and seat belt on his tractor. And then he can see to it that he and anyone else who drives the tractor wears the seat belt! While a ROPS and seat belt can't keep the wolf of an overturn away from the farm, it can prevent the wolf from biting and hurting the farmer and his loved ones. Be like the smart little piggy who learned from others and who thought about the future. Play it safe! Get a ROPS on your tractor and buckle up!

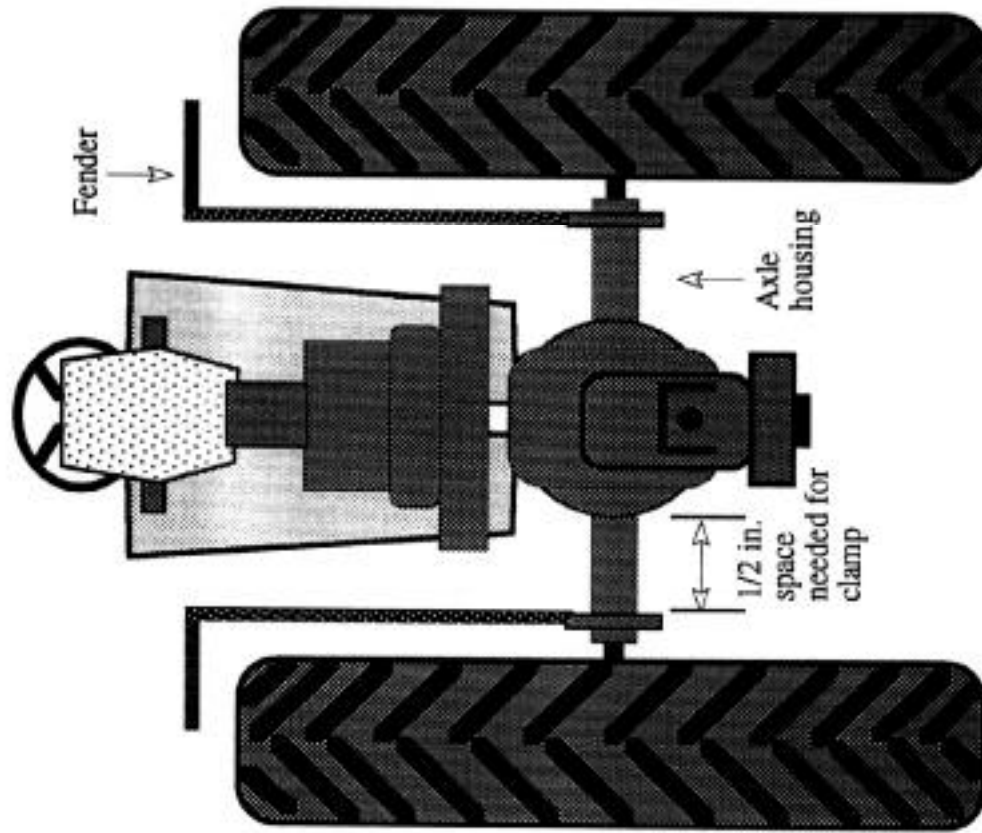
Additional Charts for Teaching The Value of ROPS

Three sets of charts and graphs are provided in this section. To facilitate their use as overhead transparencies and poster displays, each chart or graph is printed in landscape with large type. These graphic materials are useful for follow-up discussions and other tractor safety activities and displays following the Mr. Good Egg Farmer activity. They are also useful as materials for use in other farm safety presentations. The large collection of charts and graphs in this section contain a great deal of information, too much to be used in any one session. Therefore, the instructor should select those graphs and charts that are most useful for the group with whom he or she is working with the Mr. Good Egg Farmer demonstration or some other activity. Selected graphs and charts can also be used to prepare short and effective oral or poster presentations on many aspects of tractor safety. The materials included in this section are intended for this purpose. They provide information from recent studies of tractor overturn hazards, injuries, fatalities, and the prevention of these hazards and injuries. The information and concepts presented in the graphs and charts are of great interest to the farmers we have spoken and interacted with.

ROPS and Seat Belts: The Difference Between Life and Death

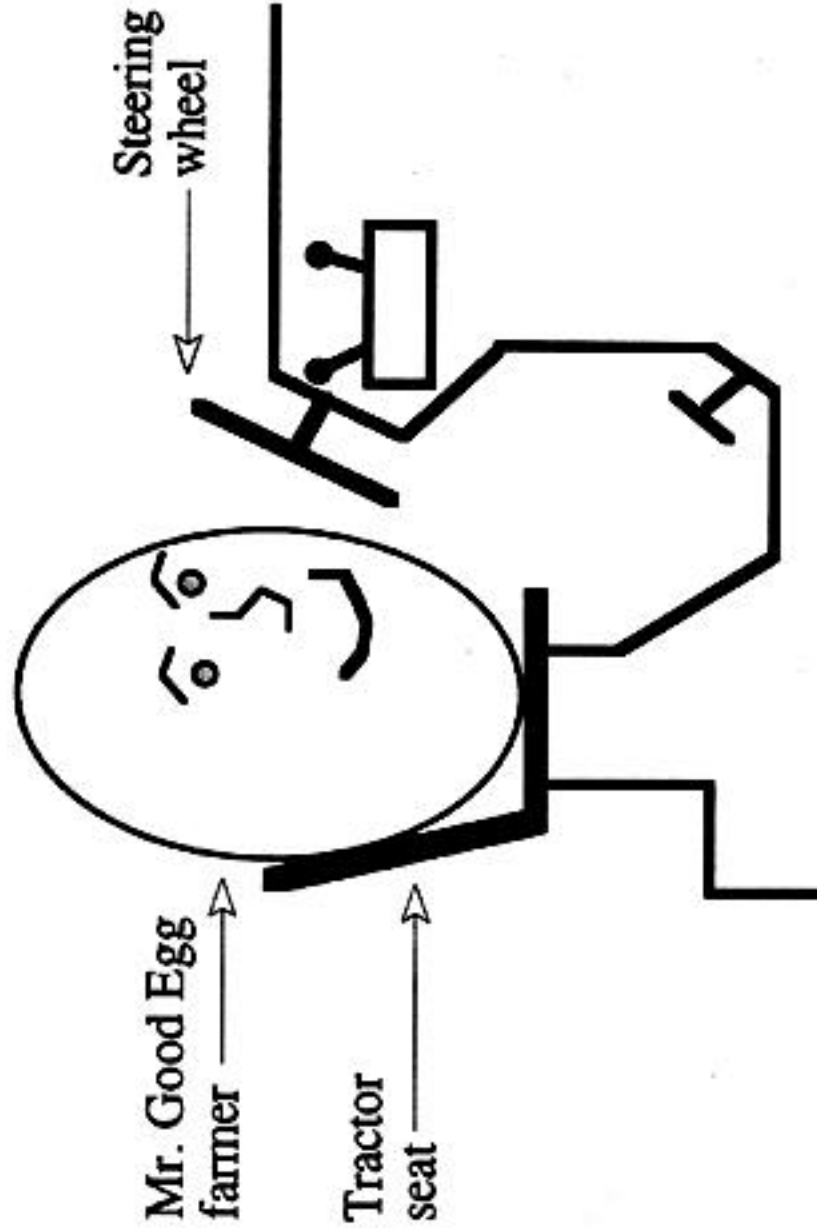
The first set of eight charts depicts a Mr. Good Egg Farmer on three tractors. The first model tractor has no ROPS or seat belt. The second model tractor has a ROPS but Mr. Good Egg does not wear the seat belt. The third model tractor is retrofitted with a ROPS and Mr. Good Egg wears the seat belt. Each of these three conditions is depicted by two drawings, one with the tractor upright, and one after the tractor has overturned. These diagrams help summarize the key message in the Mr. Good Egg Farmer activity, or may be used in other ways as part of other poster displays or educational program activities.

Model Tractor



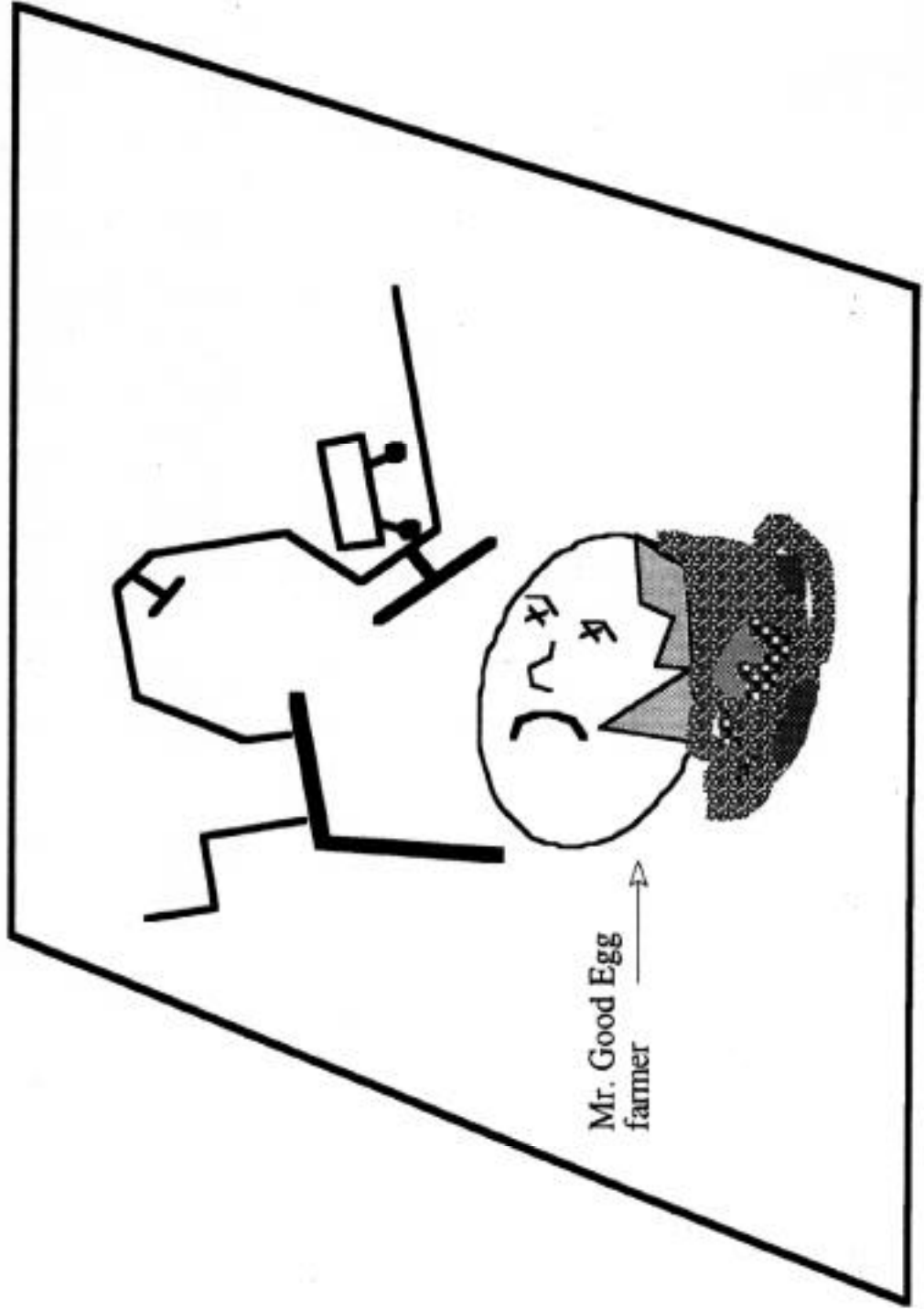
Mr. Good Egg Farmer

(living dangerously, no ROPS no Seat Belt)

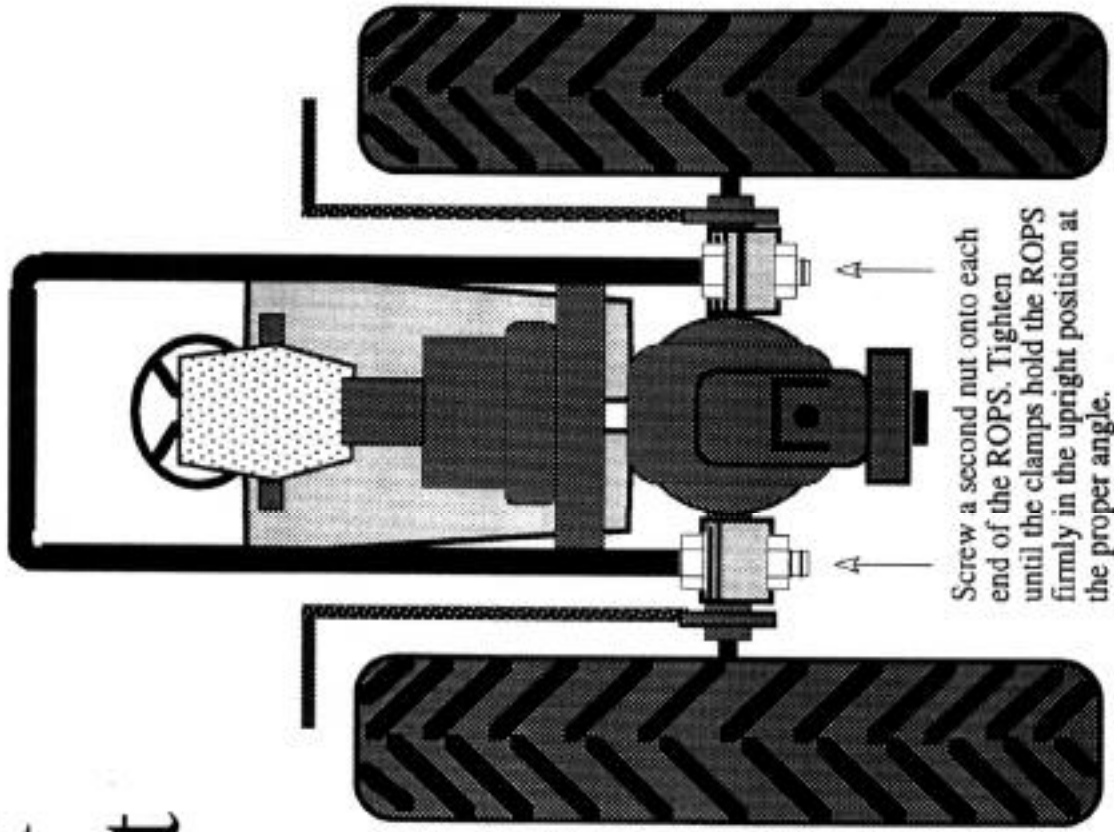


Unprotected Mr. Good Egg Farmer

(overturn with no ROPS & no Seat Belt)



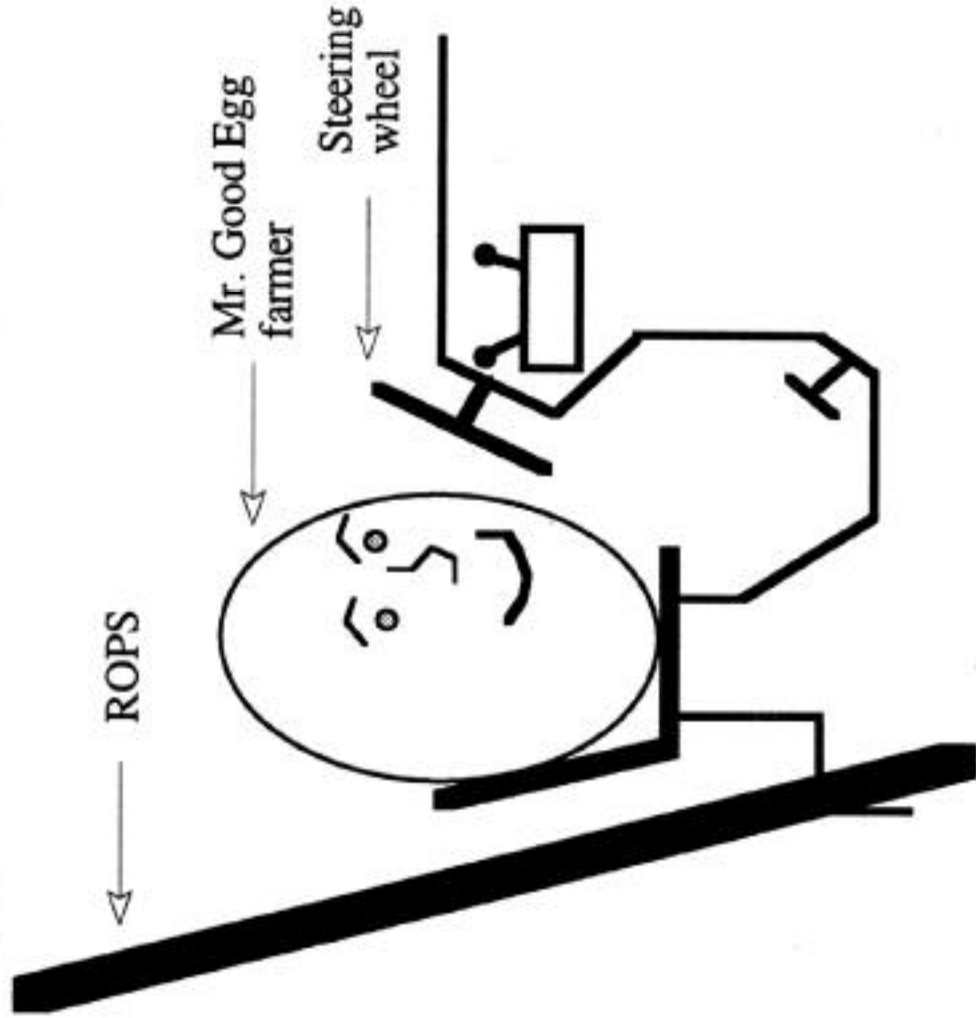
Model Tractor with a Retrofit ROPS



Screw a second nut onto each end of the ROPS. Tighten until the clamps hold the ROPS firmly in the upright position at the proper angle.

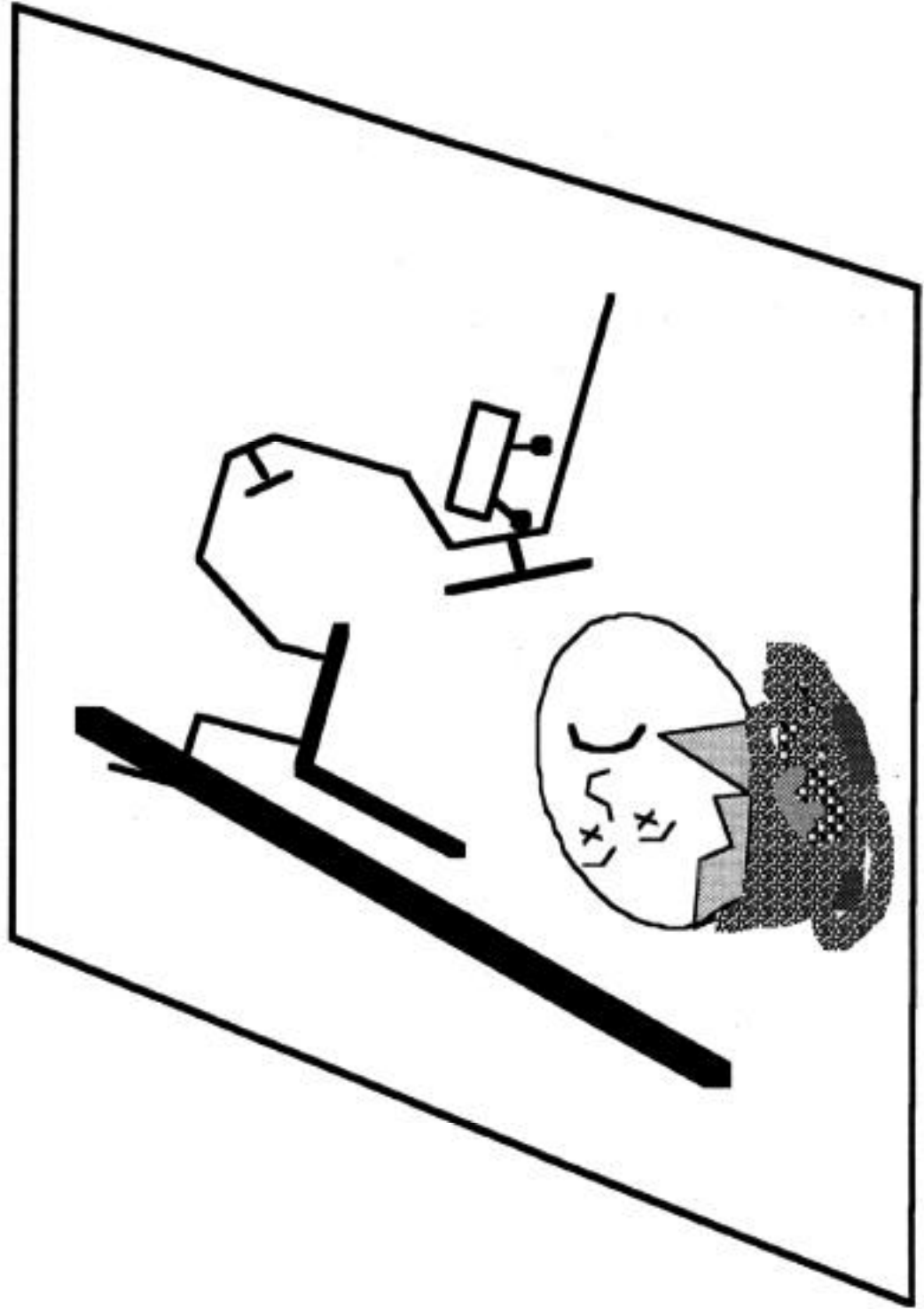
Mr. Good Egg Farmer

(partially protected with a ROPS but no Seat Belt)



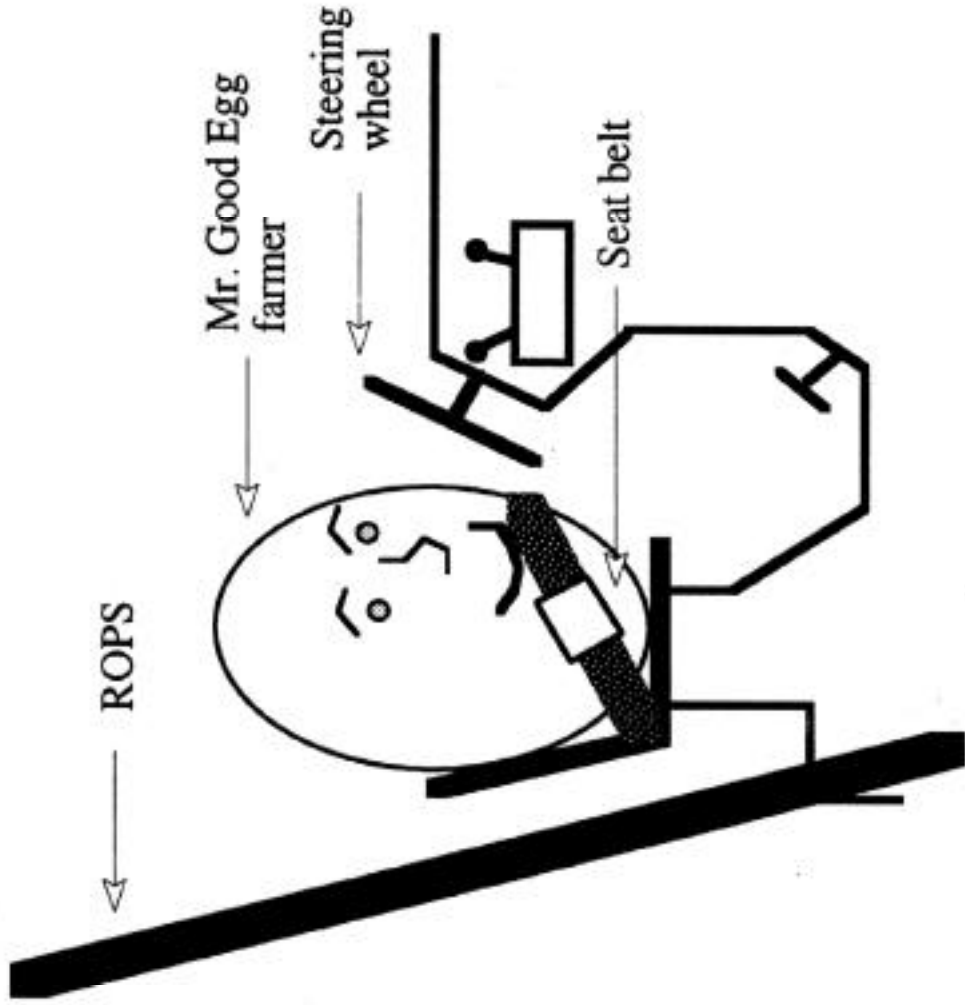
At Risk Mr. Good Egg Farmer

(overturn with a ROPS but no Seat Belt)



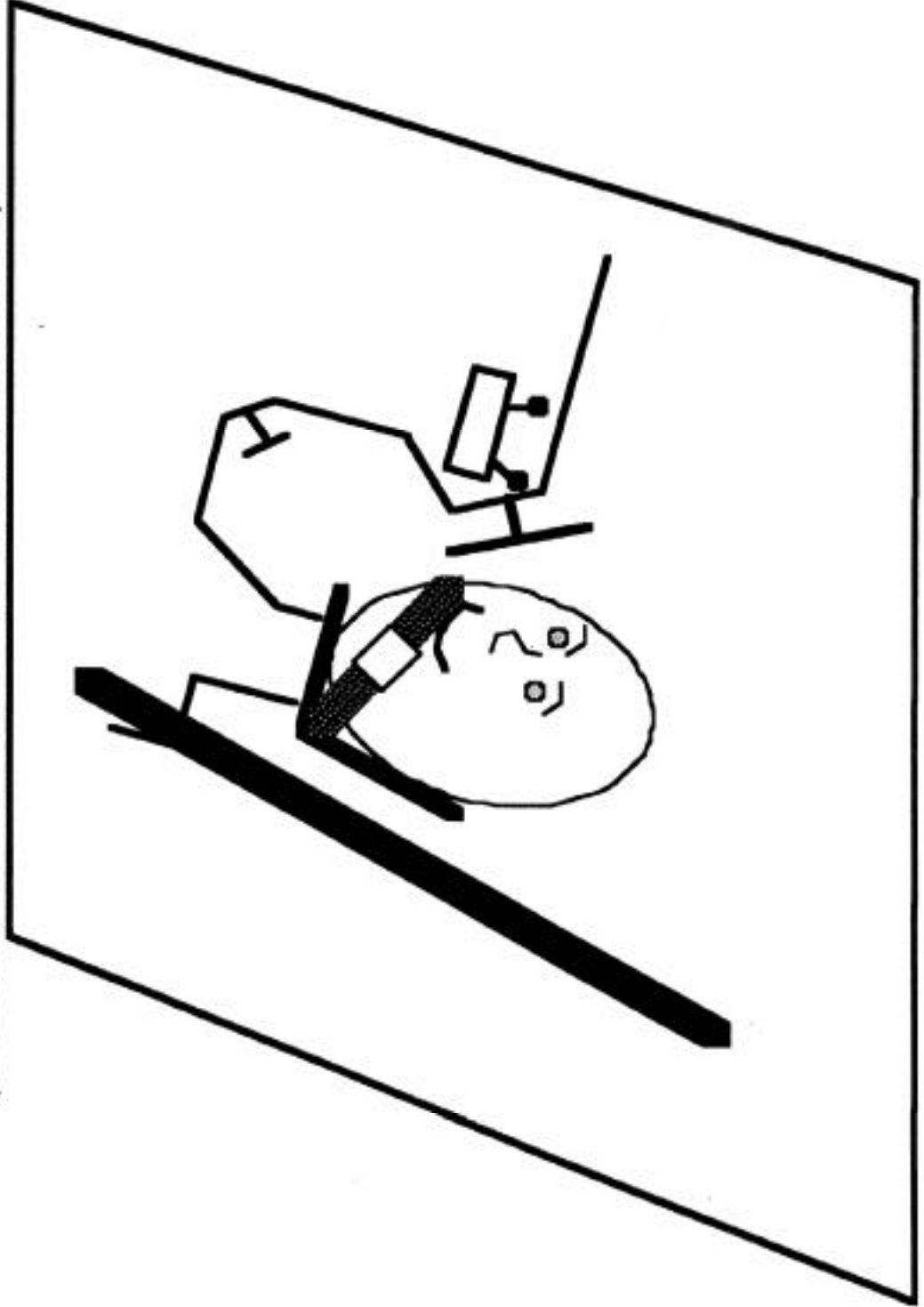
Mr. Good Egg Farmer

(fully protected with a ROPS and a Seat Belt)



Protected Mr. Good Egg Farmer

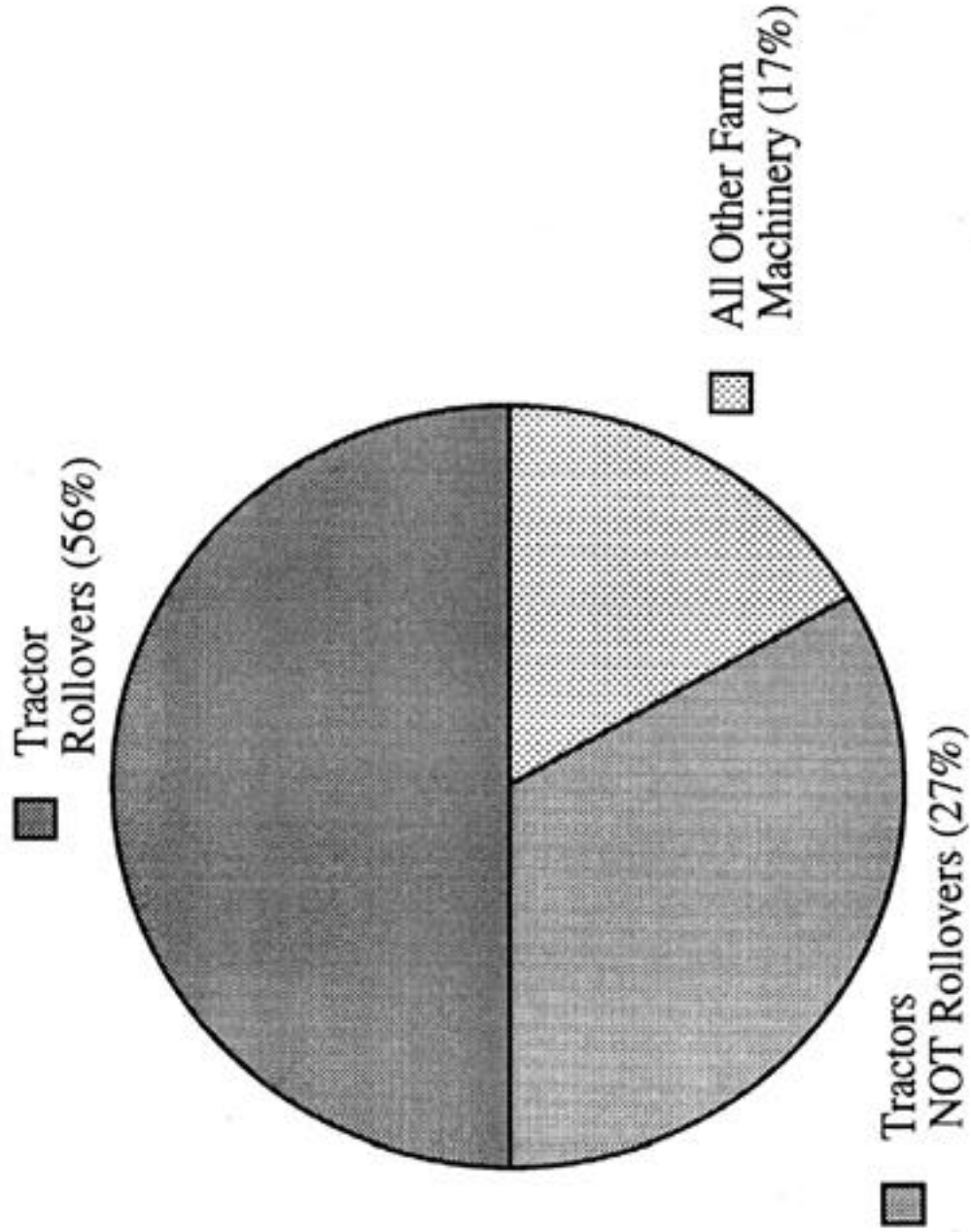
(overturn with a ROPS and a Seat Belt)



ROPS & Seat Belts: Protection, Farmers' Perceptions, and Behavior

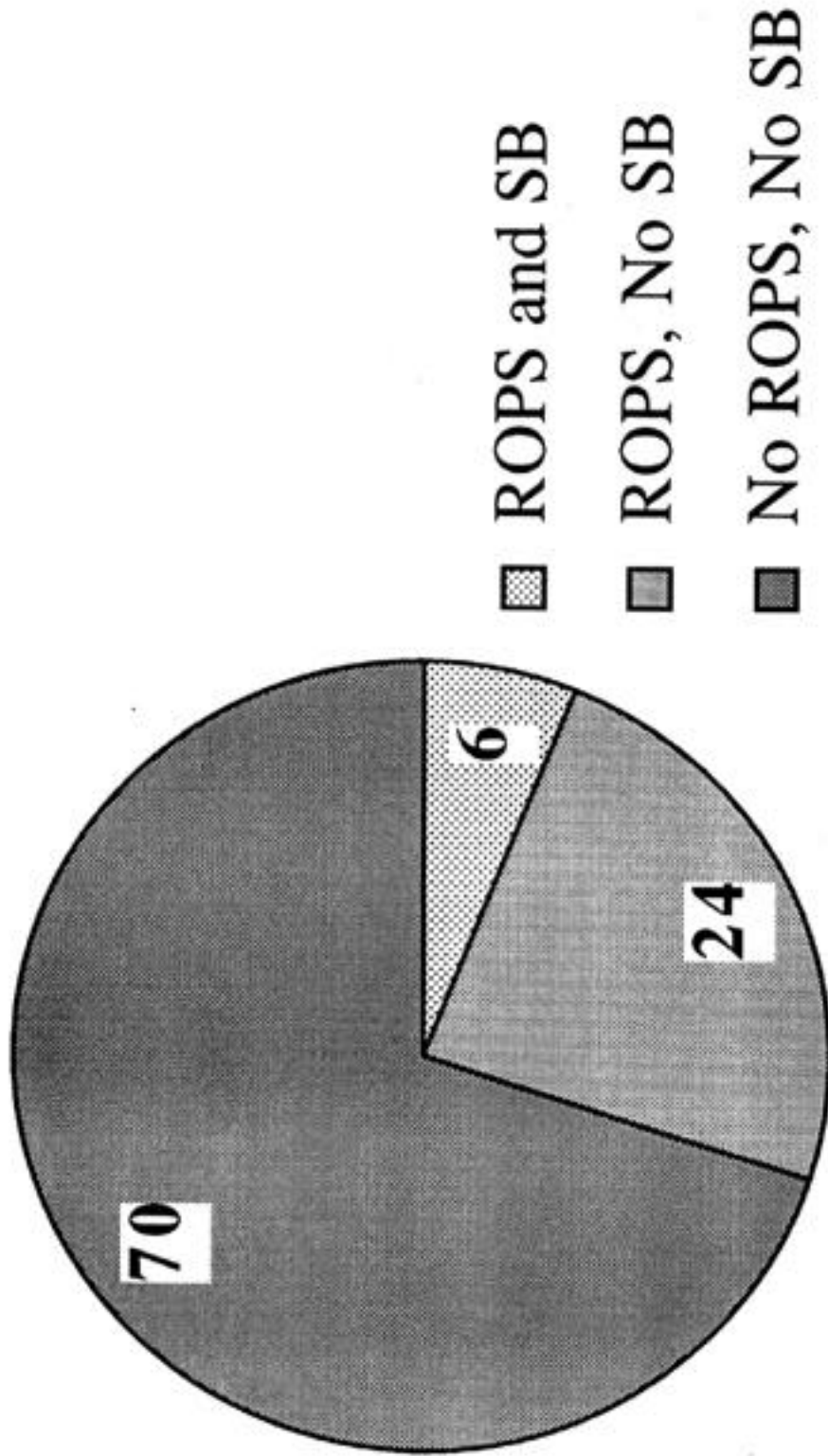
The second set of graphics includes five pie charts. Three additional charts also depict the number of 100 "Mr. Good Egg Farmers" in Kentucky who are protected from tractor overturns by ROPS and seat belts (6%), are partially protected by a ROPS but who don't wear the seat belt (24%), and the large number of farmers (76%) who are unprotected because they have no ROPS or seat belts on their tractors. The first two pie charts provide information about actual injury rates to Kentucky farmers from tractors and tractor overturns and the percent of farmers who are protected by ROPS and seat belts. The next five pie charts are based on a February 1997 study of a large random sample of farmers from four Kentucky counties. These charts show how much farmers (1) thought about getting a ROPS on their tractor(s) within the last year, (2) actually tried to get a ROPS on one or more tractors, (3) how much protection they believe a ROPS and seat belt provide the operator during an overturn, (4) how often farmers who drive ROPS-equipped tractors wear the seat belt, and how likely it is that the farmer thinks he or she will overturn a tractor in his or her lifetime. Studies of large samples of other farmers from 60 Kentucky counties found that 1 in 9 or 11% of farmers overturn a tractor in their lifetime and survive, although many of these farmers are injured, some severely, and some suffer permanent disabilities. Many other farmers die from tractor overturns as can be seen from the first pie chart in this section. This chart is based on examination of Kentucky death certificates for an eleven year period from 1982 to 1992. These pie charts may be useful as discussion points with individuals and groups following the Mr. Good Egg Farmer activity or as part of other farm safety education programs. Farmers and other farm community members are often not aware of the high injury and fatality rates from tractor overturns and are usually quite interested in the charts and the information they contain.

Kentucky Agricultural Machinery Fatalities (death certificate analysis 1982-92)

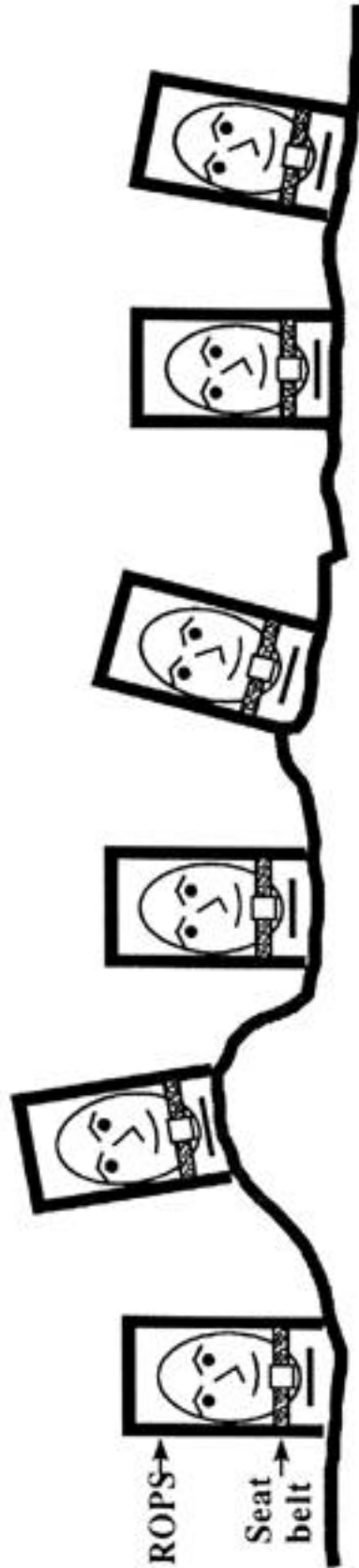
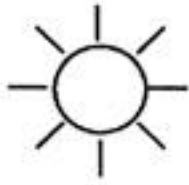


total = 293

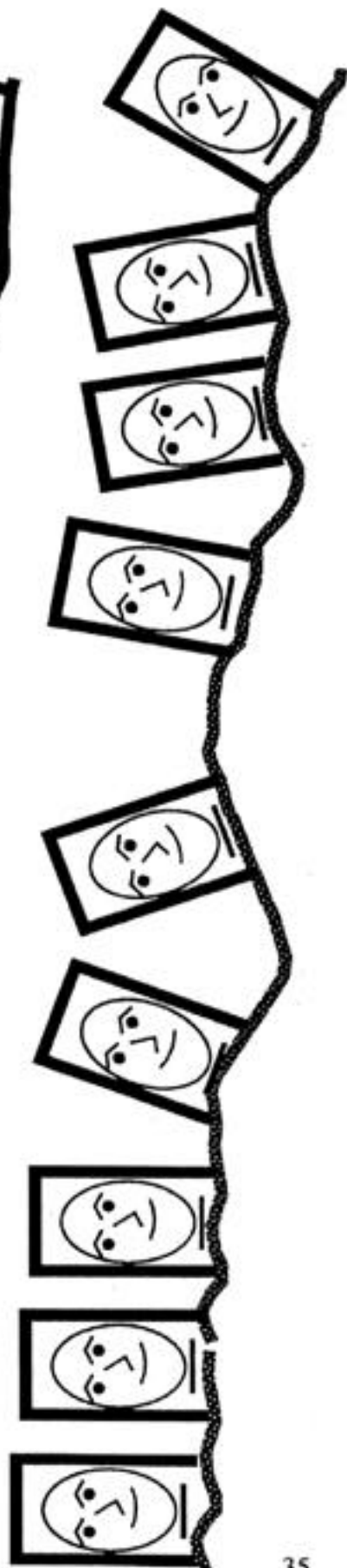
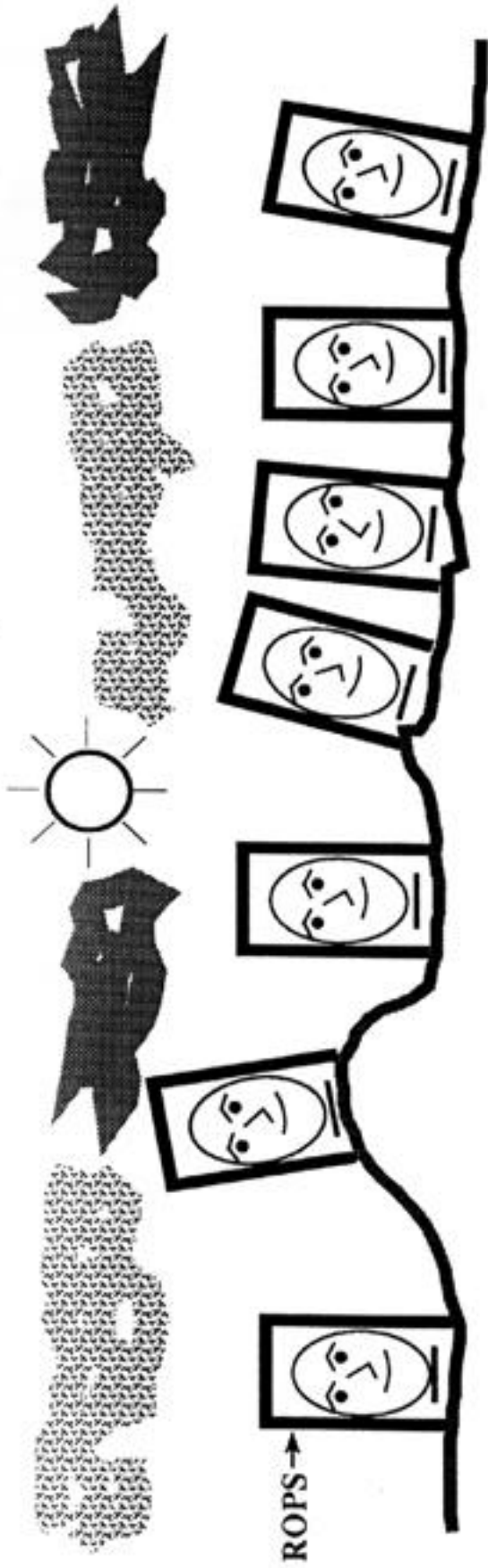
Percent of Kentucky Farmers Protected by Tractor ROPS and Seat Belts



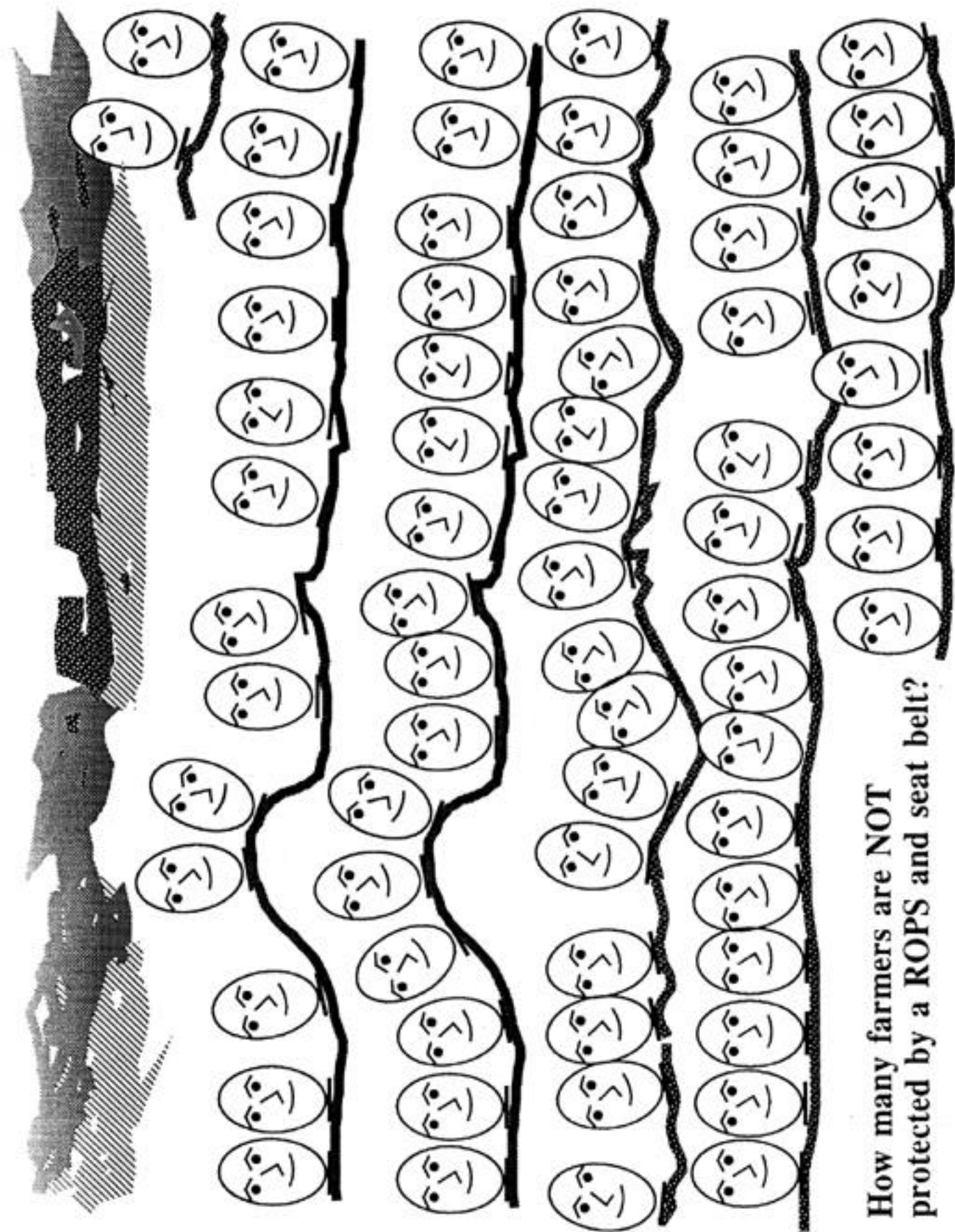
100 Kentucky Mr. Good Egg Farmers on Their Tractors



How many of the 100 are fully protected by a ROPS and seat belt?

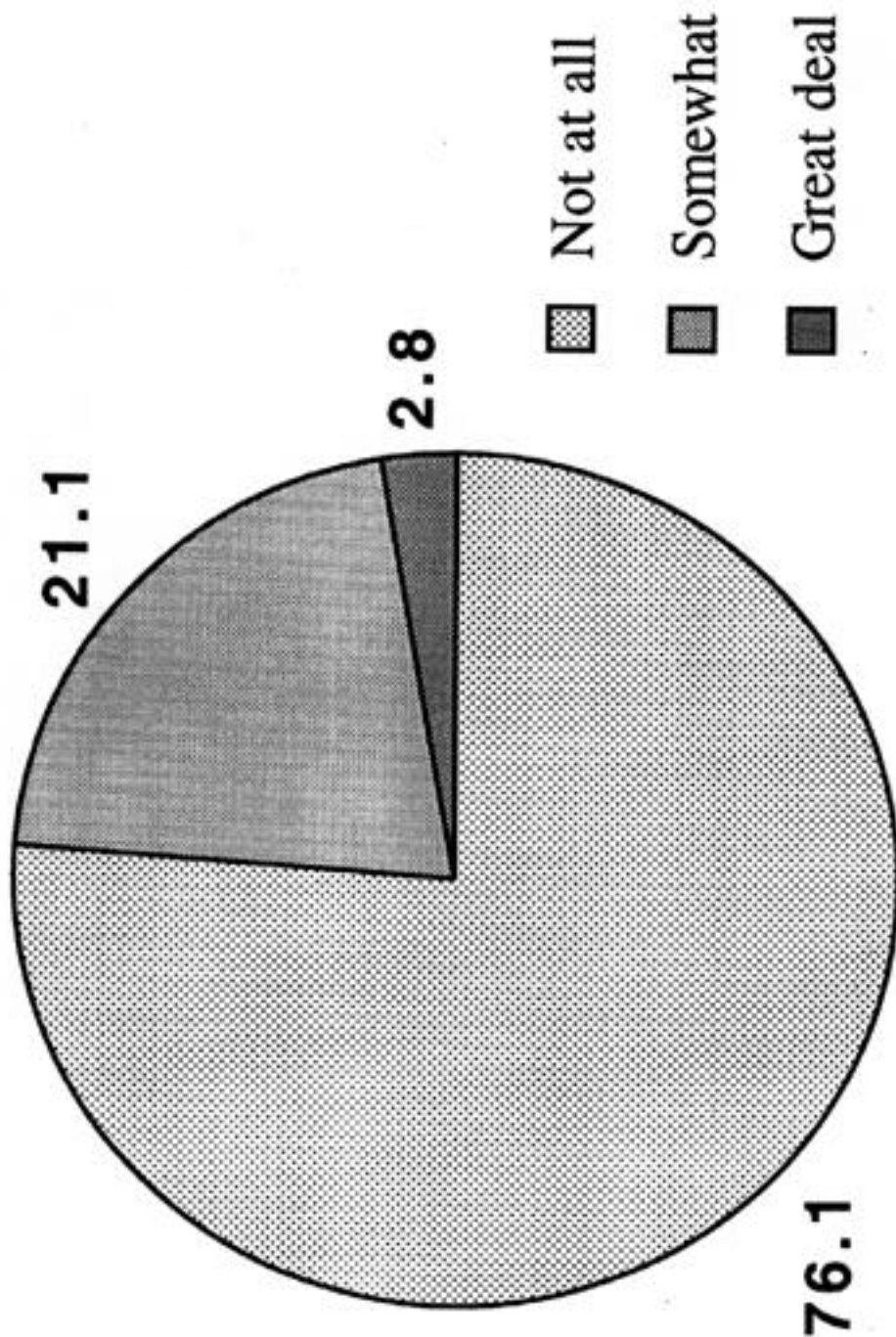


How many farmers are partially protected by a ROPS but NOT a seat belt?



How many farmers are NOT protected by a ROPS and seat belt?

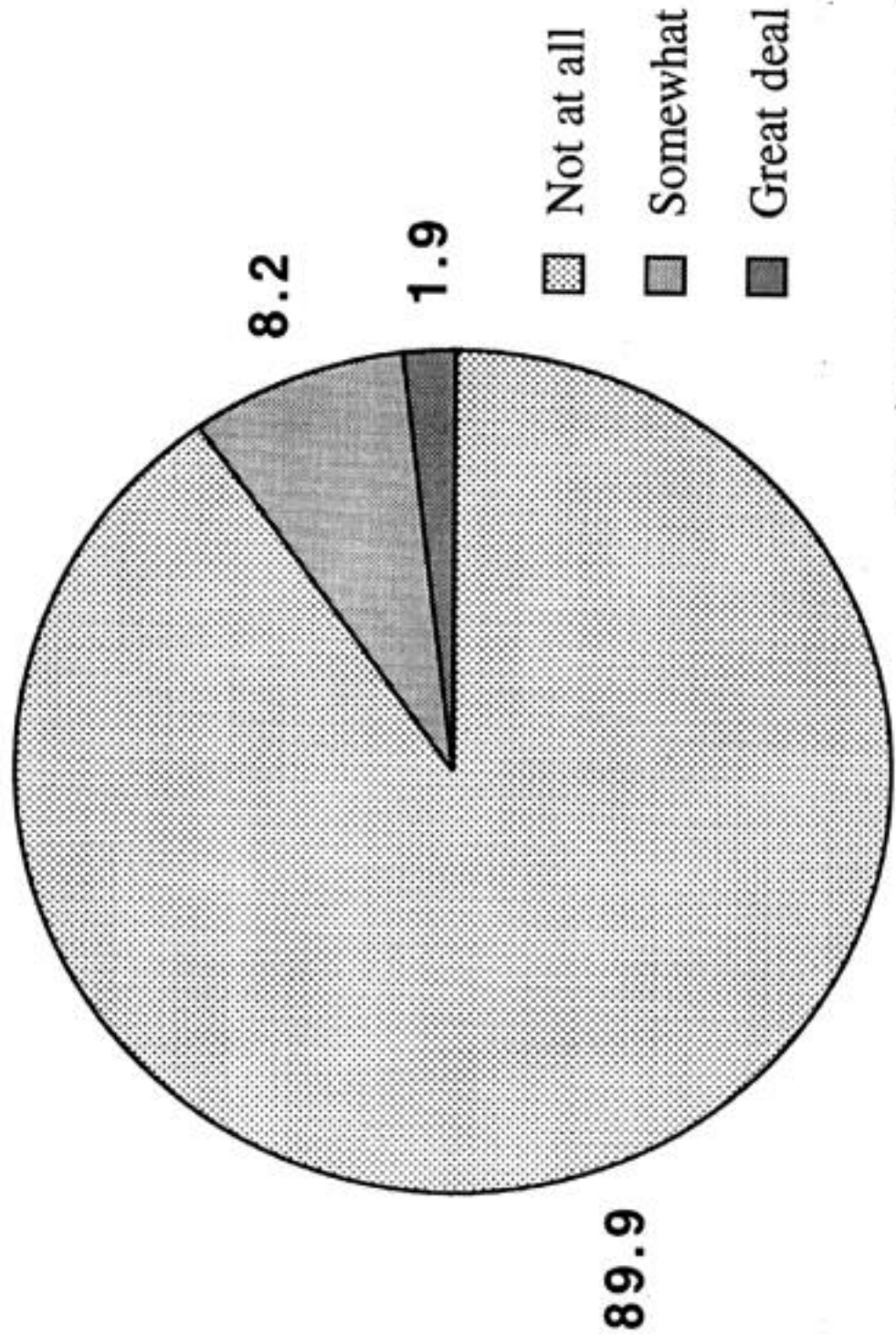
Kentucky Farmers Who Thought About Getting a ROPS Within the Last Year (n = 1,446)



pre-intervention sample

Community Partners Kentucky ROPS Project

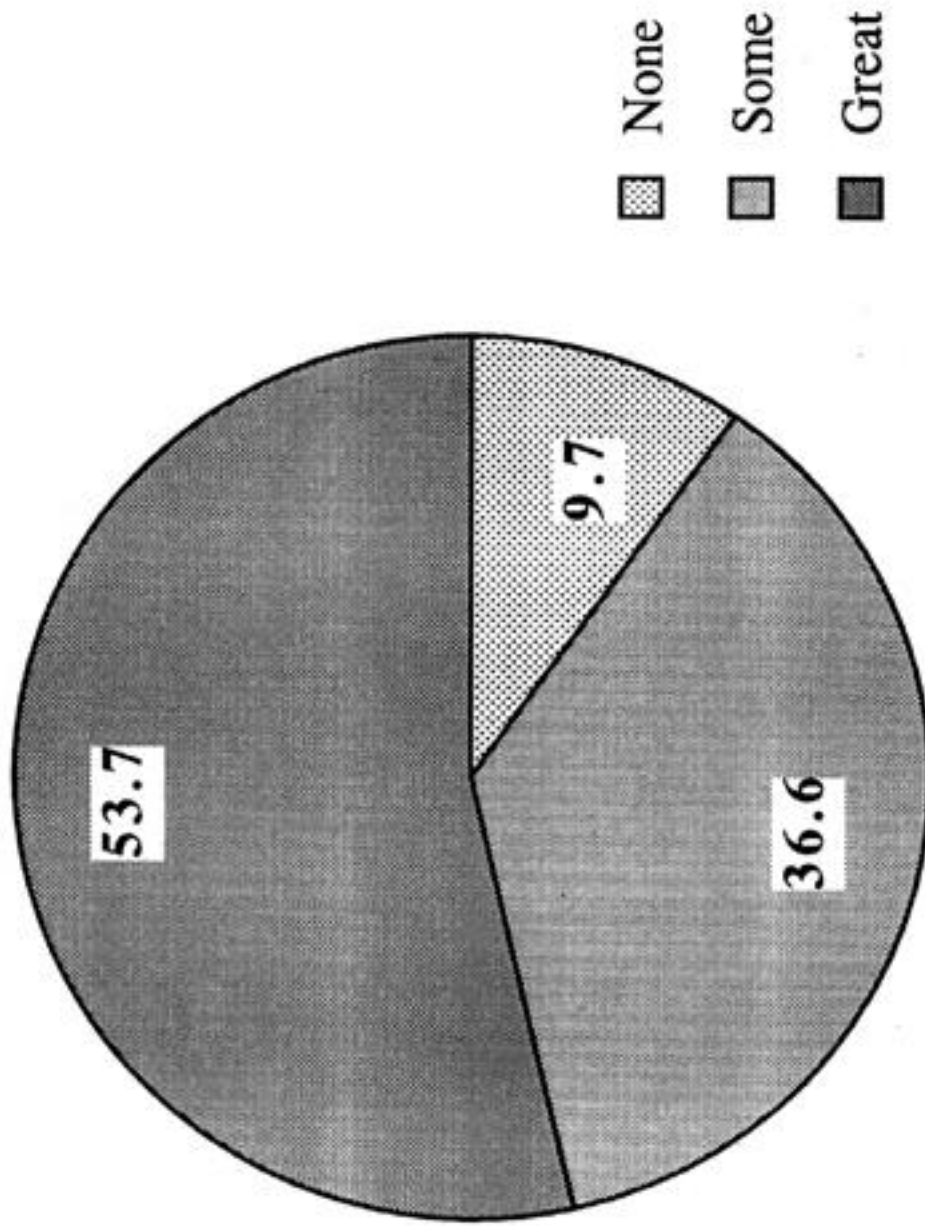
Effort by Kentucky Farmers to Obtain ROPS Within Last Year (n = 1,439)



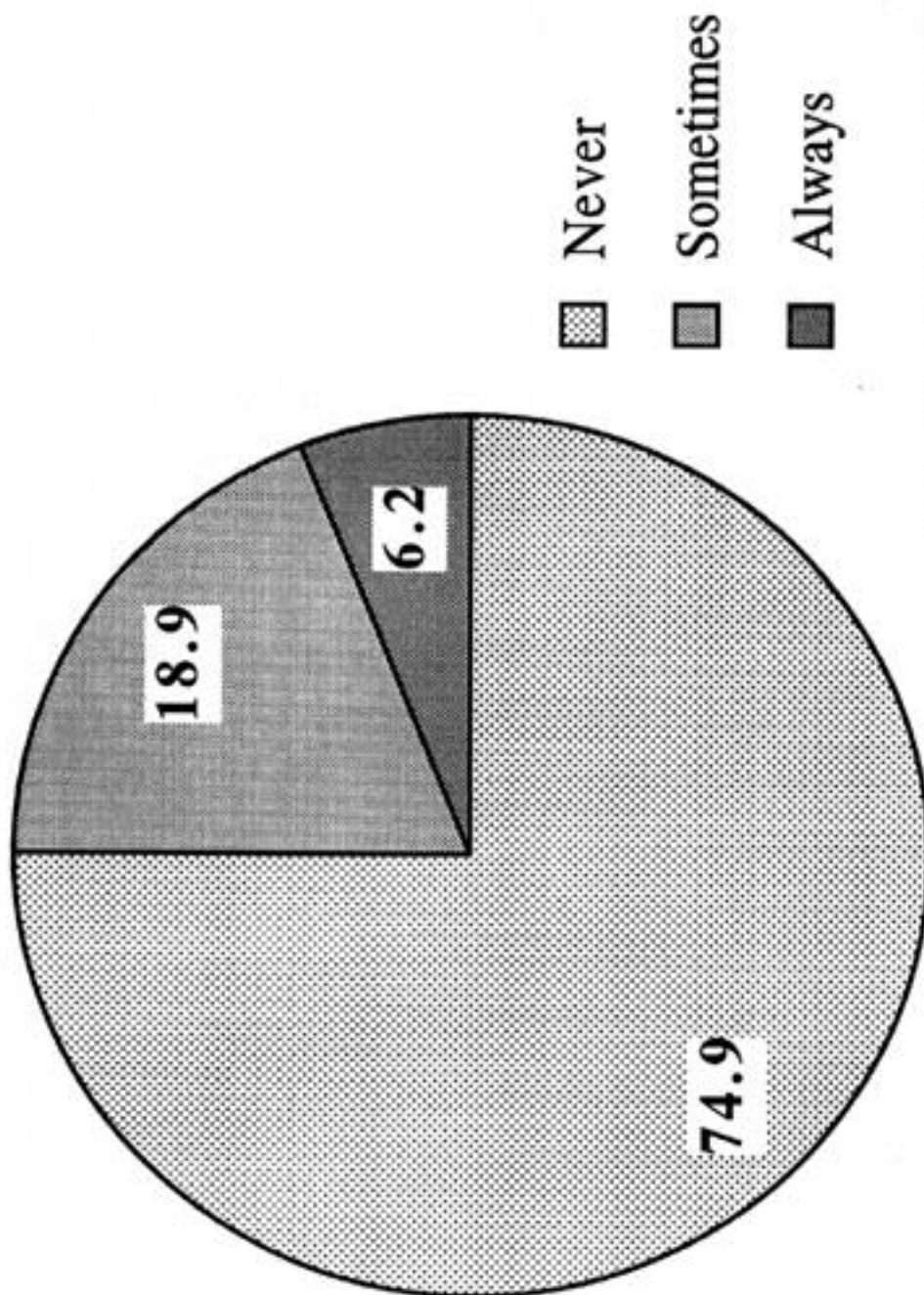
pre-intervention sample

Community Partners Kentucky ROPS Project

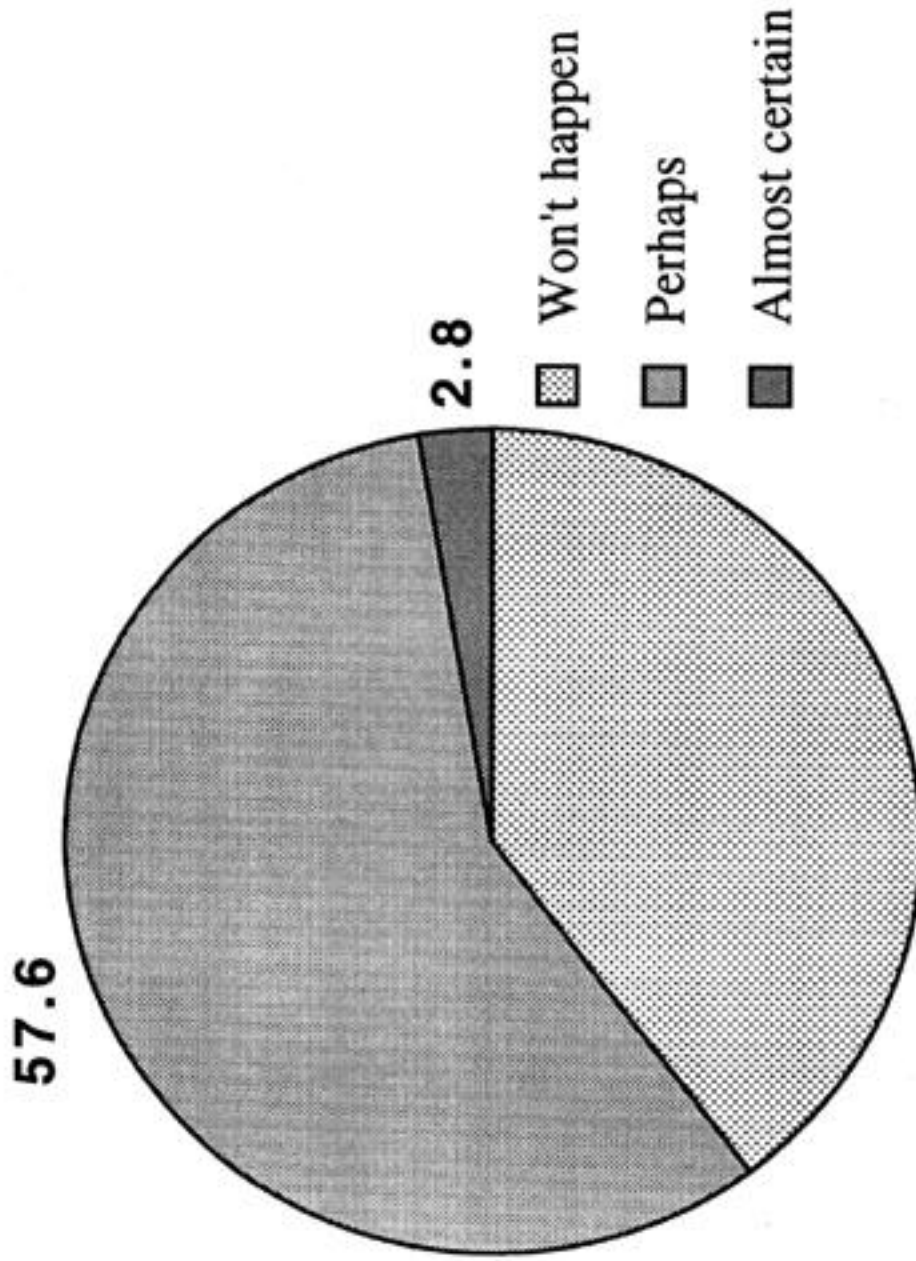
Kentucky Farmers' Judgment of the Protective Value of a ROPS and Seat Belt (n = 1,648)



Kentucky Farmers' Seat Belt Wearing Behavior on ROPS Tractors (n = 721)



Kentucky Farmers' Perception of Their Chance of a Tractor Overturn in Their Lifetimes (n = 1,551)



pre-intervention sample

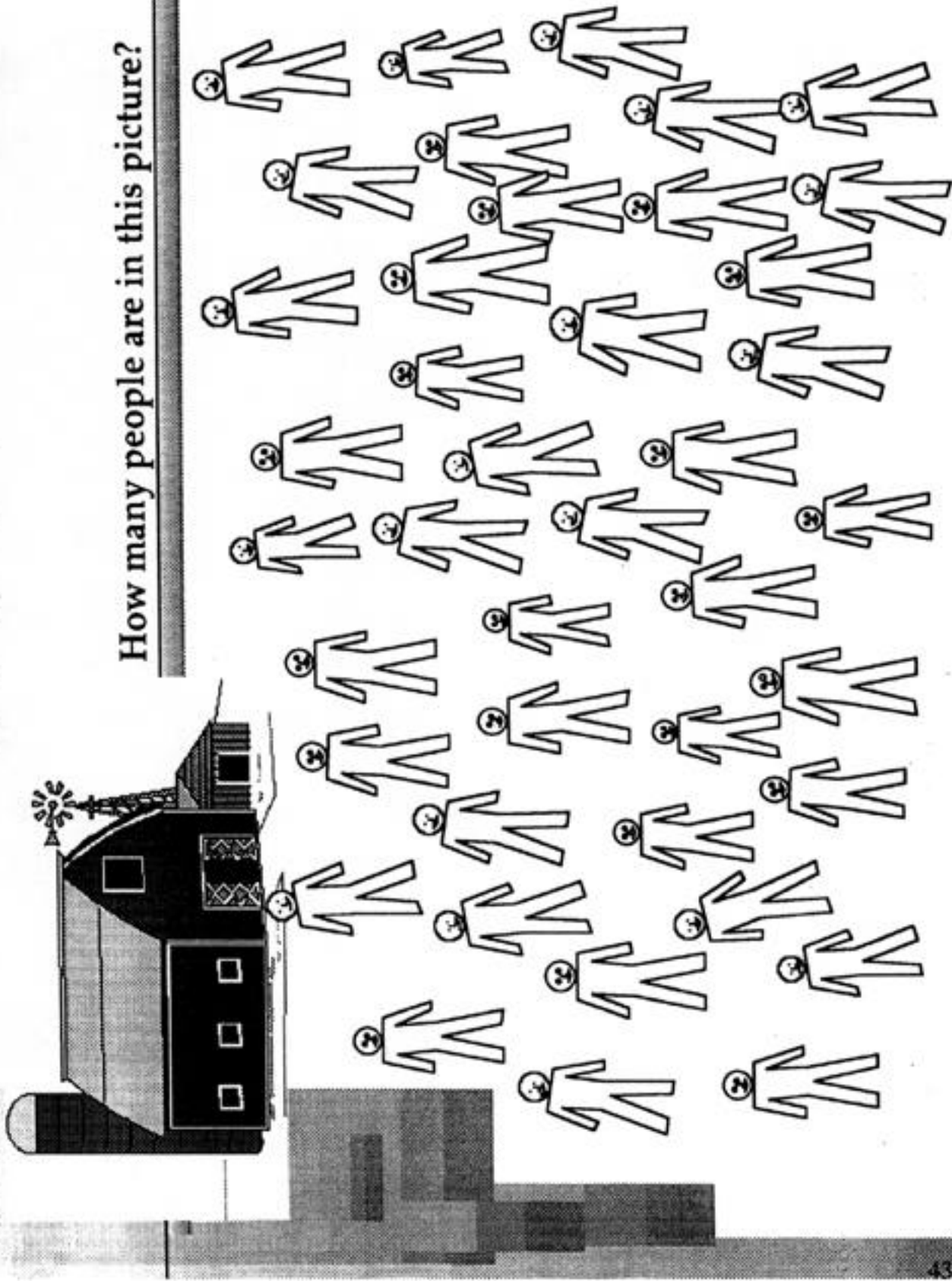
Community Partners Kentucky ROPS Project

More Facts & Figures About Tractors, ROPS, and Overturns Injuries

The third set of graphics in this section are eight additional charts that present important facts and figures about injury rates from tractor overturns and the cost and consequences of these injuries. Most farmers don't realize how high the injury and fatality rates from tractor overturns are. They are often shocked when they see these figures. Use these charts and figures selectively with groups of farmers or farm youth with whom you interact and as part of the program messages to these groups in oral or poster presentations.

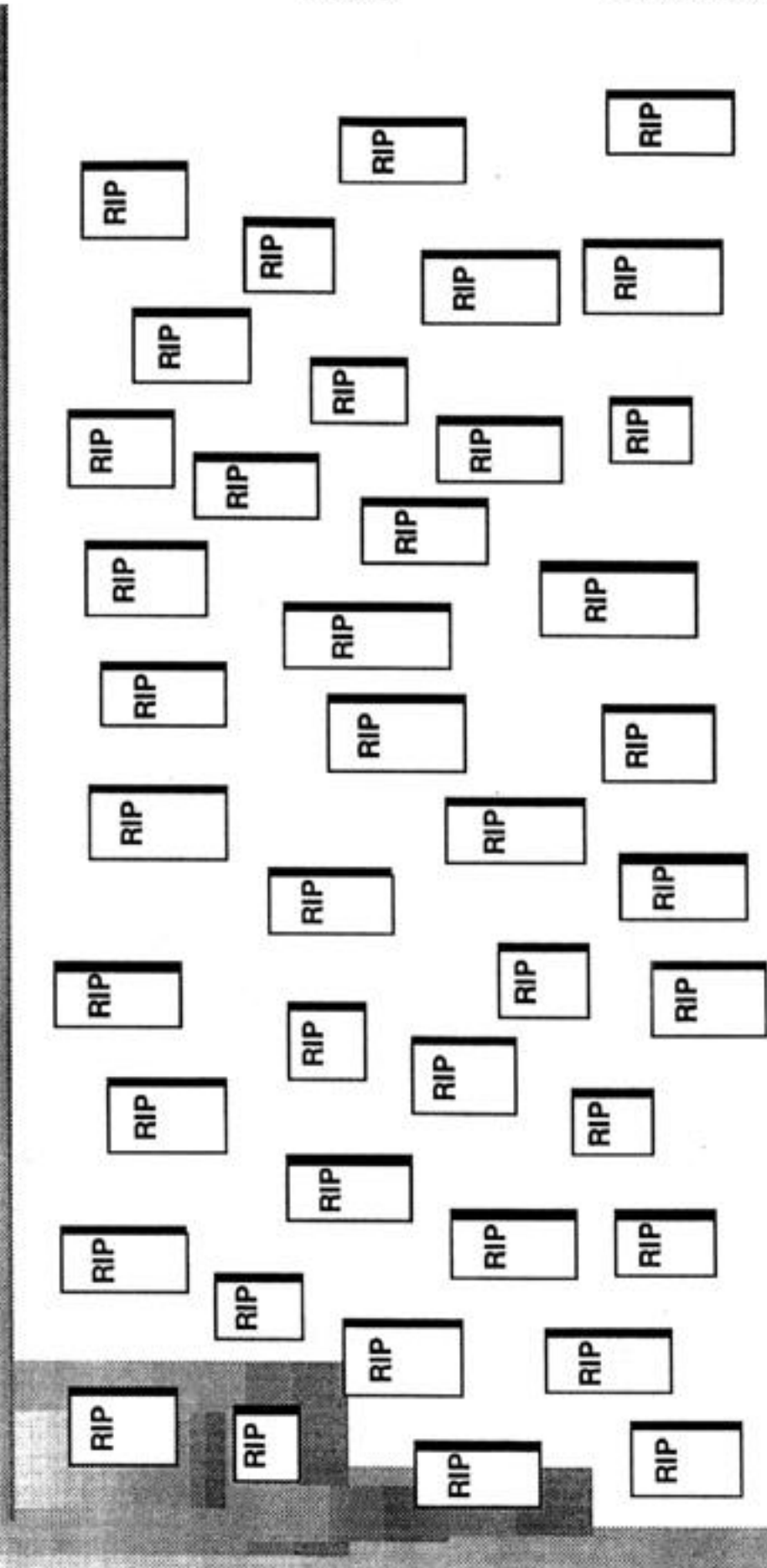
A Tough Quiz!

How many people are in this picture?



What happened to these farmers?

These 41 men, women and children died in tractor overturns in 1994-95.
 One tractor had a ROPS, but that person was not wearing the seat belt.

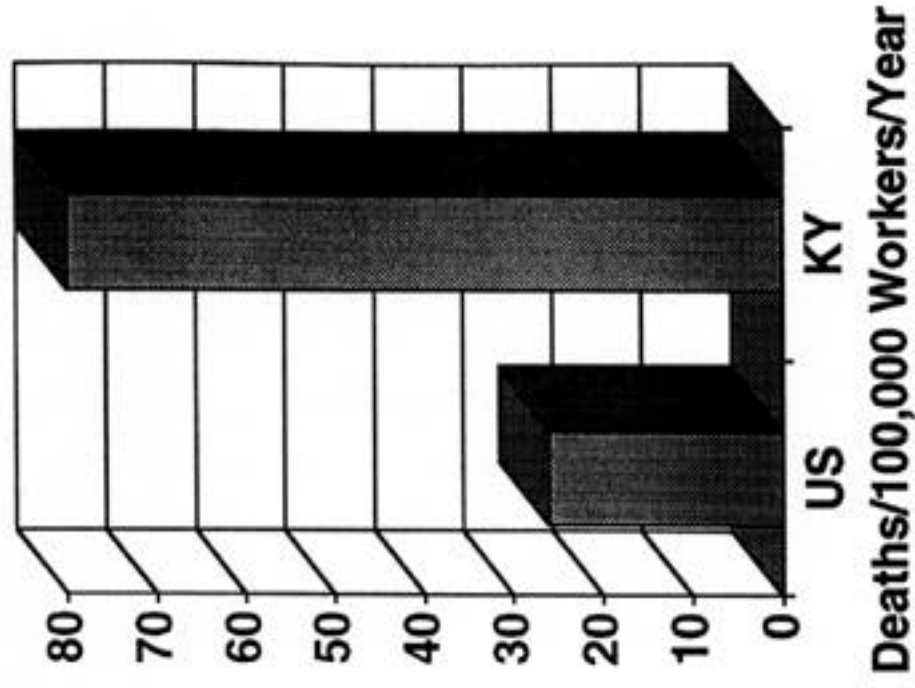


How many would have survived with a ROPS and seat belt?

All of them! Don't become a grim statistic. Get a ROPS & buckle up!

Kentucky Farmers at Risk

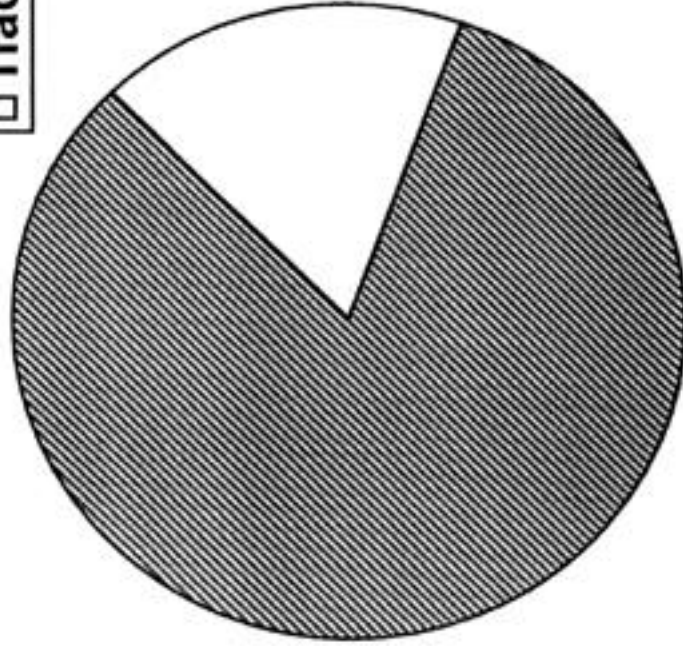
- In KY, the fatality rate in Ag/Forestry/Fishing is **3 times** the national rate
- In KY, nearly all of these deaths are farming related



Tractors and Injuries

- *KY has more than 5,000 farm injuries/yr.*
- *More than 1,100 are farm tractor related*

☐ Tractors



Injuries

Value of ROPS & Seat Belts

- 29 tractor-related deaths in 1994
 - † 44 total farm deaths
- 27 could have been saved by ROPS & seat belts
 - † 23 tractor overturns
 - † 2 tractor crash
 - † 1 run over by tractor
 - † 1 run over by wagon
 - † 1 run over by bush hog
 - † 1 fall from a tractor

Lifetime Chance of a Rollover

- *1 in 9 Kentucky farmers age 55 or older have overturned a tractor and lived*
- *1/3 of these survivors have had two rollovers*
 - *many of these persons were injured*
 - *some received minor injuries*
 - *some severe injuries*
 - *some were permanently disabled*

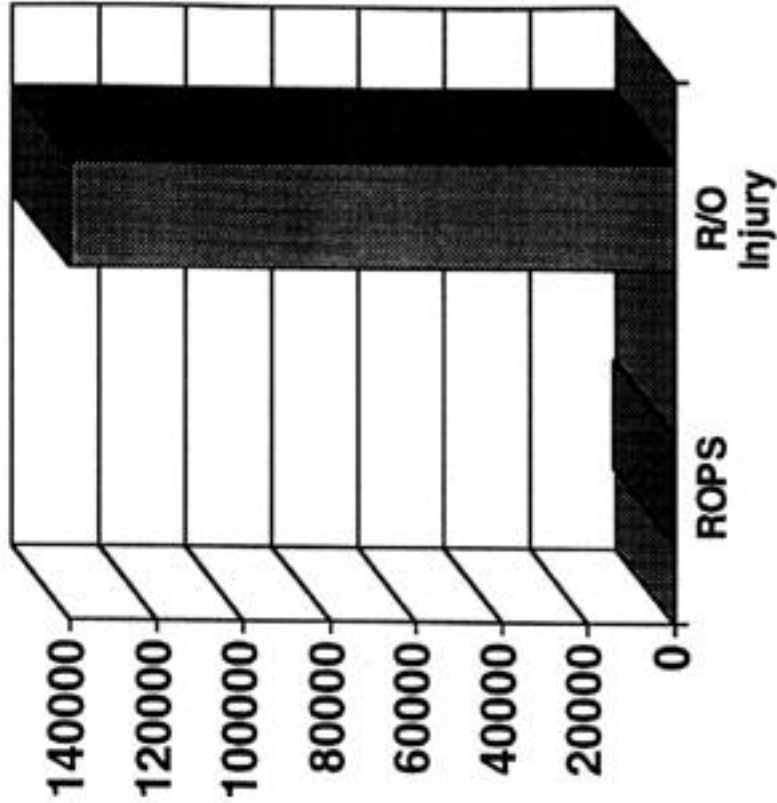
Farms with Children Ages 11-17

- Farms of less than 60 acres ⇨ 73% have no ROPS tractors
- Farms with only one tractor ⇨ 73% have no ROPS on the tractor
- Farms of more than 214 acres ⇨ 61% have at least one tractor with a ROPS

*Many children on small farms are at risk.
Children start driving tractors at age 10 years.*

Are ROPS Cost Effective?

- A study at UK found medical costs from a severe rollover injury can be \$140,000 +
- Rollover fatalities and serious injuries often result in loss of the farm
- A ROPS is a one-time \$600 cost



Relative \$ Costs of a ROPS vs. a Serious Rollover Injury

Evaluation of the Mr. Good Egg Farmer Simulation Activity

A one-page evaluation form for the Mr. Good Egg farmer activity is provided on the next page. Duplicate copies of this form before you conduct the activity. After you complete the activity and the discussion, give each person a copy of the questionnaire and then ask them to answer each question. Collect the completed questionnaires and return them to the University of Kentucky We will use the information and your advice to improve the activity. Return the completed evaluation forms to

Henry Cole
Southeast Center for Agricultural Health and Injury Prevention
1141 Red Mile Road
University of Kentucky
Lexington, KY 40536-0084

Initial Field Test Results

Approximately 400 persons were involved in the field test of the Mr. Good Egg Farmer (MGE) simulation exercise activity. Approximately 125 of these persons were adults but because of time constraints, only 15 completed the formal evaluation form. The remainder were farm youth from age 8 to 13 involved in summer, Farm Safety Day camps where time constraints also prevented completion of the formal evaluation form by the participants.

Qualitative Evaluation Results

The Mr. Good Egg (MGE) Farmer simulated tractor overturn activity was field tested with 175 farm youth at a Progressive Farming Safety Day camp in Warren County in Bowling Green, Kentucky on June 17, 1997. Later on the evening of that same day the MGE simulation activity was also field tested with 12 community leaders in Barren County at the Glasgow, Kentucky Farm Bureau office. On June 17, 1997 the MGE simulation activity was field tested with 100 Barren County farm youth who attended a second Progressive Farming Farm Safety Day Camp at Temple Hill. On July 17th the exercise was field tested with 110 farmers who attended the annual Kentucky Minority Farmers Association held in Meade County. In August 1997 it was again field tested with three Fleming County adult community leaders and farmers

Because of time limitations no formal evaluation data were collected at the Farm Safety Day camp nor at the Kentucky Minority Farmers meeting. Each group of participants had only 20 minutes for the activity that was sandwiched between other activities and presenters. However, the instructors (Larry Piercy and Freddy Button for the Youth camps and Henry Cole for the Minority Farmers group) judged the MGE to be easy to use, interesting and relevant to the farm youth and adults alike, and capable of holding their interest and keeping them task oriented. Many adults asked questions and requested a copy of the materials to use with farm safety presentations they planned to conduct. The copy of a newspaper article attached to this document describes the typical participation and reaction of farmers to the exercise.

Formal Evaluation Results

The simulated tractor overturn activity was demonstrated, discussed, and formally evaluated with a one-page questionnaire with a group of 15 adults, 10 of whom reported being farmers. Ten members of the group reported that they drove tractors. The remaining persons were members of farm families who either lived (or had in the past lived) on farms. The basic demographic characteristics for these people are listed in the table at the top of page 53. Their average age was 39.6 years. Those 10 persons who farm have an average of 223.3 years farming experience. The average farm size was 215 acres, approximately the average size of Kentucky farms. Among the 10 farmers in the group, the average days per month of tractor driving is 14.8, very close to the average 15 days per month reported by a sample of 1,648 randomly selected individuals in a February 1997 survey of 1,648 Kentucky farmers in Barren, Fleming, Hardin, and Nelson Counties.

These participants rated the activity as a realistic simulation of what can happen during a tractor overturn when there is not a ROPS, when there is a ROPS but the operator is not wearing a seat belt, and when the tractor has a ROPS and the operator is wearing the seat belt. The participants also reported that the activity helped to convince them that ROPS save lives and prevent injuries, that the seat belt is valuable, that ROPS and seat belts combined can save farmers money, and that the activity helped to convince them to get a ROPS on their tractors and to use the seat belt. The analysis of the participants' demographic characteristics and responses are found on the next three pages.

The 15 persons' high ratings of the activity can be seen from inspection of the means and standard deviations provided for each 4-point Likert scale item. The highest possible rating is a 4.0 and the lowest a 1.0. The mean ratings for the exercise for individual items listed on the evaluation questionnaire are found the table at the top of page 54 and are also listed in Table 1 on the next page. Table 1 includes the questionnaire item number and item content as well as the mean ratings. Histograms of the frequencies of persons within key demographic variable categories, and within the four Likert scale categories for each of the 13 evaluation items, are found on the next three pages.

Table 1: Participants' evaluation ratings of the Mr. Good Egg Farmer activity

Item No.	Item Content	Mean*	SD
9	Activity shows what happens in real-life tractor overturns	3.8	0.4
10	Activity helped convince me ROPS save lives	3.9	0.4
11	In an overturn a seat belt holds the operator safe inside the ROPS	3.7	0.5
12	Activity helped convince me to wear the seat belt	3.6	0.7
13	Activity helped me believe a ROPS can prevent injuries	3.8	0.4
14	ROPS and seat belts on tractors can save farmers lots of money	3.7	0.5
15	Because of this activity I will think more about getting a ROPS	3.3	0.5
16	Activity has helped convince me to get a ROPS on our tractors	2.8	0.8
17	ROPS are not worth the time and costs it takes to get them	1.2	0.6
18	Had a chance to discuss the exercise and share my ideas	3.5	0.9
19	The demonstration of the tractor rollovers was interesting	3.8	0.4
20	I will use the activity to teach others about the value of ROPS	3.6	0.8
21	I didn't learn anything from this activity	1.1	0.3

* Maximum rating = 4, minimum rating = 1

Field Test Results for 15 Adult Farm Community Leaders for the Mr. Good Egg Farmer Exercise

Descriptive Statistics

	Mean	Std. Dev.	Std. Error	Count	Minimum	Maximum	# Missing
Age	39.6	13.4	3.6	14	22.0	60.0	1
Years Farming Experience	23.3	11.4	3.8	9	10.0	40.0	6
Farm Size	215.4	80.4	21.5	14	50.0	340.0	1
Realistic Exercise	3.8	.4	.1	15	3.0	4.0	0
Convinced ROPS Save Lives	3.9	.4	.1	14	3.0	4.0	1
SB Holds Within ROPS	3.7	.5	.1	15	3.0	4.0	0
Convinced to Wear SB	3.6	.7	.2	12	2.0	4.0	3
ROPS & SB Save \$	3.7	.5	.1	15	3.0	4.0	0
Think More Getting ROPS	3.3	.5	.2	9	3.0	4.0	6
Try Get ROPS	2.8	.8	.3	9	1.0	4.0	6
Discussed Activity	3.5	.9	.2	14	1.0	4.0	1
Learned Nothing	1.3	.8	.2	14	1.0	4.0	1
Days Drive Trac/Month Dr	13.1	10.1	3.4	9	0.0	30.0	6
ROPS Prev Injury	3.8	.4	.1	15	3.0	4.0	0
ROPS Not Worth Time & Cost	1.2	.6	.2	14	1.0	3.0	1
Interesting Exercise	3.8	.4	.1	15	3.0	4.0	0
Use to Teach Others	3.6	.8	.2	13	2.0	4.0	2

