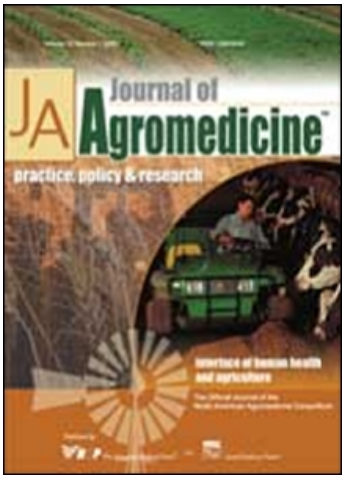

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Dealing With Pre-ROPS Tractors: Is a Trade-in Program the Solution?

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ABSTRACT. Tractor overturns are the leading cause of work-related death in an industry with the highest occupational fatality rate. Rollover protective structures (ROPS) and seatbelts are 99% effective in reducing the risk of an overturn fatality. However, kits are not available for 20% of tractors currently lacking ROPS. For these tractor owners, two potential solutions have been discussed: (1) technology for reinforcing tractor axles to accommodate ROPS and (2) a pre-ROPS tractor removal program. The purpose of this study was to conduct preliminary research to assess the feasibility of a tractor trade-in program. Focus groups were conducted with pre-ROPS tractor owners and tractor dealers. The data were analyzed using a concept development analytical approach and results were reviewed in an industry stakeholder's workgroup session. Data from the research indicates that tractor owners and dealers would need persuasive financial incentives to participate in a trade-in program. The workgroup session also indicated that it would be difficult to fund or support a large-scale initiative, and the economics of removing a large group of older tractors from the marketplace may exacerbate financial roadblocks. However, the data from this study could be used to pilot test a small-scale, focused, tractor buy-back program.

KEYWORDS. Concept development, focus groups, intervention research, overturn fatalities, overturn injuries, pre-ROPS tractors, tractors, tractor overturns, tractor fatalities, tractor injuries

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INTRODUCTION

Tractor overturns are widely acknowledged in the health and safety research community as a public health priority.[1–3] They account for the greatest number of fatalities on US farms.[4–8] For every overturn death, there are approximately five injuries, 13% of which lead to permanent disability.[9] The related costs are equally devastating. The 2010 inflation-adjusted estimate of the mean societal cost of a fatal occupational injury ranges from to $1,063,177 to $1,081,520.[10]

Fortunately, rollover protective structures (ROPS) are 99% effective in preventing an injury or fatality in the event of an overturn when the operator is wearing a seatbelt.[1] Even without the use of a seatbelt, a ROPS can eliminate many fatalities[11]. However, little more than half of US tractors are currently equipped with ROPS.[12]

The great majority of tractors with ROPS were purchased from a dealer with the ROPS included as standard equipment. However, for tractors manufactured before 1985, ROPS were offered as optional equipment[13] and many farmers did not elect to purchase them. For owners of these tractors, research has been directed at finding ways to encourage them to install ROPS retroactively, with some successes demonstrated.

However, a remaining issue and current gap in the literature relates to tractors that cannot be retrofitted (i.e., tractors manufactured prior to 1966). These "pre-ROPS tractors" were not manufactured to accommodate ROPS and although the ROPS would likely retain its structural integrity in a roll, the axle housing to which it attaches, may not.[14] Based on National Institute for Occupational Safety and Health (NIOSH) estimates, approximately 20% of the tractors that currently lack ROPS do not have ROPS kits commercially available.[4] Data from the Fatality Assessment and Control Evaluation (FACE) Program, which provides fatality investigation reports for fatal occupational injuries, indicate that 64% (54/85) of overturn fatalities occurring on tractors without ROPS can be attributed to tractors manufactured between 1930 and 1960 (italicized in Table 1).

Although no research has currently been conducted on the demographic variables associated with tractors that cannot be retrofitted, research on characteristics associated with a lack of ROPS protection indicate that farmers 65 years and older or farms with less than $10,000 in annual sales are less likely to have ROPS.[15] If these statistics hold true for tractors that cannot accommodate ROPS, then potentially vulnerable segments of the farm population (older farmers or low-income farm operations) currently lack adequate solutions for tractor overturn protection.

Two options have currently been discussed for these tractor owners.[16] The first relates to the construction of a ROPS mounting structure that could increase the strength of the axle housing for older tractors.[14] The second is the possibility of a "recycling/removal" program.[17]

This paper explores the viability of the second option by presenting research conducted with pre-ROPS tractor owners, tractor dealers, and agricultural stakeholders. The first objective of the research was to gather qualitative data from tractor owners and tractor dealers that could be used to identify optimal parameters for a tractor trade-in program. The second objective was to gather feedback from industry representatives on the parameters identified in tractor owner/dealer focus groups, in order to discuss identified issues and industry solutions. Industry representatives included individuals from tractor manufacturing companies, insurance companies, and tractor dealership organizations.

METHODS

Focus Group Discussions

Our objective was to identify the elements of a trade-in program that would be responsive to individuals most interested in retrofitting and most in need of ROPS protection. As a result, selection of participants was based on the following criteria:

1. The individual had contacted the New York State ROPS Rebate Program Hotline.
2. It was not possible to locate a ROPS for the individual's tractor.

TABLE 1. Summary of 91 FACE and State FACE Investigations of Tractor Overturns Between 1991 and 2004 by Model Year of Tractors Involved in the Overturn

	Tractor model years								
	1930s	1940s	1950s	1960s	1970s	1980s	1990s	Unknown	Total
ROPS									
No	*1*	*8*	*19*	*26*	*24*	5	1	1	85
Yes	0	0	0	1	0	1	1	1	4
Unknown	0	0	0	0	0	0	0	2	2
Total	1	8	19	27	24	6	2	4	91

Note. The data in italics show that overturn fatalities occurring on tractors without ROPS can be attributed to tractors manufactured between 1930 and 1960.
Source: Myers JR, personal communication, October, 2009.

3. The individual did not have any other ROPS protected tractors.
4. The individual did not have any other tractors that could be retrofitted.

The New York State ROPS Rebate Program Hotline is part of a social marketing intervention in New York that provides financial and logistical assistance for installing ROPS and promotional messages/ materials encouraging ROPS installation.[18,19] Thus interest in retrofitting was based on an individual having called the hotline to inquire about ROPS for their tractor.

Of 1170 contacts to the ROPS hotline through February 2008, 93 pre-ROPS tractors were identified in the hotline database. Based on information in the database, we identified 47 tractor owners that met the study eligibility criteria. These 47 individuals were then contacted by phone in order to confirm their eligibility and to invite them to participate in a focus group discussion. Of the 47, 11 could not be contacted, 16 declined the offer to participate, 4 were no longer eligible, and 16 agreed to participate. Tractor dealers were also invited to participate and were selected based on their close proximity to the focus group locations. Of the tractor dealers invited to the discussions, 23 declined to participate, 4 could not be contacted, 2 had gone out of business, and 7 agreed to participate. Both tractor owners and tractor dealers were informed of the nature of the study, what participation would entail, and where and when focus group discussions would be conducted. They were also offered $25 for participation, as well as reimbursement for any travel expenses incurred.

A semistructured interview guide was used for discussions (see Figure 1). For each of the focus groups there was a moderator, notetaker, tractor owners, and tractor dealers present. Discussions started with a brief description of the affiliated research center, the New York Center for Agricultural Medicine and Health, and the purpose of the study. Participant's rights as study subjects were discussed and each participant signed an informed consent form. Discussions were tape-recorded and notes were also taken during the discussions. Audiotapes were transcribed and contents verified using discussion notes.

Discussion group data were analyzed using a concept development analytical method. This method is largely used in marketing research to develop guidelines or suggestions for improved products, services, or programs. This involved an initial read-through of each discussion transcript. Following this, each of the transcripts was reviewed again to identify segments of information or statements that highlight barriers or motivators to participating in a trade-in program, as well as ideas regarding eliminating old tractors. These segments and statements were then grouped to identify prominent themes.

Stakeholder Work Group Session

The work group session was scheduled during the 2008 National Institute for Farm Safety Conference held in Lancaster, Pennsylvania. Focus group data were presented to the

FIGURE 1. Abbreviated version of focus group discussion interview guide.

I. Motivations and Alternatives:
- Why were you *[tractor owners]* interested in retrofitting your tractor?
- What other options to retrofitting did you *[tractor owners]* consider?
- Which of these options seemed to be the most feasible and why?
- Which of these options were not feasible and why?

II. Exploring the Barriers/Motivators of a Possible Trade-in Program:
- If a tractor trade-in program could be organized, what incentives or assistance would interest you *[tractor owners]*?
- Which of these options would dealers be able to provide?
- What difficulties would dealers encounter in trying to provide these incentives?
- What barriers would make it impossible for you *[tractor owners]* to participate in a trade-in program regardless of the incentives or assistance provided?
- Can anyone think of possible solutions for addressing or resolving these barriers?
- How could dealers or tractor manufacturers help to address these barriers?

III. Exploring the Issue of Disposing Old Tractors:
- What could be done with old tractors once they've been traded in?
- Which of these options would be preferable for dealers?
- Would any of these options take these tractors out of commission permanently?
- Are there any other issues relative to getting rid of old tractors that can't be retrofitted?

IV. Designing the Ideal Trade-in Program *(tractor owners and dealers were asked to work together to design an ideal tractor trade-in program that would address the following questions)*:
- What incentives would you provide?
- How would you provide them?
- How would you advertise the program?
- How would you dispose of the old tractors?

21 attendees and they were then asked to discuss potential solutions for identified issues. Attendees included representatives from the following industries: insurance agencies ($n = 2$), tractor manufacturers ($n = 4$), tractor dealers ($n = 2$), Farm Bureau ($n = 1$), the research community ($n = 10$), and the National Institute for Occupational Safety and Health ($n = 2$). Specifically, attendees were asked to consider and discuss the questions listed in Figure 2.

FIGURE 2. Summary of questions discussed in stakeholder workgroup session.

I. Program parameters
- Who should be eligible for a tractor trade-in program?
- What rules or stipulations would be an essential part of a trade-in program?
- How should a trade-in program be advertised?

II. Disposal of old tractors
- Should they be disassembled and sold as parts or be permanently destroyed?
- How could these tractors be permanently disposed?
- Who would regulate the disposal of old tractors?
- Should this always be done through the tractor dealer?
- Can the price of newer tractors be controlled as the demand for them increases?

III. Incentives
- What could be provided for a pilot tractor trade-in program?
- What role could manufacturers play in the long term?
- What role could insurance companies play in the long term?
- What role could tractor dealers play in a tractor trade-in program?

This discussion was tape-recorded and notes were taken. The audiotape was transcribed and analyzed in the same manner as the focus group discussions. The themes that evolved from the grouping of key statements and information were then summarized. The study was approved by the Mary Imogene Bassett Hospital Institutional Review Board (Human subjects protocol # 779).

RESULTS

Motivations for Retrofitting/Other Options Considered

Of the 23 tractor owners and dealers who agreed to participate, 16 were able to attend one of the four focus groups held in different parts of New York State. Table 2 provides information on the distribution of tractor owners and dealers attending each of the four focus groups, as well as information on tractor brands represented. Thus the participation rate was 28% of eligible tractor owners and 8% of eligible tractor dealers.

TABLE 2. Distribution of Tractor Owners, Tractor Dealers, and Tractor Brands Represented in Focus Group Discussions

	Focus group attendees	
	No. of tractor owners	No. of tractor dealers (tractor brand)
Focus group 1	4	1 (New Holland)
Focus group 2	3	1 (John Deere)
Focus group 3	3	1 (Case)
Focus group 4	3	0
Total	13	3

As stated previously, discussions followed the major topic areas outlined in Figure 2. The themes that emerged are summarized in the following section, with the addition of direct quotes that highlight these themes.

Motivation to retrofit largely circumstantial. Participants indicated a number of circumstances that led them to consider retrofitting. These included dangerous terrain, a close call, children or workers using unprotected tractors, dangerous implements (front end loaders), or concerns about aging and their ability to operate a tractor safely.

Tractor owner: "We usually have a kid in the summertime that works with it [unprotected tractor] and we try to do things as safe as we can. It was more just for the safety of the kids, you know, the guys that are working with us, than for ourselves. We operate it enough so that we know all the tricks of the tractor. We've got some pretty decent hills where you've really got to watch what you are doing."

Fabricating or altering existing ROPS is an attractive alternative. Participants were also asked to discuss other options they had considered when they learned their tractor couldn't be retrofitted. Most had considered fabricating their own ROPS or altering an existing ROPS.

Tractor owner: "My first thought when it couldn't be found was to look at another ROPS, see how big the steel was and just make one. If it [ROPS] was half inch steel you would make it 5/8's or ¾'s, right off the bat. That will hopefully get you past the risk."

Some considered a newer tractor, but cost was a sizeable barrier. A few of the participants had considered purchasing a new tractor, but this was related more to the utility of a newer tractor and less about obtaining ROPS protection.

Barriers and Motivators to Participating in a Tractor Trade-in Program

The group was then asked to consider incentives that would make participation in a trade-in program appealing and barriers that would discourage or make it impossible for them to participate. The following themes emerged:

Financial incentives are essential, but the type preferred varies. Unlike the other discussion topics, responses to the question "What would motivate you to consider participating in a trade-in program?" were varied. For some, 0% financing was attractive, for others, insurance or tax breaks were more appealing. Nonetheless, money was consistently mentioned as a motivating factor.

Moderator: "Can you think of any incentives that could be provided that would make trading in easier?"
Tractor owner: "A big chunk of money."

Financing a newer tractor is a prominent barrier. There was more consistency regarding barriers to participating in a tractor trade-in program than there were with motivators. For all participants, financing a newer tractor was the prominent issue and getting enough money for the older one was a primary concern. Finances coupled with the practicality of using a tractor that works, that you are familiar with, and that is paid for made it very difficult for many of them to imagine participating in a trade-in program.

Tractor owner I : "For what you would get for trading it in, it is just as easy to keep it and keep running it."

Tractor owner II: "We've got a small farm and older equipment, kind of a part-time thing, so that buying any equipment is tough to do. The last couple tractors we've gotten, we probably paid three or four thousand dollars each."

Compatibility of tractor implements an additional barrier. Another barrier mentioned several times by participants was that the implements for the old tractor may not be compatible with the newer tractor.

Tractor owner: "I've got a special attachment, the side mower on it, that I have reworked and it would be awfully hard for me to replace that tractor with that functionality."

One sentiment shared repeatedly among participants was that it made no sense to destroy a perfectly good tractor.

Tractor owner: "What I would be more interested in is keeping my older tractors without the ROPS and buying a different tractor with a ROPS to use primarily on the farm and for the more risky work, instead of getting rid of a good tractor which in our mind is a good tractor that we could hold on to."

Concerns not enough to overcome barriers. In general, concerns about overturns did not appear to override the issues related to getting a tractor with ROPS.

Tractor owner I: "I don't think I'll be driving my tractor too many more years. I'm not really so worried that I would get another one. My son would inherit it, so I am going to let him worry about that."

Tractor owner II: "Exactly, I mean if we happen to come across a ROPS we would think about it, but we kind of like that tractor and it doesn't cost much to run it."

Prefer a solution that makes older tractor safe. Participants felt it should be easy enough to build a ROPS for these tractors and there appeared to be widespread ignorance regarding the fact that the axle housings on many older tractors were not designed to withstand the force of an overturn and could very well break, rendering a ROPS useless.

Numerous barriers to dealer participation. For tractor dealers, there were numerous barriers to participating in a trade-in program. Although moving newer tractor stock would be beneficial, providing money to the owner for the older tractor would result in a financial loss for the dealer, since these tractors could not be resold due to liability issues.

Tractor dealer: "The problem you are creating, when it comes in to us is what do we do with it? We have safety issues we are involved in all the time, PTO covers and everything else which needs to be considered before we put a tractor back out for sale."

Destroying the tractor was equally complicated. Dealers indicated they did not have the time or the manpower to do this. Another issue brought up during discussions was that the price of newer tractors would be driven up, if the demand for these tractors were increased due to the trade-in program.

Tractor dealer: "The whole problem is if you create a program that convinces people to trade-in an old non-ROPS tractor and then you destroy it, you now create demand for tractors that have ROPS and the price goes up."

What To Do With the Older Tractors?

No identifiable solutions for disposing old tractors. How to deal with the older tractors was a difficult question for the group to resolve and in the end there were no convenient solutions identified. As participants indicated, if older tractors were taken to salvage yards, there would be no guarantees that the salvage yard wouldn't turn around and sell the tractor as a whole or for parts.

Tractor dealer: "There are people we call jockeys that buy used pieces. They have a place that they move them to, especially if there is more of a problem in one area of the country, they will get rid of it some place else."

Tractor owner: "I know the guy at the salvage yard. I know darn well, if he can get more money for a whole tractor than he could in parts, he would sell it whole."

Tractor dealers, in particular, were concerned about the difficulties they would encounter in trying to dispose of or ensure the destruction of older tractors.

Tractor dealer: "It's a catch twenty-two, if we are going to do so much to take the tractor apart, now we have costs involved, forget what we may have wanted to put into that tractor. We've got costs involved to tear it apart, we have to truck it, the cost of fuel, where do I have to take it to dispose of it? Then who is going to be the watch agency to make sure it is destroyed?"

Stakeholder Work Group Session

These data were then presented to stakeholders who were asked to discuss and address the identified issues. Stakeholders' responses are summarized under each of the discussion topics:

Program Parameters

- *Identifying participants*. Participants for a trade-in program should be identified through a retrofitting program database. This will ensure participants are interested in ROPS protection for tractors that are being used regularly. Advertising the program to the general public may generate interest from tractor owners who just want to get rid of older equipment that is no longer functioning.
- *Criteria based on income*. Stakeholders suggested that participation in the program should be based on the tractor owner's income. If the individual could prove that they couldn't afford to finance or purchase a newer tractor, the program could provide cash for the older tractor and assistance for buying the newer tractor. Other workgroup participants indicated that farmers don't like to discuss the financial stability of their farms.

Disposal of Old Tractors

- *Redirecting old tractors to the antique tractor market*. Instead of scrapping older tractors, it was suggested that participants might sell their tractors to antique tractor dealers. These tractors would be used in parades or as show pieces, not for work. Issues related to this include the drop in pricing for antique tractors if a large-scale trade-in program were to be initiated and many tractors were to flood the market. Also there would be no guarantees that new owners would not use them for farm work.
- *Ensuring the tractor is permanently disabled*. One suggestion for permanently disabling older tractors was to put a hole in the engine block. Although this would render the tractor inoperable, it could still be dismantled and the parts resold to keep other pre-ROPS tractors in operation. There was also no identifiable solution for who would perform this function.

Incentives

- *Role of insurance companies*. During the discussion, the role that insurance companies could play in providing incentives was raised. Possibilities included providing reductions in insurance premiums or refusing coverage for tractor owners that do not have ROPS on tractors. Insurance company representatives stated that it would be difficult to provide reductions in premiums and to deny coverage would make it difficult to remain competitive with other insurance companies.
- *0% financing*. Manufacturers and dealers raised concerns about providing 0% financing to farmers purchasing a newer tractor that could be retrofitted. As these individuals indicated, 0% financing is already a standard offer to farmers purchasing newer equipment. For those that cannot get 0% financing, their credit is so poor that it would be difficult to offer this just for the sake of taking an old tractor that can't be retrofitted out of commission.
- *Dealer incentives*. Dealership representatives indicated that in the current economy, it would be difficult to dedicate manpower and provide incentives for a trade-in program. Dealerships would need some financial incentive for participating or disposing older tractors.
- *Legislation*. The role of legislation was also discussed. Attendees felt a legislative mandate would be the easiest way to get tractor owners to trade in older tractors. However, it was also widely acknowledged that it would be difficult to enforce such a law, let alone get it passed.
- *Cash incentives*. Giving tractor owners cash for older tractors was also suggested and attendees felt that this would likely be the best way to motivate owners to trade in old tractors. Providing a flat rate of $4000 to $5000 per tractor was suggested.

DISCUSSION

The objective of this research was to assess the feasibility of a recycling/removal program for pre-ROPS tractor owners that would work to remove unsafe tractors that cannot be retrofitted from service, in order to replace them with newer, safer models that have ROPS or that could be retrofitted. To do this focus groups were conducted with those individuals to whom a trade-in or removal program would most necessarily be responsive to, i.e., pre-ROPS tractor owners and tractor dealers. In order to shape these data into a potentially cohesive and long-term strategy, focus group information was reviewed with those stakeholders most likely to have a vested interest in a long-term, viable solution.

Although the generalizeability of our data may be compromised due to the relatively small sample size, results from our study provide at least an initial indication that formulating a successful recycling or trade-in program could be an extremely challenging prospect.

Perhaps the biggest and most difficult issue to resolve is funding. As tractor owners indicated, their older pre-ROPS tractors are still functioning, they are still useful, farmers like them because they know how to operate them and they aren't making payments on them. Given this and given the money they could make from selling them on the antique tractor market, they are not likely to trade them in, for anything less than $4000 to $5000. Other financial incentives, besides cash, were marginally appealing, such as 0% financing, reductions in insurance premiums, or tax breaks. Not one of these options appealed to a majority of tractor owners. Dealers also indicated that participation in a trade-in program would require some form of financial remuneration for their time (e.g., orienting employees on the different aspects of the program and taking apart or destroying the older tractors). For dealers to provide a price break on a newer tractor based on the trade-in of an older tractor, they would also need financial compensation, as they would not be able to resell the older tractor. As the discussion from the stakeholder workgroup session indicates, manufacturers, insurance companies, and Farm Bureau representatives will not likely be able to provide the funding or policy changes that would support a trade-in initiative. These financial problems are likely to be exacerbated by the pricing structure problems that a sweeping tractor

removal program would create. As dealers and industry representatives indicate, by removing these older tractors, the price for antique tractors might go up, forcing trade-in programs to pay more for pre-ROPS tractors. The increased demand for new or newer tractors that can be retrofitted will also increase the price that participants in a trade-in program will be forced to pay for a tractor that can be retrofitted or that has ROPS.

Comments from participants also indicated they find it easier to take risk than to tackle the many issues surrounding getting a safer tractor. Although participants said they were concerned about the safety of family or workers, many also said they would be unwilling to take on the extra cost of a newer tractor or take less for their tractor than they thought it was worth. Indeed, many of the tractor owners felt there were several good reasons for keeping the old tractor. These included the familiarity with the old tractor and the compatibility with existing tractor implements. The thought of destroying "a perfectly good tractor" was also a difficult concept for these tractor owners to accept, indicating that the issue is considered more from a work-oriented perspective than a safety-oriented perspective. Many of the participants also felt it would be far easier to just fabricate a ROPS. Widespread knowledge of the issues related to the reliability of axle housings in the event of an overturn did not appear to exist among discussion group participants.

CONCLUSION

In light of this information, developing a successful wide-scale tractor removal program for pre-ROPS tractors that cannot be retrofitted may not be a promising strategy. Tractor owners would have to be convinced of the need, persuasive incentives would need to be provided, and the issues related to pricing structure and the large-scale removal of older tractors would need to be addressed. However, one potential solution for many of these issues may be to develop a small-scale tractor removal program that targets specific, at-risk segments of the pre-ROPS tractor community, such as older farmers or farmers working on hilly terrain or some combination of these factors. Based on the information gathered in this study, it may be possible to develop guidelines for a limited pilot study that could test the feasibility of a focused buy-back program under ideal conditions, i.e., funding for purchase of pre-ROPS tractors.

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