

Evaluating Agricultural Workplace Assistive Technology for Secondary Injury Hazards

An Assessment Tool for Professionals Who Assist Farmers and Ranchers with Disabilities



National AgrAbility Project
Breaking New Ground Resource Center
Purdue University

EVALUATING AGRICULTURAL WORKPLACE ASSISTIVE TECHNOLOGY FOR SECONDARY INJURY HAZARDS

**An Assessment Tool for Professionals Who Assist
Farmers and Ranchers with Disabilities**

National AgrAbility Project

Breaking New Ground Resource Center, Purdue University
225 South University Street, West Lafayette, IN 47907
Phone: 800-825-4264, Web: www.agrability.org

This resource was funded, in part, by
National AgrAbility Project Grant No. CSREES/USDA-2008-41590-04796
National Institute of Food and Agriculture, U.S. Department of Agriculture

TABLE OF CONTENTS

Preface	iii
Authorship/Acknowledgments (iii)	
Disclaimer/Limitations (iii)	
About Professional Liability (iii)	
Section I—About The Assistive Technology Assessment Tool	I-1
Introduction of the Tool (I-1)	
Purpose of the Tool (I-1)	
Who Should Use the Tool and Why (I-2)	
Component Parts of the Tool (I-2)	
Computerized Version of the Tool (I-3)	
On-Site Assessment ‘Tool Kit’ (I-4)	
Section II—Steps in the Assistive Technology Assessment Process	II-1
Before the Evaluation—Steps 1-4 (II-1)	
During the Evaluation—Steps 5-7 (II-1)	
After the Evaluation—Steps 8-11 (II-2)	
Section III—Explanation of Assistive Technology Assessment Items Related to—	III-1
Construction and Components of an AT (III-1)	
Controls on an AT (III-3)	
Electrical and/or Hydraulic Parts on an AT (III-4)	
Moving Parts and Surfaces of an AT (III-6)	
Risks Associated with Operation of an AT (III-8)	
Preventive and Protective Features on an AT (III-10)	
Practices to Enhance Safe Operation of an AT (III-12)	
Limitations of the User of an AT (III-13)	
Section IV—Example of an Assistive Technology Assessment	IV-1
Worksheet A—The Client, the Disabilities, and the Farming Operation (IV-1)	
Worksheet B—The Assistive Technology to Be Evaluated (IV-3)	
Worksheet C—Quick-Reference Checksheet of Assessment Items (IV-4)	
Worksheet D—Detailed Assessment of Injury-Potential (IV-5)	
Worksheet E—Injury-Potential Problems Observed/Solutions Suggested (IV-12)	
Worksheet F— Assessment Results and Recommendations (IV-21)	
Section V—Appendices	V-1
Appendix A—Selected Agricultural Safety and Health Resources (V-1)	
Appendix B—Farm and Ranch Safety Inventory (V-3)	
Section VI—Blank Assessment Tool Worksheets	VI

Terms of and Conditions for Appropriate Use of This Document

Copyright, Purdue University (2010). All rights reserved.

This manual or portions thereof may be reproduced and distributed at no charge ONLY if used for personal or educational purposes. The material is not to be modified in any way; and the above copyright notice must appear on any copies distributed. Likewise, except for personal use, neither the manual nor portions thereof are to be copied and distributed in printed or electronic form without the written permission from Purdue.

If any of the material would be used in any manner for commercial purposes (e.g., a profit realized from its use, a fee charged, its use enhancing commercial interests), request must be made to the National AgrAbility Project, Breaking New Ground Resource Center (*see below*). That request will be forwarded to Purdue’s Office of Technology Commercialization for review and approval.

If you have questions concerning any of the above, contact the Breaking New Ground Resource Center by phone (800-825-4264), by fax (765-496-1356), or by e-mail (*bng@ecn.purdue.edu*).

PREFACE

Authorship/Acknowledgments

This resource was developed at the Breaking New Ground Resource Center (BNG) with guidance from Dr. William E. Field, Director, National AgrAbility Project; Project Leader, BNG; and Professor, Agricultural and Biological Engineering Department, Purdue University. The BNG staff involved in its production include: Dr. Samuel Mathew (lead author), Dr. Gail DeBoy, Mr. Paul Jones, Mr. Jon Smith, and Mr. Steve Swain.

The contributions by the following are gratefully acknowledged:

- The staff members of state and regional AgrAbility projects who provided expert opinions and helpful suggestions.
- The farmers who provided access to their workplaces and shared valuable insights about the assistive technologies they use. (Special note: Among those was Pullman, MI, blueberry grower *David Munjoy*, on whose farm the AT assessment tool was initially tested. Physically limited by disability and health issues, he had fabricated or modified numerous devices and pieces of equipment that allowed him to remain amazingly productive. An inspiration to the entire assessment process development team, Mr. Munjoy passed away in January 2010.)
- Subject matter experts who assisted with the pilot-testing of this tool, including: *Ed Bell*, assistive technology consultant; *Steven Etheridge*, Indiana Vocational Rehabilitation Services; *Ned Stoller*, Michigan AgrAbility Project; *Steven Swain* (ATP), rural rehabilitation specialist; and *Paula Wasko*, assistive technology assessment specialist.
- *Dr. Dennis Murphy*, Pennsylvania State University (University Park, PA), and *Dr. Mac Legault*, Flat-Iron Construction Corp. (Longmont, CO), who made available a number of photos of potential agricultural worksite and equipment hazards, out of which several are included in Section III of this document.

Disclaimer/Limitations

The assessment procedure presented here is intended as a tool to determine the potential for secondary injury from a specific assistive technology (AT) in an agricultural workplace. This tool is not meant—nor claimed—to certify the safety of an AT. Rather, it attempts to (1) identify those sources and situations (relative to the AT and its user) that would likely increase the risk of injury to the user, then (2) suggest corrective measures to minimize that risk. The process herein contains ‘assessment items’ based on data collected and analyzed from existing farm ATs and validated by a panel of rehabilitation professionals and agricultural safety experts.

If there are additional hazardous sources and situations present unique to specific ATs, individual users, agricultural enterprises, and/or geographic regions, these should be identified and corrected using a similar process to minimize the potential for secondary injury.

The findings or recommendations resulting from the use of this assessment tool are not to be considered binding on any party. Rather, it is meant to provide a fair-judgment/good-faith guideline for AT evaluation.

Research studies have indicated that human estimation of risks for injuries is not completely accurate. Under-estimation of risk can increase the possibility of a user's risky behavior and, hence, may lead to higher potential for injuries. Strict compliance to safety regulations and guidelines is one way to reduce risk of injuries for everyone.

About Professional Liability

No one is immune from potential liability claims that may result from participating in an activity/effort involving people and hazardous situations. As our society becomes more litigious, the chances of being identified as a defendant in a liability claim increase. As noted in the above disclaimer statement, this assessment tool is meant to provide guidelines for evaluating the safety of an AT, not to officially certify its safety. Neither does it apply any engineering calculations or design criteria to identify the various sources or situations leading to potential injury when using a particular AT.

The best protection against any liability claim is to inform the AT user of the identified injury potentials observed then allow him/her to make the decision regarding any suggested modifications. Possible support in making recommended changes (e.g., referral to funding sources, engineering professionals, commercially available solutions) may be provided to help the client achieve his/her goal of 'safe farming.'

In carrying out an assessment utilizing this tool, all potentially hazardous sources/situations observed should be recorded and the user provided a copy of that record. If the potential for injury involves children, there may be a legal requirement or professional responsibility to report such situations to a child protective agency. In summation, the guiding principle in carrying out an assessment should be to minimize harm in the best possible way, based on your current knowledge and judgment—and to clearly communicate the facts to the user.

Lastly, any information provided by the client is voluntary and based on trust. Hence, it is important to maintain confidentiality of the data collected. Information should be shared with others only after obtaining clear, written permission from the client.

Section I.

ABOUT THE ASSISTIVE TECHNOLOGY ASSESSMENT TOOL

Introduction of the Tool

This document is an assessment instrument designed to estimate the potential for ‘*secondary injury*’ from the use of ‘*assistive technology*’ by farmers, ranchers, or other agricultural workers who have disabilities. These two terms are defined as follows:

- **Assistive technology** (AT)—a practice, device, or piece of equipment—either ‘home’ (i.e., self- or locally) fabricated/modified or commercially available—that is utilized to enhance the functional capabilities of individuals with disabilities.
- **Secondary injury**—an injury caused by limitations associated with disability conditions and/or by using an assistive technology intended to compensate for those conditions.

Although this assessment ‘tool’ can be used independently, it is intended primarily as a companion to **“*Conducting Agricultural Worksite Assessments: A User’s Guide for Professionals Assisting Farmers and Ranchers with Physical Disabilities*”** (available from the Breaking New Ground Resource Center at Purdue University). That resource provides a process for carrying out disability-related needs assessments of the work environments of farmers or ranchers with disabilities, including identification of significant workplace barriers due to functional limitations that prevent completion of desired tasks.

To help overcome the barriers and limitations due to disabilities, many farmers/ranchers utilize various assistive technologies (ATs). This assessment tool presents a systematic procedure for (1) evaluating the relative safety of an AT for its user and (2) suggesting corrective measures where potential for injury is identified. Contents of the tool are as follows:

- Section I introduces the tool, spells out its purpose, identifies its intended users, and discusses its component parts, which includes six worksheets and a reference section. Also discussed is a computer program version of the tool and a list of hardware items for on-site visits.
- Section II outlines the steps involved in the assessment process.
- Section III is the reference section for Worksheet D and explains (along with pictorial examples) the potential injury-causing items related to the ATs being evaluated.
- Section IV presents an example of a completed assessment of a specific AT utilizing the tool’s worksheets.
- Section V consists of two appendices, the first being a listing of selected agricultural safety and health resources and the second being a farm/ranch safety inventory.
- Section VI includes blank assessment tool worksheets, which may be reproduced for each assessment made at the client’s worksite.

Purpose of the Tool

To determine the suitability of an AT and ensure the safety of its user, it is important that potential hazards be identified and the risk of injury minimized. Injuries may be caused by features

of the AT, by situations that are unique to the user, and by the environment in which the AT is used. Considering the many different types of ATs that could be found in an agricultural workplace, generalizations cannot be drawn from a single workplace-wide assessment. Rather an evaluation must be made for each AT and its user.

The purpose of this assessment tool is to aid in identifying the potential injury situations associated with an AT so that corrective actions can be taken. Also, re-assessment is recommended if any significant changes occur relative to the AT, the user's disability, or the work environment.

Who Should Use the Tool and Why

This assessment tool will most likely benefit the following, because of their involvement in the design, fabrication, evaluation, and/or use of ATs in the agricultural workplace:

- **Rehabilitation professionals.** They can utilize the tool to identify the hazardous situations and potential for injury in using ATs in the agricultural workplace in order to recommend appropriate corrective measures. Such assessment-generated recommendations would allow rehabilitation agencies to be more confident concerning safe use of an evaluated AT being considered for funding.
- **Fabricators of ATs.** Section III especially is useful as a reference guide for fabricators to incorporate appropriate safety features as they design and build ATs for their customers. Completion of the assessment process presented here will demonstrate a professional approach in providing customers with products that have incorporated basic safety measures.
- **AT users and those who assist.** They would find the tool helpful in better understanding the potential for injury on the ATs they presently use (or are considering to use). By applying corrective measures, they can minimize the risk of potential injury-causing situations.

Component Parts of the Tool

This AT assessment tool consists of six worksheets *plus* a reference section that identifies and describes potential injury-causing items an assessor should be looking for. Following is a brief explanation of each of the tool's components. (*Note. Worksheet A needs to be completed only once for a client, while Worksheets B through F must be completed for each AT evaluated.*)

- **Worksheet A—The Client, the Disabilities, and the Farming Operation.** On this form, the assessor records details about the AT user, his/her disabilities, and the farming operation. That information is provided by the client, family members, and/or co-workers.
- **Worksheet B—The Assistive Technology to Be Evaluated.** On this form, the assessor records details about the AT which is to be evaluated. That information is to be obtained from the client, his/her family, and/or co-workers, as well as the assessor's observation of the AT.
- **Worksheet C—Quick-Reference Checklist of Potential Injury Items (optional).** Before conducting a detailed assessment (Worksheet D), the assessor can use this form to 'flag' items for assessment based on his/her first-impression or preliminary observation of the specific AT. (Utilizing this worksheet will likely speed up the evaluation process, since the identified 'not-applicable' items can be skipped at the outset.)

- **Worksheet D—Detailed Assessment of Injury Potential.** This worksheet contains eight subsections under which are listed 55 items that have the potential of causing injury to the AT user. For each of the items, the assessor indicates if injury potential is present or not, based on his/her visual inspection and observation of the operation of the AT, as well as conversation with the client, family, and others. (*Note: Each item has been given an injury-potential ‘rating’ of high (H), medium (M), or low (L), based on research studies among farmers with disabilities and rehabilitation professionals experienced in assessment of ATs. These ratings serve as guidelines in determining what items, if any, call for corrective action and in what priority order they may be addressed.*)
- **Worksheet E—Injury-Potential Problems Observed/Solutions Suggested.** On this form, the assessor lists those items that were identified in Worksheet D as posing an injury hazard then spells out the problems observed and the solutions suggested.
- **Worksheet F—Assessment Results and Recommendations.** On this form, the assessor records his/her assessment of the AT’s overall suitability for the user, lists in priority order those items that warrant corrective action, and makes note of anything else relative to the AT that should be brought to the attention of the user.
- **Reference Section—Explanation of Assistive Technology Assessment Items.** Section III of the tool provides explanations and pictorial examples of 55 potential injury-causing items (listed in the same order as in Worksheets C and D), along with commonly recommended corrective measures. The assessor is encouraged to refer to this section often before and during his/her inspection of the AT.

Computerized Version of the Tool

A computer program has been developed whereby the assessor can complete Worksheets A, B, and D on-site using a laptop as well as complete Worksheet E and F later on, then print out a report along with uploaded digital photographs. Available for free download from the National AgrAbility Project website (www.agrability.org), the program’s features are as follows:

- One-to-one correspondence to Worksheets A, B, and D.
- One-click selection to mark the ‘problem present’ or ‘no problem’ or ‘not applicable’ boxes in Worksheet D.
- Adequate space provided to enter comments in the ‘problems observed’ and ‘solutions suggested’ portions of Worksheet D.
- Ability to upload multiple pictures taken of each item.
- Simultaneous creation of ‘.xml’ and ‘.html’ files when the data are saved.
- The ‘.xml’ file contains client data, which can be re-loaded later for editing.
- The ‘.html’ file is the report file that can be opened in the browser and printed with the browser’s ‘print’ command. Pictures are size-adjusted automatically. (No separate Worksheet E needs to be prepared.)
- Separate sub-directories created automatically to store pictures, along with the ‘.xml’ and the ‘.html’ files.
- Switching from one section of the tool to another (e.g., between worksheets and/or subsections within Worksheet D) easily done from anywhere in the program.

On-Site 'Toolkit'

In addition to this document and/or the computer program on a laptop, the following basic hardware 'tools' are suggested for each on-site visit:

- Digital camera
- 25-foot measuring tape
- Magnifying glass
- Clipboard
- Angle finder
- Screwdriver set
- Spring scale
- Calculator
- Voltage tester
- Level
- Wire brush
- Pliers

Section II.

STEPS IN THE ASSISTIVE TECHNOLOGY ASSESSMENT PROCESS

Before the Evaluation

Step 1. Familiarize yourself with the AT assessment tool, especially Section III (“Explanation of Assessment Technology Assessment Items”) in order to:

- (a) properly identify those items that can potentially cause injury to the AT user;
- (b) understand the risk that each item presents when you actually evaluate the AT on-site;
- (c) provide appropriate solutions to minimize the identified injury risk.

(Note: If uncertain about the risks involved, you may want to contact an agricultural safety professional for assistance.)

Step 2. Meet with the client (and, if possible, family members and any co-workers) before conducting the assessment. This is important not only to establish a cooperative relationship between the client and yourself, but also to gather the required information to carry out Steps 3 and 4.

Step 3. Collect the information needed to complete Worksheet A. This involves observing and asking questions about the client, the family, his/her disability, the farm operation, the workplace, and the ATs that the client uses. *(Note: Be sensitive to the client’s feelings and respect his/her right to privacy, particularly with regard to his/her disability or prognosis. If the client is reluctant to provide personal details, the corresponding fields on the worksheet should be left blank, with perhaps an appropriate comment (e.g., “Not available presently”).*

Step 4. Collect the information needed to complete Worksheet B for each of the ATs to be evaluated.

During the Evaluation

Step 5. Observe the operation of the AT, preferably as client completes the task(s) for which it is intended; also, carefully examine it while not in operation. (This is probably the best time to take pictures.)

Step 6. Read the instructions at the top of Worksheet C and follow through on points (1) and (2). *(Note: As one becomes experienced in using the AT assessment tool, completion of Worksheet C may become optional; however, in the beginning, the use of Worksheet C is highly recommended.)*

Step 7. Make assessment of the AT, recording the following in Worksheet D:

- First, to the right of the question for each of the assessment items, mark an ‘X’ in one of the check-boxes as the appropriate response—i.e., item presents a potential problem OR item has a safety feature or poses no problem OR item is not applicable to the AT. *(Note: The top-most box is marked when a potential problem is evident.)*

- Second, for each item where a problem has been noted, in the space provided beneath the question, write down your observations, concerns, even preliminary suggested solution(s) related to that item.

After the Evaluation

Step 8. After the initial assessment of the AT, complete Worksheet E as follows:

- First, list all the items identified in Worksheet D as having a potential for causing injury.
- Second, for each of the items listed, under ‘Problems observed’ explain (and perhaps illustrate with drawings or photographs) what those problems are, based on the observations/concerns you wrote down in Worksheet D and with reference to that item in Section III.
- Third, under ‘Solutions suggested,’ make recommendations for addressing the problems, taking into account the possible consequences of the various corrective actions.

Step 9. Discuss with the client the contents of Worksheet E. This will help confirm that what you recorded in Worksheet D (both problems observed and solutions suggested) is understood by the client as well. If appropriate, seek his/her input and, if possible, that of the AT’s designer and/or fabricator (if other than the client).

Step 10. Based on the observed problems and suggested solutions recorded in Worksheet E, complete Worksheet F, which is your ‘report’ as to the general suitability of the AT, the critical problems to be resolved and other non-critical problems identified, along with any additional comments.

Step 11. As the last step in the assessment process, give a copy of both Worksheets E and F to the client and discuss the details so he/she fully understands the rationale behind your recommendations. Among the hoped-for outcomes of such a discussion is the setting of priorities so that the solutions can be implemented to prevent or at least minimize the risk of secondary injury. (*Note: If you utilized the AT assessment tool computer program, the ‘report’ generated will include the contents of Worksheets D and F plus any pictures you uploaded into the program, so that you may provide the client with a printed copy.*)

Section III.

EXPLANATION OF THE ASSISTIVE TECHNOLOGY ASSESSMENT ITEMS

Note: Each of the 55 items that fall under the eight categories in this reference section has been ascribed an injury-potential rating of high (H) or medium (M) or low (L), based on research studies involving farmers and rehabilitation professionals. The rating, which follows the item number, serves as an indication of the general risk level—e.g., 1 (H), 5 (M), 7 (L). For further information applicable to the safety of devices and work practices used in the agricultural workplace, see the list of resources in Appendix A. For a general farm/ranch inventory designed to help a client identify other workplace hazards, see Appendix B.

Items Related to the Construction/Components of an AT

1 (H) **General construction** — *Does the AT (whether fabricated or modified) appear to be of sturdy and stable construction?*

Sturdy, stable construction is important to any AT's long-term, reliable, and safe operation. Indications of good construction include: use of quality materials; overall integration of well-fitting component parts; properly welded or bolted joints; and the right size, grade, and number of fasteners at appropriate places. (Since adherence to building codes could be mandatory for construction, proper approval may have to be obtained before modifying a structure.)



2 (H) **Physical damage** — *Is there any physical damage (e.g., cracks, rust, rot, wear, corrosion, bends, dents) apparent that would affect performance or safety?*

Cracks indicate weakness, leading to breakage. Rust, rot, wear, and/or corrosion could indicate deterioration or weakness. Bends or dents can hinder proper functioning of moving parts during operation. Close investigation and measured judgment are required to determine the severity and hazard potential of physical damage. Also, inspect to ensure that paint and other surface coatings have not hidden any deteriorating structural components.



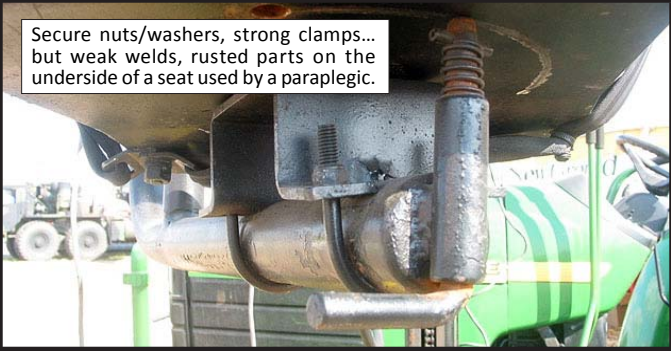
3 (H) **Component parts** — *Are the component parts (e.g., cables, straps, fasteners, buckles, tubes, hoses) strong, stable, and secured appropriately?*

The integrity of components used on an AT is important, especially if they are part of modifications made to the original equipment. Poor-quality parts could break or loosen, resulting in injury. Check especially these components: cables/straps that are not strong enough to bear intended weight or withstand pull, fasteners that are inappropriate, buckles that are flimsy, hoses/tubes having loose connections, and plastic parts that are frail.



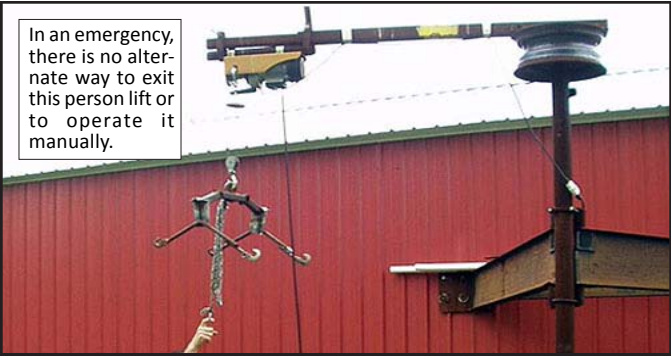
4 (H) **Joints** — *Are all joints welded, bolted, tied, or glued adequately or otherwise fastened securely?*

Modifications to original equipment sometimes require new joints using welds, glue, nails, or nuts and bolts. It is recommended that welding is done by a professional, glue is appropriate for the application, and nuts/bolts are grade 5 or higher and adequately tightened. Check especially for: wobbly joints, weak welds, loose nuts, joints secured only by cables or ropes, absence of washers between nuts and slotted surfaces, or inappropriate lock nuts or washers.



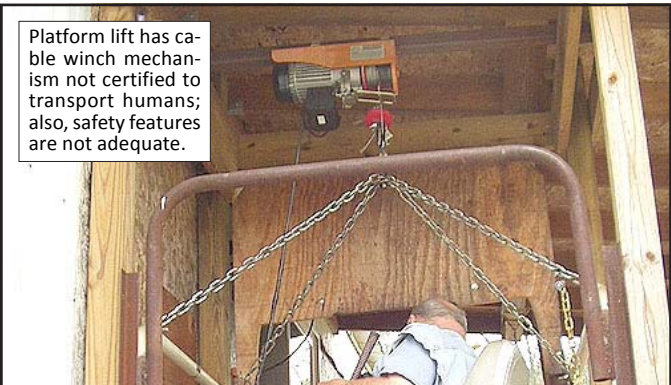
5 (M) **Emergency exit** — *Is there an alternative way for the user to exit the AT if the regular exit method becomes inoperable?*

If the user of farm equipment has a person lift to access and exit the operator's station, an alternate exit should be available in case the lift malfunctions. One possible alternative might be a platform near where the machinery is normally parked onto which the user can exit. A back-up power supply should also be considered so the lift could still operate in the event of a power failure (see Item 47).



6 (H) **Cable winch mechanism** — *If used to elevate/transport a person, does the AT utilize a cable winch mechanism not certified for that purpose?*

Winch systems are generally designed for hoisting and/or moving cargo, not people. The inherent hazards of unapproved motorized winch mechanisms on lifts to raise humans include: cable break; jerky movement causing imbalance; lack of a fall arrestor; no emergency stop (i.e., free-wheeling); and no alternate exit. Raising or transporting humans requires winch mechanisms that are certified for such use. Regular inspection of cables, pulleys, and other components (and maintaining a record of those inspections) is highly recommended.



7 (L) **Carrying capacity** — *Has the weight-carrying capacity of the AT (especially one intended to carry the user) been established and posted?*

If intended to carry a person, the AT and its components need to be designed for that purpose and the maximum weight-carrying capacity prominently posted on the AT, along with any warnings as to usage restrictions. Even for an AT that does not carry persons, its load-bearing maximum should likewise be established and posted.



8 (L) Overall weight — *Is it possible that the weight of the AT could cause the user strain and/or fatigue that would lead to further injury?*

The overall weight of an AT can contribute to strain and fatigue (thus subsequent injury potential) for the user if it has to be lifted, carried, pushed, or pulled (e.g., a hand-operated planter, a modified tool, a planting cart). An AT's weight relative to the user's disability should be considered at the design and fabrication stages.

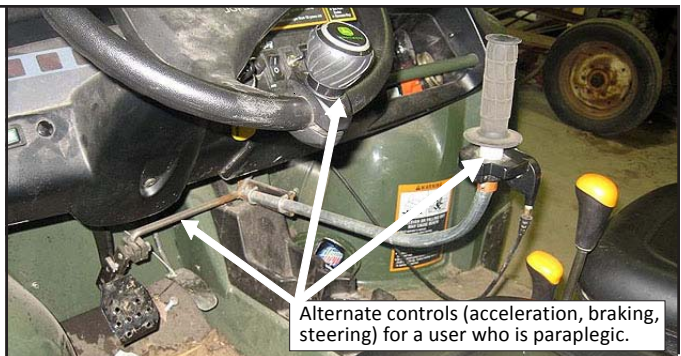


Attachable tow bar makes this heavy planting cart easy to pull by hand or vehicle.

Items Related to the Controls on an AT

9 (M) Alternate controls — *Have alternate controls been installed in place of any regular ones that the user cannot operate due to his/her disability limitations?*

If any AT has controls that the operator cannot use due to his/her disability, alternate accessible controls need to be installed—e.g., hand controls for brakes, clutch, and accelerator for an operator who is paraplegic; or attachment on the steering wheel that can be maneuvered with a prosthesis. Reliance on temporary or quick fixes, such as using an upper limb to move a lower limb or using a cane or rope to operate controls, can greatly increase the risk of injury.



Alternate controls (acceleration, braking, steering) for a user who is paraplegic.

10 (H) Unintentional activation of controls — *Could any control levers/switches be unintentionally activated or deactivated when required during operation?*

Control levers and switches should not be prone to activation without positive intentional action of the operator, but rather have mechanisms designed to prevent such occurrences. Interlocks should be in place to activate controls exclusively and safely. Appropriate lock nuts, safety wires, latches, and locks can help prevent unintentional activation during operation.



Unintended activation of controls on tractor, lift, or wheelchair during transfer could result in severe injury.

11 (H) Emergency stop — *Is there a switch within easy reach or a mechanism that would automatically activate to stop the AT immediately in event of an emergency?*

If the user would need to bring a powered AT to an immediate halt, it must be equipped with an emergency 'kill switch' that is clearly marked (or color-coded), within easy reach, simple to operate, and quick in response. Such a switch is especially important if the AT has multiple controls, as in the case of a person lift. A fall arrestor is an example of an emergency stop mechanism that automatically activates in case of a cable break or malfunction.



Red emergency stop button near the control switches on this truck-mounted lift.

12 (H) Braking/speed control — *Is there a braking mechanism and/or a speed-regulating mechanism to control the AT's movement?*

Any AT that is powered or transports or lifts a person should be equipped with a braking or speed control mechanism. A good braking mechanism is one that (a) stops the AT in the shortest time possible, (b) requires minimal strength to activate, (c) is easily accessible to the operator, (d) requires little maintenance, and (e) is clearly identified with a label, marking, or color code. A good speed control mechanism is one that (a) accelerates and brakes smoothly and (b) has a pre-set maximum speed well within the AT's safe operating limits.



13 (L) Location of controls — *Are all controls in locations easily accessible to the user?*

All controls on an AT should be within comfortable reach of the operator to minimize strain and/or fatigue, which could lead to injury. Any disability that restricts the user's reach would require the controls to be located closer to him/her.



14 (L) Control lever shape/size — *Does the shape and/or size of any control levers increase the potential for user strain and/or fatigue?*

The shape and size of levers can affect the level of strain and fatigue on the user. Therefore, his/her disability and specific needs should be considered in determining appropriate lever size and shape. Generally, lever handles should be round and be adjusted for easy operation, depending on the user's dexterity and range of motion.



Items Related to the Electrical/Hydraulic Parts on an AT

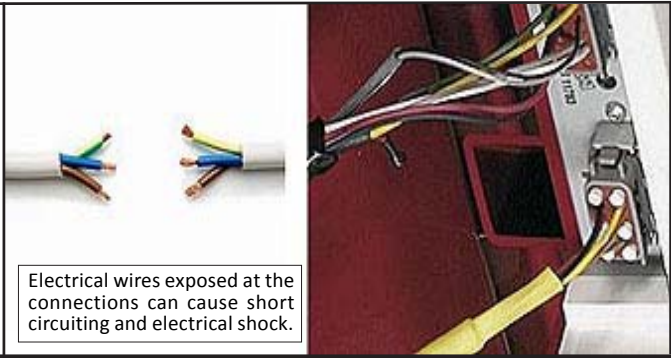
15 (H) Damaged wires/circuits — *Are all electrical wires/circuits adequately protected from cuts, corrosion, fire, or other types of damage?*

Electrical wires/circuits can be severed or even destroyed by sharp objects, abrasions, corrosive liquids, or heat, thus shorting out and creating a fire or shock hazard to the operator. Use of insulated protectors, grommets, and conduits will greatly reduce the danger of wires being exposed or unintentionally damaged. Periodic inspection of the AT's electrical circuits is highly recommended, because exposure to high voltage can be fatal and malfunction can occur suddenly without warning.



16 (H) Uninsulated connections/terminals — *Are there uninsulated connections or terminals on or around an AT that could result in electrical shock or short-circuiting?*

If an AT is electrically powered, the user could experience a shock if he/she comes into contact with wire connections and terminals that are not insulated or are otherwise exposed. The potential for shock may not be apparent unless an AT is operating. Another possible problem with exposed wiring connections is unintentional grounding (i.e., shorting), which could lead to equipment failure or fire. Adequate insulation or protection is a must.



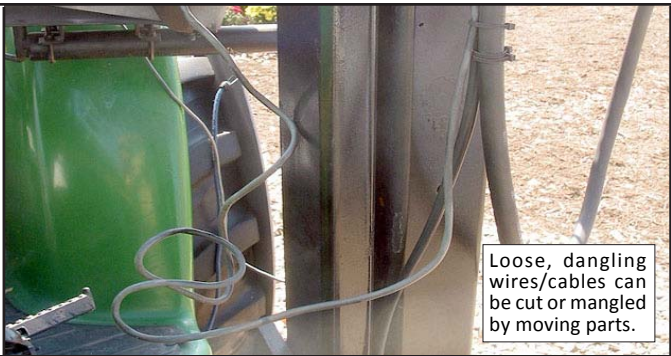
17 (H) Unfused/wrongly-fused circuits — *Are all of the circuits fitted with the appropriate-capacity fuses to prevent electrical overload?*

If an AT is electrically powered, circuits should include fuses to prevent overloading in event of a malfunction. Overloads can result in overheating and perhaps fire. Fuses should be of a rating appropriate for an AT's power consumption, easily accessible and replaceable, and not by-passed for any reason. (They are not always visible on equipment and may require careful identification.) A certified electrician should do any wiring that is connected to a 120/240-volt main power supply to ensure all electrical codes are observed.



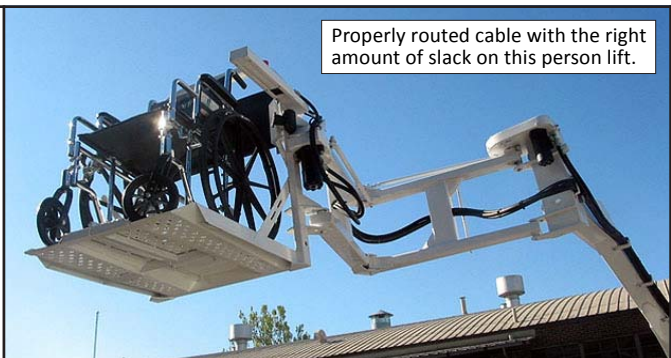
18 (H) Loose, dangling wires/cables/cords — *Are there any loose or hanging electrical wiring, cables, or cords anywhere on or around the AT?*

Loose, dangling wires/cables/cords are more likely to be cut or mangled by moving parts or they may entangle the user. The result could be malfunction of an AT as well as injury to the user. Wires/cables/cords should be tied and restrained or routed through cable guides or conduits (see Item 19).



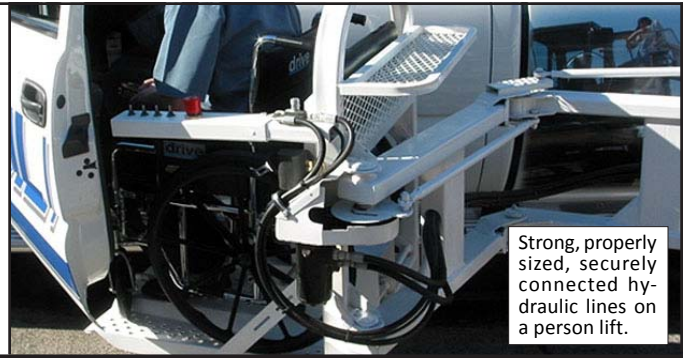
19 (H) Improper cable tension — *Do any of the electrical cables that are attached to moving parts have too much or too little slack?*

A cable attached to a moving part can be a source of malfunction of the AT if it does not have the proper amount of slack. If too much slack, the cable could be caught between moving parts; if not enough slack, it could be stretched to the breaking point. Proper slack is the minimum length required for the cable to adequately reach the moving part at its farthest position. If possible, it should be routed so as to prevent it from dangling freely during operation (see Item 18).



20 (M) Damaged hydraulic lines/fittings — *Are any of the hydraulic lines and/or fittings leaking, worn, cut, or otherwise damaged or exposed to potential damage?*

Hydraulic lines that carry fluids to operate equipment are often hot and under high pressure. Thus, leaking lines or fittings may result in an AT not operating when needed and may cause heat- or pressure-related injuries to the operator. Periodic maintenance, proper fittings, and thermal guards around those fittings can reduce injury potential. **Caution:** Never use your hands to try to locate potential hydraulic leaks; high-pressure oil can be injected into the skin.



Items Related to Moving Parts/Surfaces of an AT

21 (H) Crush points — *Could any moving parts create potential crush points?*

Crush points exist where two moving objects or one moving and one stationary object make contact with a force sufficient to 'crush' a body part. They can also occur if components unintentionally fall on the user's feet or other parts of the body. Crush points may only become apparent when an AT is operating. Installing shields and posting warning labels at identified crush points can reduce the risk of injury.



22 (H) Pinch points — *Do any moving parts have potential pinch points?*

Pinch points are points between two moving parts or one moving and one stationary part where an object or body part could be pinched, caught, or mangled. Common pinch points are between sprockets and chains, between belts and pulleys, and between rollers. They may only become apparent when an AT is operating. Installing shields and posting warning labels at identified pinch points can reduce the risk of injury.



23 (H) Shear points — *Could the edges of any moving parts become potential shear points?*

Shear points exist where the edges of two moving parts move across one another or the edge of a moving part slides against the edge of a stationary part. Shear points may only become apparent when an AT is operating. Installing shields and posting warning labels at identified shear points can reduce the risk of injury. A better solution, however, is to not design machine with potential shear points.



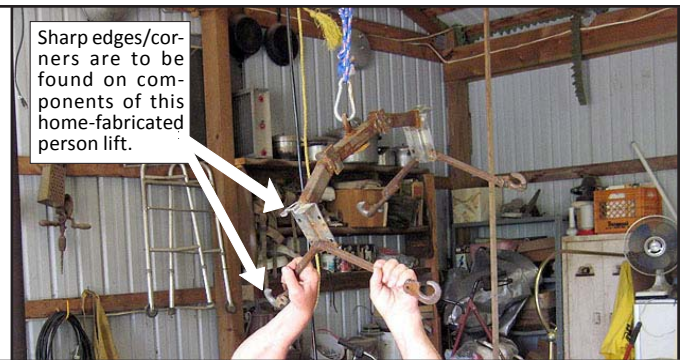
24 (H) **Wrap points** — *Do any of the rotating parts have the potential to become wrap points?*

Wrap points are where a sleeve, string, or any other portion of loose clothing—or even hair—could get caught and become wrapped around a rotating part (e.g., shaft, sprocket). They may only become apparent when the AT is operating. Although installing shields and posting warning labels at identified wrap points can reduce the risk of injury, their presence anywhere in the proximity of the operator should be considered unacceptable.



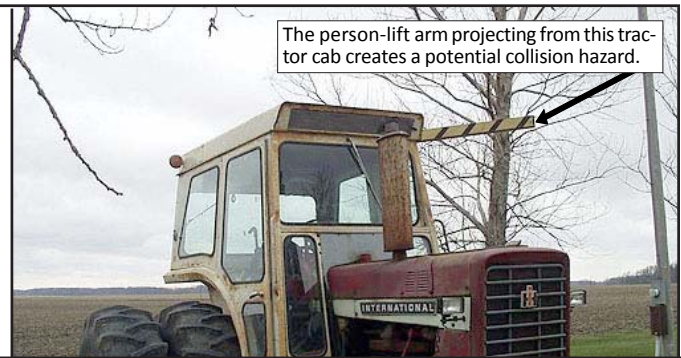
25 (H) **Sharp edges/corners** — *Are there any sharp edges or corners present on moving parts or other areas that could come in contact with the user?*

Sharp edges and corners on an AT can cut or cause other injury, especially if they are on moving parts (e.g., rotating shaft) that could possibly come into body contact. Rounding or reshaping these sharp edges and corners is highly recommended. Warning labels should be posted where the edges/corners cannot be modified to reduce a chance of injury.



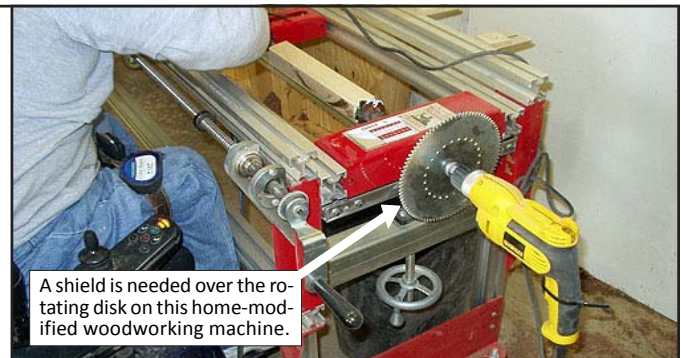
26 (H) **Projections on moving parts** — *Do any moving or rotating parts or other areas have potentially dangerous projections?*

There may be projections on an AT that could come in contact with a vulnerable object or with the user to cause injury. Projections on any moving parts (e.g., set screws, keys, knobs) should be shielded where possible (see Item 27). For larger projections (e.g., levers, beams) that cannot be shielded, warning labels should be posted nearby as well as safety training provided before initial use of the AT.



27 (H) **Inadequately shielded moving parts** — *Are any moving parts either unshielded or poorly shielded?*

Moving parts (or projections) on an AT that are not adequately shielded can be a greater hazard to the user with a disability than to others because of his/her likely restrictions in movement, slower response time, lack of strength, less dexterity, or other limitations. Installing appropriate shields where required, or at least posting warning labels, can reduce the risk of injury.



28 (M) Abrasive contacts — *Do any of the moving parts come into contact with other parts in an abrasive way?*

A moving part that rubs against another moving part or a stationary part is likely to eventually break or be damaged (e.g., cable insulation), resulting in malfunction of an AT and injury to the user. Design considerations plus the use of lubricants, wear washers, or grommets in appropriate locations are some ways to reduce the potential hazard.



29 (H) Hot surfaces — *Could the user come in contact with hot surfaces while operating the AT?*

Hot surfaces are likely to exist on powered farm equipment around the muffler/exhaust, radiator, engine, hydraulic lines, and where hot gases or liquids are present. While hot surfaces can cause injury to anyone, persons with disabilities are at greater risk if loss of sensation is a side effect of their disability. Hot surfaces become evident only when the equipment has been operating for some time. Installation of appropriate shielding and/or insulation plus posting of warning labels can reduce the injury risk.



30 (M) Slippery surfaces — *Are there any surfaces where the user stands, sits, or grasps onto that are or could become dangerously slippery?*

Steps, platforms, railings, etc. can become slippery when wet or covered with mud, ice, or oily/greasy substance. This is especially likely on ATs that are used outdoors. To reduce the risk of slipping and falling, such surfaces could be grooved, made of self-cleaning grill-work, and/or covered with slip-resistant material. Hand holds provided in these areas will also be helpful (see Item 42). Walkways and ramps should be covered or regularly cleaned to prevent accumulation of ice, snow, or mud.



Items Related to the Risks Associated with Operation of an AT

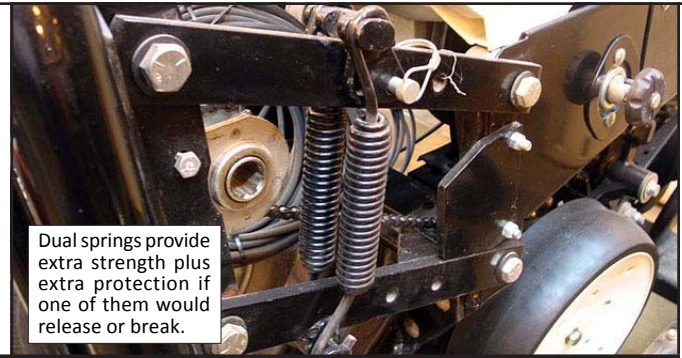
31 (L) Fire hazard — *If the risk of fire during operation exists, is a fire extinguisher within easy reach of the user?*

Fire hazards can be fatal, with engulfment in flames that may happen quickly without warning. It is very important, therefore, that a fire extinguisher be readily available for an AT user, his/her assistant, or rescue personnel. It should be easy to reach and operate, and the charge level should be periodically checked. Also crucial is the user's ability to contact others in event of a fire emergency (see Item 55).



32 (H) Unintentional spring release — *Are there springs under tension or compression that could suddenly and unintentionally release and/or break?*

Unintentional release or breaking of a spring under tension or compression could cause injury to the AT user due to sudden release of stored energy. Installing and adequately securing springs of appropriate strength and size, posting warning labels, providing shields, and 'sharing' the stored energy through duplicate springs can minimize the risk of injury.



33 (H) Toxic materials — *Is there a chance of chemicals or other toxic materials being released during operation which could cause injury from inhalation or skin contact?*

Harmful gases, corrosive liquids, hazardous chemicals, or other toxic materials released or spilled while an AT is in operation could seriously injure the user (e.g., leaking battery acid). Appropriate respirator, mask, gloves, goggles, and protective clothing are in order if the potential for such a situation exists.



34 (M) Excessive vibration — *Is the user exposed to excessive vibration while operating the AT?*

High levels of vibration for extended periods of time can cause musculoskeletal injuries, especially to those with spinal cord- or lower back-related disabilities. Excessive vibration may be caused by loose parts, out-of-balance moving parts, poor design and/or construction, and inadequate maintenance. Addressing these issues plus installing vibration-absorbing seats and shock-absorbing materials can significantly reduce the risk of injury.



35 (H) Excessively loud noise — *Does continuous operation of the AT result in noise levels sufficient to possibly cause auditory injury or the inability to hear others?*

Operating an AT that produces uncomfortably high sound levels (over 85 decibels) continuously may have detrimental effects on the user, such as the masking of other sounds, distraction of one's attention, and hearing impairment over the long term. Appropriate hearing protection (e.g., ear plugs) and sound-reduction aids (e.g., mufflers) on powered equipment should be used to minimize the potential adverse effects of loud noise.



36 (M) Clutter/obstructed view — *Could safe operation of the AT be jeopardized by the presence of clutter or obstruction of the operator’s view of the surroundings?*

An AT and the surrounding area should be free of clutter (e.g., bags, tools, trash, supplies) to provide for safe, efficient operation and eliminate the chance of malfunction and injury to the user. When operating any farm equipment, a clear view of the surroundings is very important, especially when other workers are present. Use of a remote camera and monitor should be considered if appropriate for the AT in such instances.



37 (L) Weather-related restrictions — *Are there weather-related restrictions for use of the AT that could lead to its malfunction and to injury of the operator?*

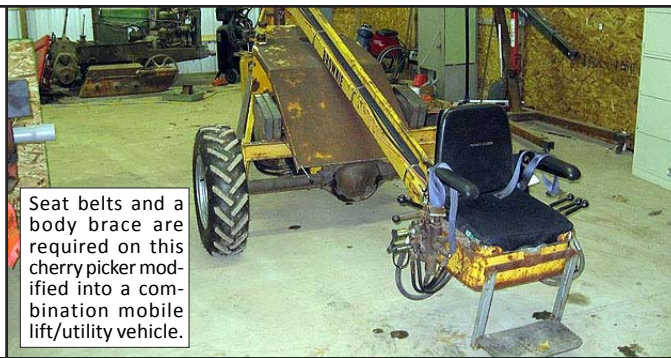
An AT may not have been designed and fabricated to operate under certain weather conditions (e.g., extreme heat or cold, high winds, icing, mud, extended exposure to the sun). If such is the case, it should only be used under those conditions for which it was designed so as to minimize malfunction and/or injury potential. Labels should be posted on the AT indicating any environment-related limitations—especially temperature maximums and minimums.



Items Related to Preventive/Protective Features on an AT

38 (H) Seat belts/body restraints — *Have appropriate seat belts and/or other body restraints been installed that take into account the user’s disability and the type of AT?*

An AT that transports or elevates the user (e.g., utility vehicle, person-lift) can cause imbalance leading to falls, especially if the user is not able to firmly grip hand-holds. For example, a paraplegic or someone with cerebral palsy is likely to have difficulty balancing, hence the need for a seat belt, harness, or body brace. (A body brace on the torso will help stabilize the entire upper body.)



39 (H) Guards/barriers — *Are guards or other types of barriers in place where needed to protect the user?*

There should be guard rails or barriers anywhere a user could come into contact with a hazardous part of an AT or could perhaps fall while operating it. For example, guard rails are needed on the platform where the user stands, and barriers needed around moving parts and hot surfaces. Possible barriers include wire or fabric mesh, grillwork, metal piping, etc. Appropriate guards should be installed depending on the type of hazard and the user’s disability.



40 (H) Roll-over protective structure — *If the AT is a self-propelled vehicle, has it been fitted with a roll-over protective structure to protect the user if it would happen to tip over?*

Tractors, utility vehicles, ATVs, or similar farm equipment could tip over if operated on uneven or sloping terrain, resulting in serious injury or even death. A roll-over protective structure (ROPS) is strongly recommended to be used in conjunction with a seat belt. (However, a seat belt should not be used on a tractor or other vehicle that is not equipped with a ROPS.)



41 (H) Stabilizing supports — *Is the AT equipped with appropriate stabilizing supports to ensure its stability?*

Stabilizing supports are a must for an AT that is used on uneven terrain or is movable, and its size and weight could cause instability—especially if the user is carried on the AT. Outriggers for portable lifts are an example of stabilizing supports; supporting clamps can also serve as stabilizers. Unstable equipment can overturn or malfunction, increasing the chance of injury. Even with stabilizing supports, ATs should be used only on level surfaces, if at all possible.



42 (L) Hand rails/holds — *Are hand rails and/or hand holds in place where needed to provide support for the user?*

Climbing, walking, or even standing can be dangerous for an AT user with mobility impairment or balancing issues. Hand holds and hand rails must be sturdy and well-anchored, and their size and gripping surfaces (non-slip) should allow the user to grab and hold firmly and comfortably. If the user has limited hand strength, appropriate body restraints should be considered (see *Item 38*).



43 (L) Function/warning labels — *Are function and warning labels affixed where needed and clearly visible?*

Function labels (e.g., 'On,' 'Off,' 'Push,' 'Pull,' 'Emergency Stop') on or next to switches, control levers, and pedals can prevent the user from choosing a wrong operation. Warning labels (e.g., 'Caution,' 'Warning,' 'Danger') that include brief explanations should be affixed at appropriate locations to identify potential hazards. Labels are not substitutes for protective features but an added way of reminding the user of a potential danger. It's important that function and warning labels be legible, durable, and, if appropriate, bilingual.



Items Related to Practices to Enhance Safe Operation of an AT

44 (L) **Scheduled maintenance** — *Has a regular maintenance schedule been established, and is it being followed?*

<p>A person with limitations in strength, mobility, and/or dexterity may have higher risk of injury if the AT is not functioning properly. Thus, routine maintenance is crucial to ensure its continued safe operation. A record of the latest maintenance, including dates and any other noteworthy details, should be kept on or near the AT.</p>	Date	Actual Hours	Hours	Completed	2305 Tractor	
	4/2/10	1060	10	X	Check wheel bolt torque (65 ft/lbs)	
				X	Test safety system	
				X	Check engine oil level	
				X	Check transmission oil level	
				X	Check air filter rubber dust unloading valve	
				X	Check radiator coolant level	
	4/8/10	1080	20	X	Test safety system	
				X	Check engine oil level	
				X	Check transmission oil level	
				X	Check air filter rubber dust unloading valve	
				X	Check radiator coolant level	
	<p>Routine maintenance of AT equipment/devices is key to ensuring continued safe operation</p>					

45 (M) **User training/usage experience** — *If training or practice in using the AT is important for safe and proper operation, has the user received that training or practice?*

Training is essential for the proper use of certain ATs, particularly powered ones that require a specific sequence of actions in order to operate safely. Such training (followed by regular practice) can minimize the risk of injury to both user and by-standers. Warning labels regarding required training should be posted on the AT to caution others. Periodic re-training, especially related to the more hazardous risks, should also be considered.



46 (L) **Assistant/substitute training** — *If the user routinely needs an assistant to operate the AT, is that person and his/her back-up adequately trained as to their responsibility?*

Sometimes assistance is required to operate a machine or device that has been modified to meet the user's needs due to his/her disability. It is important, therefore, that not only the primary assistant but also his/her substitute is able to provide the help needed and has been trained in: (a) performing the assisting tasks, (b) operating the AT, (c) making repairs and carrying out routine maintenance, and (e) contacting others in event of an emergency.



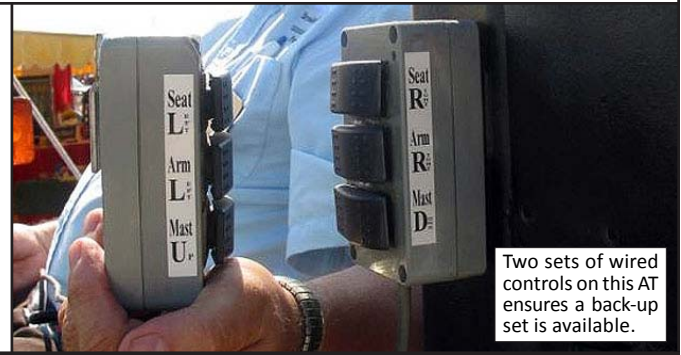
47 (L) **Back-up power source** — *If the AT is power-operated, is it equipped with a back-up power source should the main source fail?*

For a powered AT, in event of a power failure, a back-up power source should be available (or at least the ability for manual operation as a temporary alternative). If the AT runs off a 12-volt battery, an alternate battery and switch are needed.



48 (M) **Back-up control switches** — *Is the AT equipped with an extra set of control switches should the original ones malfunction?*

When control switches are used to operate an AT, an additional set of switches that have the same function should be available in case the operator loses access to the original set or it fails. For example, if the regular control is a wireless remote, a hard-wired switch that's easily reachable would be a suitable back-up. Even if the primary control switch is wired, a back-up control will be appropriate.



49 (L) **Operating instructions** — *Are the essential operating instructions and located with or attached to the AT?*

Basic operating instructions are important for ensuring an AT's safe and proper functioning and, hence, reducing the potential for injury. Those instructions should: (a) be comprehensive yet easy to understand; (b) include pictures/drawings as appropriate; and, (c) if possible, be printed on a quick-reference card that's either laminated or in a clear plastic jacket and kept with or near the AT. (A simple AT may not require written instructions.)



50 (L) **Operation/maintenance manual** — *Is there an operation and maintenance manual, and is it accessible?*

Having a manual that describes the operational details and sequence of maintenance is important for the safe use of an AT. Such a document should be easily understood, kept in an accessible location, and include a quick-reference card. Any complex modifications made to original equipment should be detailed so that repairs can be performed as required.



Items Related to Limitations of the User of an AT

51 (M) **Operating/functioning ability** — *Is there concern about the user's ability to operate the AT in a consistent and stable manner as a result of his/her disability?*

Physical strength, dexterity, concentration, sensory abilities, cognitive status, stamina, and other factors all must be considered in determining the user's ability to safely operate an AT. A musculoskeletal-related disability can reduce stamina, strength, and motor skills; whereas a developmental disability can limit cognitive functioning. A simple 'rule of thumb' in assessing the user's ability to operate an AT safely is: If one is licensed to drive a car, he/she can probably safely operate most farm machinery.



52 (M) Traits/habits/medications — *Does the user have behavioral traits and work habits or take medicines that might be detrimental to safe and proper operation?*

Certain behavioral traits (e.g., impulsiveness, irritability, lack of concentration) and work-related issues (e.g., disorganization, poor work habits, failure to follow instructions) could result in flawed decisions and/or actions that would put the user at greater risk of injury. Also, certain medicines may cause unpredictable reactions, drowsiness, and/or changes in one's functioning, cognitive, and reflexive abilities. If medications are taken regularly, the best time to operate an AT should be determined.



53 (M) Use in adverse environment — *Does the user operate an AT under weather, terrain, or other environmental conditions that are not favorable to its safe use?*

Adverse environmental conditions (e.g., temperature/weather extremes, confined spaces, presence of harmful gases, uneven terrain) may lead to unsafe use or malfunction of an AT, as well as cause pain, stress, or fatigue for the user. These conditions should be considered in deciding when and where to operate the AT.



54 (M) Physical exertion/extended use — *Does the user have to exert manual force to operate the AT for long periods of time and thus experience pain, stress, or fatigue?*

Depending on his/her physical limitations and an AT's suitability, the user could experience pain/stress/fatigue if sufficient breaks, appropriate medication, or other suitable measures are not taken. Having to apply manual force for long periods of time to operate an AT can cause injury; for example, frequent and extended use of a manual wheelchair can lead to shoulder injury. It's important, therefore, to recognize the user's physical condition and the AT's force requirements to avoid injury from over-exertion.



55 (M) Two-way communication ability — *Does the user have access to a two-way communication device when operating the AT?*

Two-way communication via cell phone, two-way radio, etc. could be a life-saver in event of an emergency. It is especially important for one with limited mobility, strength, or dexterity should an unforeseen need for assistance arise. AT users must have ready access to a reliable communication device at all times.



Section IV.
EXAMPLE OF AN ASSISTIVE TECHNOLOGY ASSESSMENT

Homemade Platform Lift on a Combine Utilized by a Client with a Right Leg Amputation Below the Knee

Worksheet A.

THE CLIENT, THE DISABILITIES, AND THE FARMING OPERATION

About the Client

Client name: James Farmington Gender: M Date of birth: 01/04/57
Address: 1234 Cornfield Drive, Anytown, IN 12345
Phone: 999-888-7777 E-mail: jfarmington@anymail.com
Family members at home (include children's ages): Wife (Grace). No children living at home

Client's occupational status:

- Full-time farmer
- Part-time farmer—primary income from farm
- Part-time farm—primary income from off-farm job
- Agri-business (type/position) _____
- Other _____
- Spouse of the farmer
- Dependent of the farm family
- Employee of the farmer

About the Client's Disabilities

Type(s) of disability

Primary: Amputation below right knee Date of injury/diagnosis: 09/21/02
Secondary? Pressure sores on leg stump

Functional limitations imposed by the disability: (Put a * by those affecting use of any AT)

<u>* Difficulty in climbing</u>	<u>Difficulty walking long distances on</u>
<u>* Lack of balance</u>	<u>uneven ground</u>
<u>* Low-level of endurance</u>	<u>Stump sock wears out quickly causing</u>
<u>Difficulty regulating blood sugar</u>	<u>the stump sores</u>

List changes in the disabling condition(s) over the last two years that might affect use of any AT.

<u>Blood-sugar level</u>	<input type="checkbox"/> Improved <input checked="" type="checkbox"/> Deteriorated <input type="checkbox"/> Stable
<u>Endurance</u>	<input type="checkbox"/> Improved <input checked="" type="checkbox"/> Deteriorated <input type="checkbox"/> Stable
<u>Pressure sores</u>	<input type="checkbox"/> Improved <input checked="" type="checkbox"/> Deteriorated <input type="checkbox"/> Stable
_____	<input type="checkbox"/> Improved <input type="checkbox"/> Deteriorated <input type="checkbox"/> Stable

About the Client's Disabilities (continued)

Any prognosis available that may affect use of any AT in the next two years? (If so, identify)
Low blood-sugar level may lead to more unhealed sores and lessened endurance

Prosthetics used? No Yes (identify): Lower leg prosthesis

Form(s) of mobility: Ambulatory Manual wheelchair Powered wheelchair/scooter
 Crutches Walker Other Cane

About the Farming Operation

Type and size of operation: (Total acreage 550 ac.)

Beef (no.) 15 Grains (types/acres) Corn/soybeans (500 ac.)

Dairy (no.) _____

Hogs (no.) 100 Forages (types/acres) Hay/pasture (20 ac.)

Sheep (no.) _____ Specialty crops (types/acres) Pumpkin (2 ac.), maize (10 ac.)

Poultry (no.) _____ Other Alpaca (6 hd.)

Persons who assist in the farming operation and what they do (name/age/responsibilities):

Wife Grace (53) – assists where needed (usually mornings)

Son-in-law Robert (28) – assists where needed (usually evenings)

Description of any mobility-related problems encountered on the farm due to the terrain, farmstead layout and surfaces, etc.: Upsloping graded area between house and combination farm shop/machinery shed, which is surrounded by trees. Driveway around shed is gravel. Steps at farm shop entry door.

List of those ATs (i.e., modified equipment and assistive devices) that the client uses to carry out the farming operation tasks that he/she performs: (Put * by those that are to be assessed)

* Platform lift to access combine

operator's station

Prosthesis for right leg

Cane

JD Gator

Extra step and hand rail on tractor

Automatic hitching device

Worksheet B.
THE ASSISTIVE TECHNOLOGY TO BE EVALUATED

What is it (name and/or description)? Homemade cable winch motor operated lift
having a platform to stand on. The lift is attached to the side of the combine
(see Figure 1)

What tasks does it help complete? Accessing the operator's station of the combine
from ground level.

Who made it? Commercially made (Manufacturer: _____)
 Custom-made by user Custom-made by local craftsman

If modified, what specifically was and/or how? Original, as made by the client.

How does it operate? Standing on the platform, the client raises and lowers the lift
by toggling switches on a hand-held wired remote control, which connects to
the combine's battery and to the winch motor mounted under the platform.

How is it powered? Battery 120- or 240-volt AC Gas or diesel engine
 Hydraulics Manually Other _____

How often is it used? Daily during harvest season.

Is assistance needed to No
access and/or operate? Yes (usually from whom?) _____

Other relevant information? The lift has no hand holds, hand rails, or guards. It's
fixed onto the body of the combine by bolts of unknown quality. The winch
motor is connected to the combine's battery via cables that hang loosely.

Worksheet C.

QUICK-REFERENCE CHECKLIST OF ASSESSMENT ITEMS

AT name/description: Homemade Platform Lift on Combine

How to use this worksheet: (1) After carrying out Steps 1 through 5 of the AT assessment process (*page II-1*), go over the list below to identify those items that you judge (on first impression) might be applicable to this specific AT. (2) Mark with an “X” each item which you feel may be an issue/concern. (3) Then on Worksheet D, respond to the questions accompanying all items that you find are indeed applicable to this AT, paying special attention to those you had check-marked on this worksheet. (Note: When using Worksheets C and D, refer as needed to Section III, “Explanation of Assessment Items” (*pages III-1 to 14*)).

Construction/components

- 1. General construction—*Unsafely built?*
- 2. Physical damage—*Noticed?*
- 3. Component parts—*Poor quality?*
- 4. Joints—*Weak?*
- 5. Emergency exit—*None provided?*
- 6. Cable winch mechanism—*Unapproved?*
- 7. Carrying capacity—*Not posted?*
- 8. Overall weight—*Too heavy?*

Controls

- 9. Alternate controls—*Inadequate?*
- 10. Unintentional activation—*Possible?*
- 11. Emergency stop—*Absent?*
- 12. Braking/speed control—*Inadequate?*
- 13. Location of controls—*Hard to reach?*
- 14. Control lever shape/size—*Hard to use?*

Electrical/hydraulic parts

- 15. Damaged wires/circuits—*Present?*
- 16. Uninsulated wires/terminals—*Present?*
- 17. Unfused/wrongly-fused circuits—*Present?*
- 18. Loose, dangling wires/cords—*Present?*
- 19. Improper cable tension—*Too loose or tight?*
- 20. Damaged hydraulic lines/fittings—*Present?*

Moving parts/surfaces

- 21. Crush points—*Present?*
- 22. Pinch points—*Present?*
- 23. Shear points—*Present?*
- 24. Wrap points—*Present?*
- 25. Sharp edges/corners—*Present?*
- 26. Projections on moving parts—*Present?*
- 27. Unshielded moving parts—*Present?*
- 28. Abrasive contacts—*Present?*

- 29. Hot surfaces—*Present?*

- 30. Slippery surfaces—*Possible?*

Risks associated with operation

- 31. Fire hazard—*No fire extinguisher?*
- 32. Unintentional spring release—*Possible?*
- 33. Toxic materials—*Present?*
- 34. Excessive vibration—*Present?*
- 35. Excessively loud noise—*Present?*
- 36. Clutter/obstructed view—*Present?*
- 37. Weather-related restrictions—*A concern?*

Presentive/protective features

- 38. Seat belts/restraints—*Inadequate?*
- 39. Guard/barriers—*Inadequate?*
- 40. Roll-over protective structure—*Absent?*
- 41. Stabilizing supports—*Inadequate?*
- 42. Hand rails/holds—*Inadequate?*
- 43. Function/warning labels—*Inadequate?*

Practices to enhance safe operation

- 44. Scheduled maintenance—*Irregular?*
- 45. User training/usage experience—*Inadequate?*
- 46. Assistant/substitute training—*Inadequate?*
- 47. Back-up power source—*Inadequate?*
- 48. Back-up control switches—*Absent?*
- 49. Operating instructions—*Absent/inadequate?*
- 50. Oper./maint. manual—*Absent/inadequate?*

Limitations of the AT user

- 51. Operating/functioning ability—*A concern?*
- 52. Traits/habits/medications—*A concern?*
- 53. Use in adverse environment—*A concern?*
- 54. Physical exertion/extended use—*A concern?*
- 55. Two-way communication ability—*A concern?*

Worksheet D.

DETAILED ASSESSMENT OF INJURY POTENTIAL

AT name/description: Homemade Platform Lift on Combine

Note: Each of the 55 items that fall under the eight categories in this reference section has been ascribed an injury-potential rating of high (H) or medium (M) or low (L), based on research studies involving farmers and rehabilitation professionals. The rating, which follows the item number, serves as an indication of the general risk level—e.g., 1 (H), 5 (M), 7 (L). For further information applicable to the safety of devices and work practices used in the agricultural workplace, see the list of resources in Appendix A. For a general farm/ranch inventory designed to help a client identify other workplace hazards, see Appendix B.

Items Related to Construction/Components of the AT

- 1 (H) **General construction** — *Does the AT (whether fabricated or modified) appear to be of sturdy and stable construction?* Unsafely built
 Not a concern

Lift mast borderline not sturdy enough

- 2 (H) **Physical damage** — *Is there any physical damage (e.g., cracks, rust, rot, wear, corrosion, bends, dents) apparent that would affect performance or safety?* Damage present
 None observed
 N/A

- 3 (H) **Component parts** — *Are the component parts (e.g., cables, straps, fasteners, buckles, tubes, hoses) strong, stable, and secured appropriately?* Inadequate parts
 Appear adequate
 N/A

- 4 (H) **Joints** — *Are all the joints welded, bolted, tied, or glued adequately or otherwise fastened securely?* Weak joints
 Appear adequate
 N/A

- 5 (M) **Emergency exit** — *Is there an alternative way for the user to exit the AT if the regular exit method becomes inoperable?* No emergency exit
 Exit present
 N/A

None provided; client would have to jump from lift platform

- 6 (H) **Cable winch mechanism** — *If used to elevate/transport a person, does the AT utilize a cable winch mechanism not certified for that purpose?* Unapproved winch
 Appropriate winch
 N/A

Unapproved cable winch, which could fail or cable could break

- 7 (L) **Carrying capacity** — *Has the weight-carrying capacity of the AT (especially one intended to carry the user) been established and posted?* Not set or posted
 Set and posted
 N/A

Not established and posted

- 8 (L) **Overall weight** — *Is it possible that the weight of the AT could cause the user strain and/or fatigue that would lead to further injury?* Weight a concern
 Not a concern
 N/A

Items Related to Controls on the AT

- 9 (M) **Alternate controls** — *Have alternate controls been installed in place of any regular ones that the user cannot operate due to his/her disability limitations?*

Alternates inadequate
 Adequate
 N/A

Checked and determined not applicable to this AT

- 10 (H) **Unintentional activation of controls** — *Could any control levers/switches be unintentionally activated or deactivated when required during operation?*

Activation possible
 Not a concern
 N/A

Remote control switch could be activated accidentally if bumped against

- 11 (H) **Emergency stop** — *Is there a switch within easy reach or a mechanism that would automatically activate to stop the AT immediately in event of an emergency?*

No E-stop switch
 E-stop switch present
 N/A

None provided on the remote control

- 12 (H) **Braking/speed control** — *Is there a braking mechanism and/or a speed-regulating mechanism to control the AT's movement?*

Control inadequate
 Adequate
 N/A

Lift operates at very slow speed, so not a problem

- 13 (L) **Location of controls** — *Are all controls in locations easily accessible to the user?*

Not accessible
 Easily accessible
 N/A

- 14 (L) **Control lever shape/size** — *Does the shape and/or size of any control levers increase the potential for user strain and/or fatigue?*

Not appropriate
 All easy to use
 N/A

Items Related to Electrical/Hydraulic Parts on the AT

- 15 (H) **Damaged wires/circuits** — *Are all electrical wires/circuits adequately protected from cuts, corrosion, fire, or other types of damage?*

Damage present
 None observed
 N/A

Potential for damage or cuts if electrical cord would happen to loop under the lift platform

- 16 (H) **Uninsulated connections/terminals** — *Are there uninsulated connections or terminals on or around the AT that could result in electrical shock or short-circuiting?*

Uninsulated parts
 None observed
 N/A

Wires coming from winch motor are exposed

- 17 (H) **Unfused/wrongly-fused circuits** — *Are all of the circuits fitted with the appropriate-capacity fuses to prevent electrical overload?*

Inadequate fuses
 Appear adequate
 N/A

- 18 (H) **Loose, dangling wires/cables/cords** — *Are there any loose or hanging electrical wiring, cables, or cords anywhere on or around the AT?*

Cords loose/dangling
 Cords secured
 N/A

Control cable can accidentally loop under lift platform, breaking the electrical connection to cause lift malfunction

Items Related to Electrical/Hydraulic Parts on the AT (continued)

- 19 (H) **Improper cable tension** — *Do any of the electrical cables that are attached to moving parts have too much or too little slack?*
- Nothing to hold cable up and out of way when in upright position*
- Too loose or tight
 Adequate slack
 N/A

- 20 (M) **Damaged hydraulic lines/fittings** — *Are any of the hydraulic lines and/or fittings leaking, worn, cut, or otherwise damaged or exposed to potential damage?*
- Damage present
 No damage concern
 N/A

Items Related to Moving Parts/Surfaces of the AT

- 21 (H) **Crush points** — *Could any moving parts create potential crush points?*
- Between lift platform and bottom of operator station platform*
- Crush points present
 None observed
 N/A

- 22 (H) **Pinch points** — *Do any moving parts have potential pinch points?*
- If client would happen to hold onto lower mast as lift rises*
- Pinch points present
 None observed
 N/A

- 23 (H) **Shear points** — *Could the edges of any moving parts become potential shear points?*
- Where lower mast goes up into upper mast*
- Shear points present
 None observed
 N/A

- 24 (H) **Wrap points** — *Do any of the rotating parts have the potential to become wrap points?*
- Wrap points present
 None observed
 N/A

- 25 (H) **Sharp edges/corners** — *Are there any sharp edges or corners present on moving parts or other areas that could come in contact with the user?*
- Edges and corners of the lift platform are sharp*
- Sharp points present
 None observed
 N/A

- 26 (H) **Projections on moving parts** — *Do any moving or rotating parts have potentially dangerous projections?*
- Moving platform could bump into an object or another person nearby*
- Projections present
 None observed
 N/A

- 27 (H) **Inadequately shielded moving parts** — *Are any moving parts either unshielded or poorly shielded?*
- Lower mast as it goes into upper mast*
- Unshielded parts seen
 None observed
 N/A

- 28 (M) **Abrasive contacts** — *Do any of the moving parts come into contact with other parts in an abrasive way?*
- Cable could rub against edges/corners of lift platform*
- Abrasive contacts seen
 None observed
 N/A

Items Related to Moving Parts/Surfaces of the AT (continued)

- 29 (H) **Hot surfaces** — *Could the user come in contact with hot surfaces while operating the AT?* Hot surfaces present
 Safety provided
 N/A

- 30 (M) **Slippery surfaces** — *Are there any surfaces where the user stands, sits, or grasps onto that are or could become dangerously slippery?* Slick surfaces present
 None observed
 N/A
Oil on the lift platform could create a slippery surface

Items Related to Risks Associated with Operation of the AT

- 31 (L) **Fire hazard** — *If the risk of fire during operation exists, is a fire extinguisher within easy reach of the user?* No fire extinguisher
 Present and reachable
 N/A
No fire extinguisher provided

- 32 (H) **Unintentional spring release** — *Are there springs under tension or compression that could suddenly and unintentionally release and/or break?* Unsafe springs present
 Springs secure
 N/A

- 33 (H) **Toxic materials** — *Is there a chance of chemicals or other toxic materials being released during operation that could cause injury from inhalation or skin contact?* Toxic items present
 Safeguards in place
 N/A

- 34 (M) **Excessive vibration** — *Is the user exposed to excessive vibration while operating the AT?* Vibration excessive
 Not a concern
 N/A

- 35 (H) **Excessively loud noise** — *Does continuous operation of the AT result in noise levels sufficient to possibly cause auditory injury or the inability to hear others?* Noise level a concern
 Noise not excessive
 N/A

- 36 (M) **Clutter/obstructed view** — *Could safe operation of the AT be jeopardized by the presence of clutter or obstruction of the operator's view of the surroundings?* Clutter a concern
 Not a factor
 N/A

- 37 (L) **Weather-related restrictions** — *Are there weather-related restrictions for use of the AT that could lead to its malfunction and to injury to the operator?* Operational concern
 Not a factor
 N/A
Winch is located under lift platform where water, mud, snow, or ice could affect its functioning

Items Related to Preventive/Protective Features on the AT

- 38 (H) **Seat belts/body restraints** — *Have appropriate seat belts and/or other body restraints been installed that take into account the user's disability and type of AT?* Restraints inadequate
 Adequate
 N/A
No seat belt or body brace to hold the client in position if he would happen to lose his balance

Items Related to Preventive/Protective Features on the AT (continued)

- 39 (H) **Guards/barriers** — Are guards or other types of barriers in place where needed to protect the user? Guards inadequate
 Adequate
 N/A
- No guards on mast to protect from crush/pinch/shear points*

- 40 (H) **Roll-over protective structure (ROPS)** — If the AT is a self-propelled vehicle, has it been fitted with a ROPS to protect the user if it would happen to tip over? ROPS absent
 Adequate
 N/A

- 41 (H) **Stabilizing supports** — Is the AT equipped with appropriate stabilizing supports to ensure its stability? Supports inadequate
 Adequate
 N/A
- Checked and determined not applicable to this AT*

- 42 (L) **Hand rails/holds** — Are hand rails and/or hand holds in place where needed to provide support for the user? Handholds inadequate
 Adequate
 N/A
- No hand-hold for the client to grasp when using the lift*

- 43 (L) **Function/warning labels** — Are function and warning labels affixed where needed and clearly visible? Labels absent
 Present
 N/A
- None on either AT or hand-held remote*

Items Related to Practices to Enhance Safe Operation of the AT

- 44 (L) **Scheduled maintenance** — Has a regular maintenance schedule been established, and is it being followed? No regular maintenance
 Not a concern
 N/A
- Not done on any regular basis*

- 45 (M) **User training/usage experience** — If training or practice in using the AT is important for safe and proper operation, has user received that training or practice? Needs training
 Not a concern
 N/A
- Client self-trained through use of the AT, but needs safety training*

- 46 (L) **Assistant/substitute training** — If the user routinely needs an assistant to operate the AT, is that person and the back-up adequately trained as to their responsibility? Not trained
 Adequately trained
 N/A

- 47 (L) **Back-up power source** — If the AT is power-operated, is it equipped with a back-up power source should the main source fail? No back-up option
 Back-up present
 N/A
- No back-up power provided*

- 48 (M) **Back-up control switches** — Is the AT equipped with an extra set of control switches should the original ones malfunction? No back-up switches
 Back-up present
 N/A
- Wired remote has only one set of control switches*

Items Related to the Practices to Enhance to Safe Operation of the AT (continued)

- 49 (L) **Operating instructions** — *Are the essential operating instructions written down and located with the AT?* No instructions
 Instructions w/ AT
 N/A
No instructions ever developed

- 50 (L) **Operation/maintenance manual** — *Is there an operation and maintenance manual, and is it accessible?* No manual
 Manual available
 N/A
No manual ever developed

Items Related to Limitations of the User of the AT

- 51 (M) **Operating/functioning ability** — *Is there concern about the user's ability to operate the AT in a consistent and stable manner as a result of his/her disability?* User ability a concern
 Not a concern
 N/A
Prosthetic leg may limit client's ability to be stable while standing and using the lift

- 52 (M) **Traits/habits/medications** — *Does the user have behavioral traits and work habits or take medicines that might be detrimental to safe and proper operation?* Potential problem
 Not a concern
 N/A
Client's tendency to 'get job done' could take priority over safety concerns

- 53 (M) **Use in adverse environment** — *Does the user operate the AT under weather, terrain, or other environmental conditions that are not favorable to its safe use?* Conditions a concern
 Not a concern
 N/A
Lift's mast could bind if platform rests on non-level surface

- 54 (M) **Physical exertion/extended use** — *Does the user have to exert manual force to operate the AT for long periods of time and thus experience pain/stress/fatigue?* Potential problem
 Not a concern
 N/A
Checked and found nothing of concern

- 55 (M) **Two-way communication ability** — *Does the user have access to a two-way communication device when operating the AT?* Not always available
 Always available
 N/A
Client does not always carry his cell phone with him



Figure 1. Platform lift on the combine.



Figure 2. Platform lift as seen from the rear of the combine.

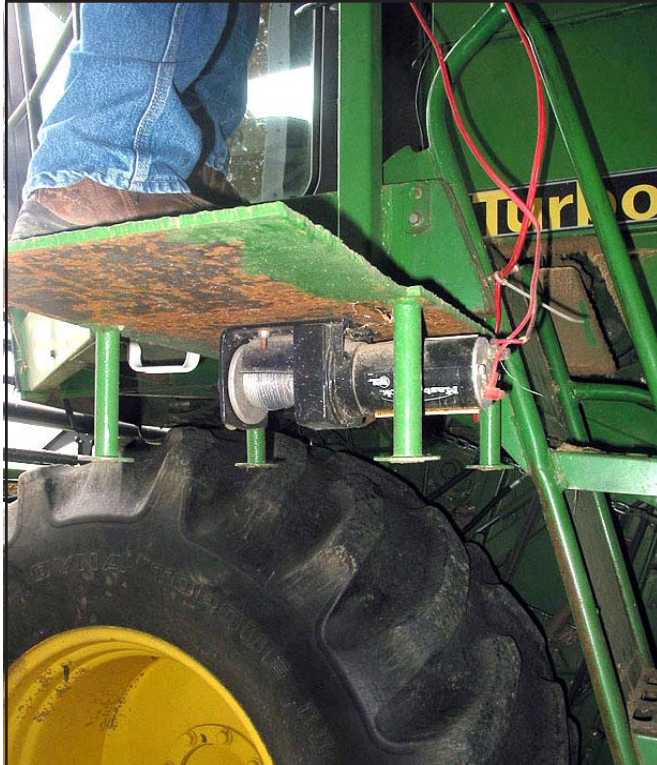


Figure 3. Cable winch mounted under the lift's platform.



Figure 4. Lift platform, winch, and hand-held remote control.

Worksheet E.

INJURY-POTENTIAL PROBLEMS OBSERVED/SOLUTIONS SUGGESTED

AT name or description: *Homemade Platform Lift on Combine*

Item No./Name: *1. General construction*

Problems observed: *Lift mast is borderline not sturdy enough.*

Solutions suggested: *Replace with a mast made of heavier steel.*

Item No./Name: *5. Emergency exit*

Problems observed: *None provided; client would have to jump from lift platform.*

Solutions suggested: *Carry a cell phone for potential emergency situations, and make sure others constantly know where the client is. Manual operation of the lift, if possible, is the best solution in event of an emergency*

Item No./Name: *6. Cable winch mechanism*

Problems observed: *Unapproved cable winch, which could fail or cable could break.*

Solutions suggested: *Ideally, substitute for the winch a mechanism that's approved for the lifting of humans. If not possible, make sure that the winch's carrying capacity is adequate. Inspect cable regularly to any signs of breakage.*

Item No./Name: *7. Carrying capacity*

Problems observed: *Not established and posted.*

Solutions suggested: *Post a label on the lift indicating carrying capacity.*

(Worksheet E. Continued)

AT name or description: *Homemade Platform Lift on Combine*

Item No./Name: *10. Unintentional activation of controls*

Problems observed: *Remote control switches could be activated accidentally if bumped against.*

Solutions suggested: *Provide a spring-loaded cover that can be opened when client needs to operate the switches.*

Item No./Name: *11. Emergency stop*

Problems observed: *None provided on the remote control.*

Solutions suggested: *Provide an emergency stop switch on the remote. (Better to have the lift stop when the 'On' switch is released.) Also, install fall limitors to stop an accidental fall if the cable would break.*

Item No./Name: *15. Damaged wires/circuits*

Problems observed: *Potential for damage or cuts if electrical cord would happen to loop under the lift platform.*

Solutions suggested: *Round the platform edges/corners and/or provide rubber or other soft padding where cables/cords come into contact with the platform.*

Item No./Name: *16. Uninsultated wires/terminals*

Problems observed: *Wires coming from winch motor are exposed.*

Solutions suggested: *Provide insulation covers/sleeves. (Ideally, motor should be housed in a box.)*

(Worksheet E. Continued)

AT name or description: *Homemade Platform Lift on Combine*

Item No./Name: *18. Loose, dangling wire/cables/cords*

Problems observed: *Control cable can accidentally loop under the lift platform, breaking the electrical connection to cause lift malfunction.*

Solutions suggested: *Use cable ties to route the cable in such a way as to avoid accidental looping.*

Item No./Name: *19. Improper cable tension*

Problems observed: *Nothing to hold the cable up and out of the way when in the upright position.*

Solutions suggested: *Route the cable appropriately, providing enough slack when doing so. Also, use cable ties or cable restraints. Consider coiled cables.*

Item No./Name: *21. Crush points*

Problems observed: *Between lift platform and bottom of operator station platform.*

Solutions suggested: *Install handholds on the platform, with a shield to prevent the client from holding onto the lower (sliding) mast.*

Item No./Name: *22. Pinch points*

Problems observed: *If client would happen to hold onto the lower mast as lift rises.*

Solutions suggested: *Install handholds on platform, with a shield to prevent client from holding onto the lower mast.*

(Worksheet E. Continued)

AT name or description: *Homemade Platform Lift on Combine*

Item No./Name: *23. Shear points*

Problems observed: *Where lower mast goes up into upper mast.*

Solutions suggested: *Provide protective cover around the area so the client won't accidentally place his hands in that area.*

Item No./Name: *25. Sharp edges/corners*

Problems observed: *Edges and corners of lift platform are sharp.*

Solutions suggested: *Ideally, round off edges and corners; or at least cover edges/corners with rubber padding.*

Item No./Name: *26. Projections on moving parts*

Problems observed: *Moving platform could bump into an object or another person who is nearby.*

Solutions suggested: *Warning labels should be posted. Ideally, the platform should move within an enclosed space, where it cannot bump into any object in its path of movement.*

Item No./Name: *27. Inadequately shielded moving parts*

Problems observed: *Lower mast as it goes into upper mast.*

Solutions suggested: *Install handholds on the platform, with a shield to prevent the client from holding onto the lower mast.*

(Worksheet E. Continued)

AT name or description: *Homemade Platform Lift on Combine*

Item No./Name: *28. Abrasive contacts*

Problems observed: *Cable could rub against edges/corners of the lift platform.*

Solutions suggested: *Insulate the cable with adequate padding, and route it in such a way that abrasions cannot occur.*

Item No./Name: *30. Slippery surfaces*

Problems observed: *Oil on the lift platform could create a slippery surface.*

Solutions suggested: *Provide for a non-slip surface (e.g., grooved, grated, or covered with a rubber mat). Also, make sure the platform is clean and dry before use.*

Item No./Name: *31. Fire hazard*

Problems observed: *No fire extinguisher nearby.*

Solutions suggested: *Provide a Type ABC—20 pound fire extinguisher on the lift itself.*

Item No./Name: *37. Weather-related restrictions*

Problems observed: *Winch is located under lift platform where water, mud, snow, or ice could affect its functioning.*

Solutions suggested: *An appropriate cover for the lift (especially for the winch motor) could reduce problems resulting from weather extremes, such as snow, ice, and sun-caused heat).*

(Worksheet E. Continued)

AT name or description: *Homemade Platform Lift on Combine*

Item No./Name: *38. Seat belts/body restraints*

Problems observed: *No seat belt or body brace to hold the client in position if he would happen to lose his balance.*

Solutions suggested: *A body brace to keep the client in a stable, upright position, ensuring he can use the remote with ease.*

Item No./Name: *39. Guards/barriers*

Problems observed: *No guards on mast to protect from crush, pinch, or shear points.*

Solutions suggested: *Install handholds on the platform, with a shield to prevent the client from holding onto the lower mast.*

Item No./Name: *42. Hand rails/holds*

Problems observed: *No hand-hold for the client to grasp when using the lift.*

Solutions suggested: *Provide hand rails on three sides of the platform and a gate on the fourth side for the user to access the platform.*

Item No./Name: *43. Function/warning labels*

Problems observed: *None on either the AT or the hand-held remote control.*

Solutions suggested: *The switches on the remote should be labeled (e.g., 'On,' 'Up,' 'Down,' 'Stop'). Warning labels should be posted about the need for training before operation and danger signs posted regarding injury potentials.*

(Worksheet E. Continued)

AT name or description: *Homemade Platform Lift on Combine*

Item No./Name: *44. Scheduled maintenance*

Problems observed: *Not done on any regular basis.*

Solutions suggested: *Regularly check parts, cables, fasteners, etc. Post a 'latest checked' date prominently on the lift itself.*

Item No./Name: *45. User training/usage experience*

Problems observed: *Client self-trained through use of the AT, but needs safety training.*

Solutions suggested: *Training on the use of the lift is not critical, since client has sufficient usage experience; however, safety training would be very beneficial.*

Item No./Name: *47. Back-up power source*

Problems observed: *No back-up power provided.*

Solutions suggested: *Not that critical, because lift is operating from a battery; however, battery should be checked periodically for potential problems.*

Item No./Name: *48. Back-up control switches*

Problems observed: *Wired remote has only one set of control switches, no back-up.*

Solutions suggested: *Not that critical, because the remote control is wired; but client should consider installing a second set on the lift mast itself.*

(Worksheet E. Continued)

AT name or description: *Homemade Platform Lift on Combine*

Item No./Name: *49. Operating instructions*

Problems observed: *No instructions were ever developed.*

Solutions suggested: *Prepare such instructions and keep them in a pouch attached to the lift.*

Item No./Name: *50. Operation/maintenance manual*

Problems observed: *No manual was ever developed.*

Solutions suggested: *A brief manual about operating procedures and maintenance, including a check list, would be appropriate.*

Item No./Name: *51. User operating/functioning ability*

Problems observed: *Prosthetic leg may limit client's ability to be stable while standing and using the lift.*

Solutions suggested: *Install a small seat (perhaps a fold-down) on the platform so he can sit while operating the lift.*

Item No./Name: *51. User traits/habits/medications*

Problems observed: *Client's tendency to 'get the job done' could take priority over safety concerns.*

Solutions suggested: *Client has to be made aware of the consequences of ignoring cautions and 'rules of safety.' Safety training is highly recommended.*

(Worksheet E. Continued)

AT name or description: *Homemade Platform Lift on Combine*

Item No./Name: *53. Use in adverse environment*

Problems observed: *Lift's mast could bind if platform rests on a non-level surface.*

Solutions suggested: *Make sure the combine is always parked on a level surface.*

Item No./Name: *55. Two-way communication ability*

Problems observed: *Client does not always carry his cell phone with him.*

Solutions suggested: *Client should be made aware of the consequences of not having ready access to two-way communication when using his combine.*

Item No./Name: _____

Problems observed: _____

Solutions suggested: _____

Item No./Name: _____

Problems observed: _____

Solutions suggested: _____

Worksheet F.

ASSESSMENT RESULTS AND RECOMMENDATIONS

AT name or description: *Homemade Platform Lift on Combine*

Overall suitability of the AT for the user: *A platform lift this client (with a prosthetic lower limb) to access the operator's station of his combine is appropriate. However, some modification of this homemade AT should be made to ensure greater safety and increased protection from secondary injury.*

Key problems observed, listed in the priority order of importance (see Worksheet D for a description of each problem and its suggested solution)

Major (**critical**) problems that need to be addressed—in priority order:

- Item no./name *1. General construction — mast borderline not sturdy enough*
- Item no./name *38/42. Body restraint/hand holds — fall danger when using*
- Item no./name *21/22. Crush/pinch points — lift-operator station space; mast*
- Item no./name *6. Cable winch mechanism — not approved to lift persons*
- Item no./name *26. Projections on moving parts — platform can bump objects*
- Item no./name *52. User's traits/habits — getting job done trumps safety*

Other (**not as critical**) problems that perhaps ought to be addressed—in priority order:

- Item no./name *11. Emergency stop — not provided but needed*
- Item no./name *15/19. Cable protection/tension — cable loop can be broken*
- Item no./name *30. Slippery surfaces — oily and potential for icing*
- Item no./name *53. Adverse environment — mast could bind on unlevel surface*
- Item no./name *51. User limitations — prosthetic limb limits standing ability*
- Item no./name *25. Sharp edges/corners — could injure user/damage cable*

Other comments about the AT: *This platform lift allows the client to access his combine's operator station, but currently presents numerous safety concerns. The modifications proposed in Worksheet E attempt to address those concerns, making the lift not only relatively safe for the users, but also minimize the chances of down-time.*

Section V. APPENDICES

Appendix A. SELECTED AGRICULTURAL SAFETY AND HEALTH RESOURCES

There are many resources available to help you achieve the highest level of safety for clients in need of assistive technology in order to continue farming. Following are lists of selected printed materials, Internet websites, and professionals that should be included in your 'toolbox' of helpful references.

Handbooks/Manuals

"Agricultural Medicine: A Practical Guide" by J. Lessenger (2005, 540 pages). New York, NY: Springer Science+Business Media, Inc.

"Agricultural Medicine: Occupational and Environmental Health for the Health Professions" by K. Donham & A. Thelin (2006, 429 pages). Oxford, UK: Wiley-Blackwell.

Many suppliers of both publications—*Use your website search engine and type in titles.*

"Farm and Ranch Safety Management"

Topics include safe machine operation, handling toxic chemicals, hazardous waste disposal, developing a safety management plan (Rev. 2009, 394 pages).

Order from—John Deere Publishing by phone (800-522-7448) or on-line (www.johndeere.com/publications).

Internet Websites

AgriSafe Network

Represents health professionals who provide agricultural occupational health and safety services to farmers and their families.

Go to—www.agrisafe.org.

Canadian Agricultural Safety Association

Source for Canadian-produced agricultural safety resources.

Go to—www.casa-acsa.ca.

Consumer Products Safety Commission

Helps keep families safe by reducing the risk of injury or death from consumer products; site includes product-recall information.

Go to—www.cpsc.gov.

Farm Safety 4 Just Kids

Information for parents and kids interested in childhood agricultural safety.

Go to—www.fs4jk.org.

Florida AgSafe Program

Provides educational information for making the agricultural workplace safer and healthier; also contains materials relevant for disaster and emergency situations.

Go to—www.flagsafe.ufl.edu.

Indiana Rural Safety and Health Council

Has available many resources on health and safety for rural and farm families.

Go to www.farmsafety.org

Minnesota Agricultural Safety and Health Program

Reports on agricultural safety and health activities that occur within the state, lists agricultural safety and health-related resources, and provides links to other occupational and health sites.

Go to—<http://safety.cfans.umn.edu>.

National and State/Regional AgrAbility Projects

Provide educational programs, consultation, and services for farmers, ranchers, and other agricultural workers with disabilities.

Go to—www.agrability.org.

National Center for Farmworker Health

Provides information resources and special projects for migrant/seasonal farmworkers.

Go to—www.ncfh.org.

National Center for Rural and Agricultural Health and Safety

Provides resources, research, and educational programs to enhance the health and safety of all children exposed to agricultural hazards, with a focus on injury prevention.

Go to—<http://research.marshfieldclinic.org>.

National Education Center for Agricultural Safety

Partners with colleges, educational centers, businesses, organizations, and agencies to bring safety and health messages to rural communities via various activities and resource materials.

Go to—www.nsc.org/necas.

National Safety Council

Features news, events, publications, fact sheets, and activities; visit the site's Agricultural Division page.

Go to—www.nsc.org.

Ohio Agricultural Safety Page

Listings of safety-related publications, services, and products available from Ohio State University Extension.

Go to—www.ag.ohio-state.edu/~agsafety.

OSHA's Agricultural Safety Standards

Go to—www.osha.gov; then in the search bar type "agricultural safety standards."

Western Center for Agricultural Health and Safety

Provides information and conducts research aimed at protecting and improving the health and safety of farmers, farm-workers, and consumers.

Go to—<http://agcenter.ucdavis.edu>.

Professional Personnel

Licensed Consulting Engineers

Review plans for AT solutions, examine ATs to ensure incorporation of safe design concepts and compliance with current codes and regulations, and assist in hazard identification.

Certified Safety Professionals

Trained to make assessment of risks and to recommend safer alternatives for workplaces and work practices.

Licensed Assistive Technology Providers

Provide assistive technologies and trained to ensure that an AT is appropriate for specific applications and will 'do no harm.'

Government Regulatory Compliance Personnel

Enforce local, state, and national codes and regulations. (If an assistive technology 'solution' makes a substantial modification to the existing structure or requires a new structure or attachment to be built, prior review by local compliance personnel is advised.)

Cooperative Extension Safety Specialists

Provide free advice or referrals regarding a variety of safety issues. These education professionals, located at many state land-grant universities, can be contacted through county Extension offices.

Appendix B.

FARM AND RANCH SAFETY INVENTORY

The following inventory was developed to serve as a simple-to-use tool for conducting a whole-farm assessment of potential workplace hazards and unsafe work practices. It is based on past agricultural-related fatality and injury data, and it reflects those hazards that have the highest potential for causing human injury or property loss. This inventory is available in a downloadable format so that copies can be provided to clients who would like to conduct their own assessments. It could also be used in conjunction with Breaking New Ground's *"Conducting Agricultural Worksite Assessments"* as well as with this AT safety assessment tool.

No hazard assessment tool can be all-inclusive due to the wide diversity both of enterprises that may exist on farm and ranches and of the individual farmer's/rancher's work practices or habits. As a professional who provides technical services to such individuals, you have a responsibility (1) to see that your actions result in no harm to your clientele and (2) to point out hazards that have a high probability of causing injury or harm. This tool seeks to help you meet these responsibilities more effectively.

<u>FARMSTEAD AND BUILDINGS</u>	OK	Corrective Actions Needed
Farmstead and buildings are free of trash/debris/ junk that could cause falls or be a fire hazard.	<input type="checkbox"/>	_____
Old buildings are structurally sound.	<input type="checkbox"/>	_____
Buildings, outdoor work areas are well lighted.	<input type="checkbox"/>	_____
Two-way communication devices are available in each major farm building.	<input type="checkbox"/>	_____
Emergency phone numbers are clearly posted in each major farm building.	<input type="checkbox"/>	_____
Fully charged ABC-type fire extinguisher is located in each farm building.	<input type="checkbox"/>	_____
Well-maintained first-aid kit is located in each major farm building.	<input type="checkbox"/>	_____
Electrical wiring is in good condition, supported in conduits.	<input type="checkbox"/>	_____
Wiring insulation is in good condition, not brittle, cracked, or broken.	<input type="checkbox"/>	_____
Electric outlets are three-prong grounded type.	<input type="checkbox"/>	_____
Ground fault interrupters (GFI) are used wherever wet conditions may occur.	<input type="checkbox"/>	_____
Stairs, ladders are in good condition.	<input type="checkbox"/>	_____
Stairs are clear of objects and slippery substances and have handrails.	<input type="checkbox"/>	_____

- Floors are free of broken concrete, slick spots, or other areas that could cause falls. _____
- Overhead storage areas have weight limits posted and are equipped with guardrails and toeboards. _____

CROP AND FEED STORAGE AREAS

OK

Corrective Actions Needed

- Entrances to grain, feed, or silage storage areas can be locked. _____
- Flowing grain hazard warnings are posted at storage facilities. _____
- Silo and bin ladders are in good condition. _____
- All bins have both inside and outside ladders and provide at least 6 inches of toe clearance. _____
- Fully charged ABC-type fire extinguisher is available in crop storage area. _____
- Approved respirators are available for handling dusty grain or feed or for cleaning grain bins. _____
- Warnings posted regarding the danger of silo gas. _____
- Storage and drying areas are free of trash, spilled grain, and fire hazards. _____
- L.P. gas lines to dryers are in good condition and free of leaks. _____
- Electric motors are placed in areas with adequate ventilation, and free of trash/other fire hazard. _____
- Overhead power lines are located away from bins and silos where augers may be used. _____

CHEMICAL STORAGE AREAS

OK

Corrective Actions Needed

- Crop chemicals are stored in a secured room or building to keep out children and animals. _____
- Chemical storage area entrance is clearly marked and posted concerning hazards inside. _____
- Chemicals are stored in labeled, original containers that are in good condition with no leaks. _____
- Chemical containers are properly rinsed and disposed of at approved collection sites. _____
- Smoking is prohibited around chemical storage buildings and 'No smoking' signs posted. _____
- Chemical storage containers are properly secured during transport. _____

FUEL STORAGE AREAS

OK

Corrective Actions Needed

- Underground fuel tanks are monitored for leaks. _____
- Above ground fuel tanks are at least 40 feet from any building. _____
- 'No smoking' and static electricity warning signs are displayed near fuel storage/refueling areas. _____
- Fuel pumps are grounded and locked. _____
- Fuel hoses and fittings are in good condition with no leaks. _____
- Weeds and other easily combustible materials are kept away from fuel storage areas. _____
- Fully charged ABC-type fire extinguishers are located in close proximity to fuel storage area. _____
- Each fuel storage tank is properly labeled with contents. _____
- Only approved fuel storage containers are used to transport fuel. _____
- L.P. gas tanks are at least 40 feet from buildings. _____

TRACTORS/SELF-PROPELLED EQUIPMENT

OK

Corrective Actions Needed

- All PTO master shields are in place. _____
- All shields over belts, pulleys, and fans are in place and in good condition. _____
- Reflectors and SMV emblems are clean and are not faded. _____
- Hazard alert decals are in place and legible. _____
- Tractors are equipped with ROPS. _____
- Wheel bearings and seals do not have excessive wear. _____
- ROPS-equipped tractors have seat belts. _____
- Tractors without ROPS do not have seat belts. _____
- Five-pound (minimum) ABC-type fire extinguisher is mounted on each tractor. _____
- All lights and flashers are clean and in working order. _____
- Cab windows and mirrors are kept clean to maintain good visibility and free of cracks. _____
- Operator's platform and steps are kept clear of grease, mud, and tools. _____

- Safety hitch pin is available on each tractor. _____
- Bolts, welds, safety hitch pins, and hitches are in good condition. _____
- Fuel, oil, and hydraulic systems are free of leaks and maintained at proper fluid levels; hoses/lines are in good condition. _____
- Tires are in good condition and kept at recommended pressure. _____
- Wheel lugs are all in place and tight. _____
- Muffler/exhaust system is properly maintained. _____
- Steering is free of excessive play. _____
- Brakes are in good condition and are adjusted evenly. _____
- Keys are not left in the ignition when tractors are parked unattended. _____
- If cab equipped, weather-stripping and sound-proofing materials are in good condition. _____

TILLAGE AND PLANTING EQUIPMENT

OK Corrective Actions Needed

- Equipment is marked with reflectors and lights for highway travel. _____
- Belts, chains, and shafts are adequately shielded. _____
- Bolts, welds, safety hitch pins and hitches are in good condition. _____
- PTO components are properly shielded. _____
- Hydraulic components appear in good condition and free of leaks. _____
- Transport locks used to take load off hydraulic system during transport are in working order. _____
- Tires are in good condition and inflated to recommended pressure. _____
- All wheel lugs are in place and tightened. _____
- Wheel bearings and seals do not have excessive wear. _____
- Hazard alert decals are in place and legible. _____

WAGONS AND HAULING EQUIPMENT

OK Corrective Actions Needed

- Lights and reflectors are in place, clean and in working order. _____

- Belts, pulleys, shafts, and chains are properly shielded. _____
- Bolts, welds, safety hitch pins, and hitches are in good condition. _____
- Each equipment has a clean SMV emblem that is not faded. _____
- Tires are in good condition and properly inflated. _____
- All wheel lugs are in place and tightened. _____
- Wheel bearings and seals do not have excessive wear. _____
- Steering mechanism and hitch do not have excessive wear. _____
- All gravity-flow unloading wagons are labeled with a warning about suffocation hazards. _____
- Hazard alert decals are in place and legible. _____

HARVESTING EQUIPMENT

OK Corrective Actions Needed

- Guards and shields are in place. _____
- Ladders and steps are in good repair and clear of grease, mud, and tools. _____
- Each machine is equipped with an SMV emblem. _____
- Self-propelled harvesters are equipped with at least one 10-pound ABC-type fire extinguisher. _____
- Operators manual is in cab for reference when making adjustments. _____
- Fuel, oil, and hydraulic systems are free of leaks; hoses and lines are in good condition. _____
- Belts and chains are properly adjusted. _____
- Safety latch, jack stand, and/or safety locks are in good working order. _____
- Flashers/lights are clean and working properly. _____
- Windows are kept clean and free of cracks. _____
- For PTO-operated machines, PTO components are properly shielded. _____
- Weather stripping and sound proofing material is in good condition if cab equipped. _____
- Wheel bearings/seals do not have excessive wear. _____
- Reflector/SMV emblems are clean and not faded. _____

CHEMICAL APPLICATION EQUIPMENT

OK

Corrective Actions Needed

Necessary personal protective equipment (gloves, goggles, etc.) is available for each applicator.

Soap and water are readily available for decontamination.

Fittings, hoses, and lines are in good condition and free of leaks.

Control valves work easily by hand w/o leakage.

All pressure gauges are in good condition.

Sprayer tank lids fit snugly to prevent spillage.

On PTO-driven applicators, driveline components are properly shielded.

Tank-mounting hardware is in good condition and secure.

Only persons who are certified are allowed to handle, mix, or apply restricted-use chemicals.

ANHYDROUS APPLICATION EQUIPMENT

OK

Corrective Actions Needed

Valves, fittings, and hoses are in good repair.

Hoses are not outdated.

Approved rubber gloves and non-vented splash goggles are available with each applicator.

Each nurse tank or applicator has 5 gallons of fresh water mounted on it (required by law).

Nurse tanks or applicators moved on public highways are equipped with SMV emblems, safety hitch pins, and safety chains.

Tires, wheel bearings, running gears, and tank-mounting hardware on nurse tanks are in good condition.

Nurse tanks are secured or under surveillance to prevent vandalism or theft of ammonia.

Only individuals of legal age and who have been trained are allowed to transport, transfer, or apply anhydrous ammonia.

LIVESTOCK FACILITIES

OK

Corrective Actions Needed

Approved respirators are available for use in dusty conditions, especially in confinement buildings.

- Doorways and aisles are free of obstructions and sharp projections, such as nails. _____
- Ceilings are 8-12 feet and door frames at least 8 feet high, with a minimum width of 4 feet. _____
- Windows are inaccessible to horses and livestock, covered with bars or screening, and made of safety glass. _____
- Water sources are grounded to prevent accidental electrical shock. _____
- Cross-ties and other tying areas are provided, and safety release snaps are utilized. _____
- Grooming and wash stalls are in open areas that are well-drained to prevent wet or icy floors. _____
- Hay is stored away from heat/electrical sources and in a separate building from where livestock and horses are housed. _____
- Tack rooms have adequate racks and storage areas to keep equipment off the floor and out of the path of traffic. _____
- Hay and bedding are securely stacked. _____
- Turnout paddock and pasture fencing is 4-6 feet in height and free of protrusions. _____
- Gates are at least 4 feet wide, swing freely, and have no sharp edges or corners. _____
- Ponds, manure lagoons, irrigation ditches, and open ditches are fenced or posted with appropriate warnings. _____
- Access doors to manure pits are secure and labeled with appropriate warnings concerning the presence of toxic gases. _____
- Adequate ventilation is provided for all livestock-confinement buildings. _____
- Internal combustion engines are not used in confinement buildings w/o adequate ventilation. _____
- Emergency plan is posted for steps to take in the event of power failure. _____
- No one under age 16 is employed to work with breeding livestock, including bulls, boars, and animals with nursing young present. _____

PERSONAL PROTECTIVE EQUIPMENT

OK

Corrective Actions Needed

- Safety glasses, face shields, or goggles are available at grinders, chemical-handling, and other sites where there are sources of eye hazards. _____

Arc welding helmets and welding goggles are in good condition and fitted with the appropriate lenses. _____

Welding gloves and protective clothing are worn when welding. _____

Approved respirators are available for dusty tasks, such as sanding. _____

Eye protection is available for every power tool. _____

Hard hats are available for construction activities. _____

Wash-up area is provided. _____

First aid kit is available and maintained. _____

SHOP

OK

Corrective Actions Needed

All fuses and circuit breakers are clearly labeled. _____

Floors are clean, dry, and free of grease and tripping hazards. _____

Flammable waste is not allowed to accumulate and is stored in approved containers. _____

Fuels and other combustible liquids are kept in approved containers and stored away from ignition sources. _____

Air used for cleaning is regulated to not more than 35 psi. _____

Stacked materials are secured against falling. _____

Adequate ventilation is provided. _____

Load capacity is plainly marked on each lifting device. _____

Safety hooks are used on all chains. _____

Jack stands are available (no concrete blocks). _____

Fully charged, 10-pound (minimum), ABC-type extinguisher is available. _____

SHOP TOOLS

OK

Corrective Actions Needed

All hammer handles are in good condition. _____

Punches and chisels are in good condition (no mushroomed heads). _____

Tools are free of grease and oil. _____

Cutting tools are sharp. _____

- Stationary power tools are secured to the floor. _____
- All stationary power tools and equipment are grounded. _____
- Table saw is equipped with guard, and push stick is available. _____
- Grinders have guards and properly adjusted work rests. _____
- Battery charging area is well ventilated and away from any ignition source, such as the welder. _____
- All belts, pulleys, and chains on power tools are guarded. _____
- Portable power tool and extension cords are in good condition (e.g., no cuts or taped splices). _____
- Portable power tools are equipped with ground cords or are double insulated. _____
- Welding area is kept dry. _____
- Compressed gas cylinders are capped and secured in place when not in use. _____
- Cylinders are turned off when not in use. _____
- Spare fuel and oxygen cylinders are capped and not stored in close proximity to each other. _____
- Arc welding cables are in good condition. _____
- Ventilation is adequate to dissipate welding fumes. _____
- Relief valve on the air compressor is in good condition. _____
- All compressed air nozzles are equipped with an approved pressure-reduction nozzle. _____
- Grinding wheels are kept dressed, securely mounted, and in good condition. _____

PORTABLE AUGERS AND ELEVATORS

OK Corrective Actions Needed

- All belts and chains are properly shielded. _____
- Auger inlet is shielded to prevent contact with flighting. _____
- Winch is in good working order and prevented from 'freewheeling.' _____
- Winch cable is free of corrosion, rust, or damage. _____
- Augers and elevators when raised are secured with wheel chocks and to a building or bin. _____

- PTO- and engine-operated components are properly shielded. _____
- Top shaft on an auger is shielded. _____
- No overhead power lines are near where portable augers or elevators are commonly used. _____
- Electric motors are properly grounded and wiring is in good condition. _____

FIELDS AND ROADWAYS

OK

Corrective Actions Needed

- Fields are free of stumps, large rocks, tile holes, or other obstacles to cropping operations. _____
- Large immovable obstacles, such as corner posts and irrigation hydrants, are flagged or well marked for visibility, even in tall crops. _____
- Buffer zones along drainage ditches allow safe maneuvering of machinery. _____
- Low branches of trees are trimmed to allow machinery to pass underneath. _____
- There is clear vision in both directions as you enter the road from farm driveway and field exits. _____
- Driveway entrance is wide enough to permit entering or exiting without swinging truck, tractor, or combine into opposite lane of traffic. _____
- Corners of all intersections by the farm are kept clear of tall crops, which might block vision of drivers on the road. _____
- Overhead power lines are not sagging below 12 feet and not near tree limbs. (Do not attempt to measure—electrocution hazard.) _____
- All wells and cisterns are securely covered or filled. _____
- Drain pipes and tiles in side ditches are marked. _____
- Waterways are seeded to prevent erosion and the forming of ditches. _____
- Low areas are tilled to prevent equipment from becoming stuck. _____

Section VI.
BLANK
ASSESSMENT TOOL
WORKSHEETS

**(Reproduce for each assessment
made at the client's worksite)**

Worksheet A.
THE CLIENT, THE DISABILITIES, AND THE FARMING OPERATION

About the Client

Client name: _____ Gender: _____ Date of birth: ___/___/___

Address: _____

Phone: _____ E-mail: _____

Family members at home (*include children's ages*): _____

Client's occupational status:

- | | |
|--|---|
| <input type="checkbox"/> Full-time farmer | <input type="checkbox"/> Spouse of the farmer |
| <input type="checkbox"/> Part-time farmer—primary income from farm | <input type="checkbox"/> Dependent of the farm family |
| <input type="checkbox"/> Part-time farm—primary income from off-farm job | <input type="checkbox"/> Employee of the farmer |
| <input type="checkbox"/> Agri-business (<i>type/position</i>) _____ | |
| <input type="checkbox"/> Other _____ | |

About the Client's Disabilities

Type(s) of disability

Primary: _____ Date of injury/diagnosis: ___/___/___

Secondary? _____

Functional limitations imposed by the disability: (*Put a * by those affecting use of any AT*)

_____	_____
_____	_____
_____	_____
_____	_____

List changes in the disabling condition(s) over the last two years that might affect use of any AT.

- | | | | |
|-------|-----------------------------------|---------------------------------------|---------------------------------|
| _____ | <input type="checkbox"/> Improved | <input type="checkbox"/> Deteriorated | <input type="checkbox"/> Stable |
| _____ | <input type="checkbox"/> Improved | <input type="checkbox"/> Deteriorated | <input type="checkbox"/> Stable |
| _____ | <input type="checkbox"/> Improved | <input type="checkbox"/> Deteriorated | <input type="checkbox"/> Stable |
| _____ | <input type="checkbox"/> Improved | <input type="checkbox"/> Deteriorated | <input type="checkbox"/> Stable |

Any prognosis available that may affect use of any AT in the next two years? (*If so, identify*)

Prosthetics used? No Yes (*identify*): _____

Form(s) of mobility: Ambulatory Manual wheelchair Powered wheelchair/scooter
 Crutches Walker Other _____

Worksheet B.
THE ASSISTIVE TECHNOLOGY TO BE EVALUATED

What is it (*name and/or description*)? _____

What tasks does it help complete? _____

Who made it? Commercially made (Manufacturer: _____)

Custom-made by user

Custom-made by local craftsman

If modified, what specifically was and/or how? _____

How does it operate? _____

How is it powered? Battery 120- or 240-volt AC Gas or diesel engine

Hydraulics Manually Other _____

How often is it used? _____

Is assistance needed to No

access and/or operate? Yes (*usually by whom?*) _____

Other relevant information? _____

Worksheet C.

QUICK-REFERENCE CHECKLIST OF ASSESSMENT ITEMS

AT name/description: _____

How to use this worksheet: (1) After carrying out Steps 1 through 5 of the AT assessment process (*page II-1*), go over the list below to identify those items that you judge (on first impression) might be applicable to this specific AT. (2) Mark with an 'X' each item which you feel may be an issue/concern. (3) Then on Worksheet D, respond to the questions accompanying all items that you find are indeed applicable to this AT, paying special attention to those you had check-marked on this worksheet. (Note: When using Worksheets C and D, refer as needed to Section III, "Explanation of Assessment Items" (*pages III-1 to 14*)).

Construction/components

- 1. General construction—*Unsafely built?*
- 2. Physical damage—*Noticed?*
- 3. Component parts—*Poor quality?*
- 4. Joints—*Weak?*
- 5. Emergency exit—*None provided?*
- 6. Cable winch mechanism—*Unapproved?*
- 7. Carrying capacity—*Not posted?*
- 8. Overall weight—*Too heavy?*

Controls

- 9. Alternate controls—*Inadequate?*
- 10. Unintentional activation—*Possible?*
- 11. Emergency stop—*Absent?*
- 12. Braking/speed control—*Inadequate?*
- 13. Location of controls—*Hard to reach?*
- 14. Control lever shape/size—*Hard to use?*

Electrical/hydraulic parts

- 15. Damaged wires/circuits—*Present?*
- 16. Uninsulated wires/terminals—*Present?*
- 17. Unfused/wrongly-fused circuits—*Present?*
- 18. Loose, dangling wires/cords—*Present?*
- 19. Improper cable tension—*Too loose or tight?*
- 20. Damaged hydraulic lines/fittings—*Present?*

Moving parts/surfaces

- 21. Crush points—*Present?*
- 22. Pinch points—*Present?*
- 23. Shear points—*Present?*
- 24. Wrap points—*Present?*
- 25. Sharp edges/corners—*Present?*
- 26. Projections on moving parts—*Present?*
- 27. Unshielded moving parts—*Present?*
- 28. Abrasive contacts—*Present?*

- 29. Hot surfaces—*Present?*

- 30. Slippery surfaces—*Possible?*

Risks associated with operation

- 31. Fire hazard—*No fire extinguisher?*
- 32. Unintentional spring release—*Possible?*
- 33. Toxic materials—*Present?*
- 34. Excessive vibration—*Present?*
- 35. Excessively loud noise—*Present?*
- 36. Clutter/obstructed view—*Present?*
- 37. Weather-related restrictions—*A concern?*

Presentive/protective features

- 38. Seat belts/restraints—*Inadequate?*
- 39. Guard/barriers—*Inadequate?*
- 40. Roll-over protective structure—*Absent?*
- 41. Stabilizing supports—*Inadequate?*
- 42. Hand rails/holds—*Inadequate?*
- 43. Function/warning labels—*Inadequate?*

Practices to enhance safe operation

- 44. Scheduled maintenance—*Irregular?*
- 45. User training/usage experience—*Inadequate?*
- 46. Assistant/substitute training—*Inadequate?*
- 47. Back-up power source—*Inadequate?*
- 48. Back-up control switches—*Absent?*
- 49. Operating instructions—*Absent/inadequate?*
- 50. Oper./maint. manual—*Absent/inadequate?*

Limitations of the AT user

- 51. Operating/functioning ability—*A concern?*
- 52. Traits/habits/medications—*A concern?*
- 53. Use in adverse environment—*A concern?*
- 54. Physical exertion/extended use—*A concern?*
- 55. Two-way communication ability—*A concern?*

Worksheet D.

DETAILED ASSESSMENT OF INJURY POTENTIAL

AT name/description: _____

Note: Each of the 55 items that fall under the eight categories in this reference section has been ascribed an injury-potential rating of high (H) or medium (M) or low (L), based on research studies involving farmers and rehabilitation professionals. The rating, which follows the item number, serves as an indication of the general risk level—e.g., 1 (H), 5 (M), 7 (L). For further information applicable to the safety of devices and work practices used in the agricultural workplace, see the list of resources in Appendix A. For a general farm/ranch inventory designed to help a client identify other workplace hazards, see Appendix B.

Items Related to Construction/Components of the AT

- 1 (H) **General construction** — *Does the AT (whether fabricated or modified) appear to be of sturdy and stable construction?* Unsafely built
 Not a concern
-
- 2 (H) **Physical damage** — *Is there any physical damage (e.g., cracks, rust, rot, wear, corrosion, bends, dents) apparent that would affect performance or safety?* Damage present
 None observed
 N/A
-
- 3 (H) **Component parts** — *Are the component parts (e.g., cables, straps, fasteners, buckles, tubes, hoses) strong, stable, and secured appropriately?* Inadequate parts
 Appear adequate
 N/A
-
- 4 (H) **Joints** — *Are all the joints welded, bolted, tied, or glued adequately or otherwise fastened securely?* Weak joints
 Appear adequate
 N/A
-
- 5 (M) **Emergency exit** — *Is there an alternative way for the user to exit the AT if the regular exit method becomes inoperable?* No emergency exit
 Exit present
 N/A
-
- 6 (H) **Cable winch mechanism** — *If used to elevate/transport a person, does the AT utilize a cable winch mechanism not certified for that purpose?* Unapproved winch
 Appropriate winch
 N/A
-
- 7 (L) **Carrying capacity** — *Has the weight-carrying capacity of the AT (especially one intended to carry the user) been established and posted?* Not set or posted
 Set and posted
 N/A
-
- 8 (L) **Overall weight** — *Is it possible that the weight of the AT could cause the user strain and/or fatigue that would lead to further injury?* Weight a concern
 Not a concern
 N/A
-

Items Related to Controls on the AT

- 9 (M) **Alternate controls** — *Have alternate controls been installed in place of any regular ones that the user cannot operate due to his/her disability limitations?* Alternates inadequate
 Adequate
 N/A
-
- 10 (H) **Unintentional activation of controls** — *Could any control levers/switches be unintentionally activated or deactivated when required during operation?* Activation possible
 Not a concern
 N/A
-
- 11 (H) **Emergency stop** — *Is there a switch within easy reach or a mechanism that would automatically activate to stop the AT immediately in event of an emergency?* No E-stop switch
 E-stop switch present
 N/A
-
- 12 (H) **Braking/speed control** — *Is there a braking mechanism and/or a speed-regulating mechanism to control the AT's movement?* Control inadequate
 Adequate
 N/A
-
- 13 (L) **Location of controls** — *Are all controls in locations easily accessible to the user?* Not accessible
 Easily accessible
 N/A
-
- 14 (L) **Control lever shape/size** — *Does the shape and/or size of any control levers increase the potential for user strain and/or fatigue?* Not appropriate
 All easy to use
 N/A
-

Items Related to Electrical and/or Hydraulic Parts on the AT

- 15 (H) **Damaged wires/circuits** — *Are all electrical wires/circuits adequately protected from cuts, corrosion, fire, or other types of damage?* Damage present
 None observed
 N/A
-
- 16 (H) **Uninsulated connections/terminals** — *Are there uninsulated connections or terminals on or around the AT that could result in electrical shock or short-circuiting?* Uninsulated parts
 None observed
 N/A
-
- 17 (H) **Unfused/wrongly-fused circuits** — *Are all of the circuits fitted with the appropriate-capacity fuses to prevent electrical overload?* Inadequate fuses
 Appear adequate
 N/A
-
- 18 (H) **Loose, dangling wires/cables/cords** — *Are there any loose or hanging electrical wiring, cables, or cords anywhere on or around the AT?* Cords loose/dangling
 Cords secured
 N/A
-

Items Related to Electrical/Hydraulic Parts on the AT (continued)

19 (H) **Improper cable tension** — *Do any of the electrical cables that are attached to moving parts have too much or too little slack?*

- Too loose or tight
 Adequate slack
 N/A

20 (M) **Damaged hydraulic lines/fittings** — *Are any of the hydraulic lines and/or fittings leaking, worn, cut, or otherwise damaged or exposed to potential damage?*

- Damage present
 No damage concern
 N/A

Items Related to Moving Parts/Surfaces of the AT

21 (H) **Crush points** — *Could any moving parts create potential crush points?*

- Crush points present
 None observed
 N/A

22 (H) **Pinch points** — *Do any moving parts have potential pinch points?*

- Pinch points present
 None observed
 N/A

23 (H) **Shear points** — *Could the edges of any moving parts become potential shear points?*

- Shear points present
 None observed
 N/A

24 (H) **Wrap points** — *Do any of the rotating parts have the potential to become wrap points?*

- Wrap points present
 None observed
 N/A

25 (H) **Sharp edges/corners** — *Are there any sharp edges or corners present on moving parts or other areas that could come in contact with the user?*

- Sharp points present
 None observed
 N/A

26 (H) **Projections on moving parts** — *Do any moving or rotating parts have potentially dangerous projections?*

- Projections present
 None observed
 N/A

27 (H) **Inadequately shielded moving parts** — *Are any moving parts either unshielded or poorly shielded?*

- Unshielded parts seen
 None observed
 N/A

28 (M) **Abrasive contacts** — *Do any of the moving parts come into contact with other parts in an abrasive way?*

- Abrasive contacts seen
 None observed
 N/A

Items Related to Moving Parts/Surfaces of the AT (continued)

- 29 (H) **Hot surfaces** — *Could the user come in contact with hot surfaces while operating the AT?* Hot surfaces present
 Safety provided
 N/A

- 30 (M) **Slippery surfaces** — *Are there any surfaces where the user stands, sits, or grasps onto that are or could become dangerously slippery?* Slick surfaces present
 None observed
 N/A

Items Related to Risks Associated with Operation of the AT

- 31 (L) **Fire hazard** — *If the risk of fire during operation exists, is a fire extinguisher within easy reach of the user?* No fire extinguisher
 Present and reachable
 N/A

- 32 (H) **Unintentional spring release** — *Are there springs under tension or compression that could suddenly and unintentionally release and/or break?* Unsafe springs present
 Springs secure
 N/A

- 33 (H) **Toxic materials** — *Is there a chance of chemicals or other toxic materials being released during operation that could cause injury from inhalation or skin contact?* Toxic items present
 Safeguards in place
 N/A

- 34 (M) **Excessive vibration** — *Is the user exposed to excessive vibration while operating the AT?* Vibration excessive
 Not a concern
 N/A

- 35 (H) **Excessively loud noise** — *Does continuous operation of the AT result in noise levels sufficient to possibly cause auditory injury or the inability to hear others?* Noise level a concern
 Noise not excessive
 N/A

- 36 (M) **Clutter/obstructed view** — *Could safe operation of the AT be jeopardized by the presence of clutter or obstruction of the operator's view of the surroundings?* Clutter a concern
 Not a factor
 N/A

- 37 (L) **Weather-related restrictions** — *Are there weather-related restrictions for use of the AT that could lead to its malfunction and to injury to the operator?* Operational concern
 Not a factor
 N/A

Items Related to Preventive/Protective Features on the AT

- 38 (H) **Seat belts/body restraints** — *Have appropriate seat belts and/or other body restraints been installed that take into account the user's disability and type of AT?* Restraints inadequate
 Adequate
 N/A

Items Related to Preventive/Protective Features on the AT (continued)

39 (H) **Guards/barriers** — *Are guards or other types of barriers in place where needed to protect the user?* Guards inadequate
 Adequate
 N/A

40 (H) **Roll-over protective structure (ROPS)** — *If the AT is a self-propelled vehicle, has it been fitted with a ROPS to protect the user if it would happen to tip over?* ROPS absent
 Adequate
 N/A

41 (H) **Stabilizing supports** — *Is the AT equipped with appropriate stabilizing supports to ensure its stability?* Supports inadequate
 Adequate
 N/A

42 (L) **Hand rails/holds** — *Are hand rails and/or hand holds in place where needed to provide support for the user?* Handholds inadequate
 Adequate
 N/A

43 (L) **Function/warning labels** — *Are function and warning labels affixed where needed and clearly visible?* Labels absent
 Present
 N/A

Items Related to Practices to Enhance Safe Operation of the AT

44 (L) **Scheduled maintenance** — *Has a regular maintenance schedule been established, and is it being followed?* No regular maintenance
 Not a concern
 N/A

45 (M) **User training/usage experience** — *If training or practice in using the AT is important for safe and proper operation, has user received that training or practice?* Needs training
 Not a concern
 N/A

46 (L) **Assistant/substitute training** — *If the user routinely needs an assistant to operate the AT, is that person and the back-up adequately trained as to their responsibility?* Not trained
 Adequately trained
 N/A

47 (L) **Back-up power source** — *If the AT is power-operated, is it equipped with a back-up power source should the main source fail?* No back-up option
 Back-up present
 N/A

48 (M) **Back-up control switches** — *Is the AT equipped with an extra set of control switches should the original ones malfunction?* No back-up switches
 Back-up present
 N/A

Items Related to the Practices to Enhance to Safe Operation of the AT (continued)

-
- 49 (L) **Operating instructions** — *Are the essential operating instructions written down and located with the AT?* No instructions
 Instructions w/ AT
 N/A

-
- 50 (L) **Operation/maintenance manual** — *Is there an operation and maintenance manual, and is it accessible?* No manual
 Manual available
 N/A

Items Related to Limitations of the User of the AT

-
- 51 (M) **Operating/functioning ability** — *Is there concern about the user's ability to operate the AT in a consistent and stable manner as a result of his/her disability?* User ability a concern
 Not a concern
 N/A

-
- 52 (M) **Traits/habits/medications** — *Does the user have behavioral traits and work habits or take medicines that might be detrimental to safe and proper operation?* Potential problem
 Not a concern
 N/A

-
- 53 (M) **Use in adverse environment** — *Does the user operate the AT under weather, terrain, or other environmental conditions that are not favorable to its safe use?* Conditions a concern
 Not a concern
 N/A

-
- 54 (M) **Physical exertion/extended use** — *Does the user have to exert manual force to operate the AT for long periods of time and thus experience pain/stress/fatigue?* Potential problem
 Not a concern
 N/A

-
- 55 (M) **Two-way communication ability** — *Does the user have access to a two-way communication device when operating the AT?* Not always available
 Always available
 N/A
-

Worksheet E.
INJURY-POTENTIAL PROBLEMS OBSERVED/SOLUTIONS SUGGESTED

AT name or description: _____

Item No./Name: _____

Problems observed: _____

Solutions suggested: _____

Item No./Name: _____

Problems observed: _____

Solutions suggested: _____

Item No./Name: _____

Problems observed: _____

Solutions suggested: _____

Item No./Name: _____

Problems observed: _____

Solutions suggested: _____

(Worksheet E. Continued)

AT name or description: _____

Item No./Name: _____

Problems observed: _____

Solutions suggested: _____

Item No./Name: _____

Problems observed: _____

Solutions suggested: _____

Item No./Name: _____

Problems observed: _____

Solutions suggested: _____

Item No./Name: _____

Problems observed: _____

Solutions suggested: _____

Worksheet F.

ASSESSMENT RESULTS AND RECOMMENDATIONS

AT name or description: _____

Overall suitability of the AT for the user: _____

Key problems observed, listed in the priority order of importance (*see Worksheet D for a description of each problem and its suggested solution*)

Major (**critical**) problems that need to be addressed—in priority order:

Item no./name _____

Item no./name _____

Item no./name _____

Item no./name _____

Item no./name _____

Item no./name _____

Other (**not as critical**) problems that perhaps ought to be addressed—in priority order:

Item no./name _____

Item no./name _____

Item no./name _____

Item no./name _____

Item no./name _____

Item no./name _____

Other comments about the AT: _____
