

# Safety Management Guidelines

and

## Safety Manual

Ver. 4



September 2012  
Safety Management Committee  
Agricultural and Forestry Research Center, University of Tsukuba

## Introduction

The Agricultural and Forestry Research Center, University of Tsukuba, was founded in 1973 at the same time as the university. Its purpose is to “supervise the university farm and experimental forest, function as a place of training and research in agriculture and forestry, and contribute to the improvement and development of technology in agriculture and forestry, both within and outside of Japan, through regional and international technological cooperation activities.” Following several organizational changes, this Center currently comprises an Education and Research Promotion Department, which includes groups for education and research planning, international exchange, environmental planning, regional exchange popularization and plant system preservation; a University Forest Department, which oversees Yatsugatake University Forest (Nagano Prefecture), Ikawa University Forest (Shizuoka Prefecture) and Tsukuba Experimental Forest (Ibaraki Prefecture); and an Administrative Department.

Since the University Farm and University Forests of the Agricultural and Forestry Production and Technology Group use various agricultural and forestry machines that entail various risks in operation, all persons must work with caution in order to ensure safety. In addition, work using stepladders, etc., in fruit-tree management, as well as work involving small creatures, such as bees and mites, and large animals, can lead to unexpected accidents. When working in intense heat or severe winter weather, precautions must be taken to ensure sufficient salt and water replenishment, rest, protection from the cold in low temperatures, and falling in case of freezing. It is also important to take measures such as wearing masks when, for example, spraying agricultural chemicals.

Due to this necessity for safety management, a Safety Manual was established and has been maintained from its initial version created in fiscal year 1997, to Revised Version 2 in fiscal year 2001, and Revised Version 3 in fiscal year 2008, with the contents being improved each time. The present “Safety Management Policy and Safety Management Manual (Version 4)” is now complete.

The purpose of this manual is to mitigate the above risks. In 2003, the Agricultural and Forestry Research Center acquired ISO 14001, the international certification for environmental management systems, as the first university farm or field science education and research center in Japan, and has implemented ISO 14001’s management system. Although no environmental management examination will be conducted, due to the fact that the Center’s operation of the ISO system has already become fixed, we will launch a proprietary system for the Center and work on continuously improving our environmental and labor-environment management, which reflects the spirit of ISO.

While there are also specifications in the “Industrial Safety and Health Act” and the “Labor Safety Guidelines” of the University of Tsukuba, it is important to always work with an awareness of safety in order to ensure the Agricultural and Forestry Research Center remains a safe place. We would like not only the instructors and employees of this Center, but also those who use it, to utilize this manual. Words of advice from users on safe working practices are also appreciated, and will be used to further improve safety in future.

In conclusion, we would like to thank the Safety Management Committee of the Center, led by Yasuhiro Matsumoto, Manager, Division of Safety and Environment, who helped in the revision of this manual.

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Qualifications of technical staff and the state of skills training, special training, and safety training according to the Industrial Safety and Health Act

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# **Agricultural and Forestry Research Center Safety Management Guidelines and Safety Management Manual**

## **◇ Safety Management at University Farm**

### **I. Safety management in farm work**

#### **1. Major causes of farm work accidents:**

- (1) Overturning of ride-on tractors or falling from ride-on tractors.
- (2) Overturning of walking tractors or falling from walking tractors.
- (3) Falling from self-propelled agricultural machines.
- (4) Getting caught by walking tractors.
- (5) Contact with dangerous part when safety equipment has been partially removed.
- (6) Contact with dangerous parts that are not protected for safety.
- (7) Getting caught in moving parts of rotary, Power Take Off shaft (PTO), etc.
- (8) Falling from stepladders, ladders, tower silos, etc.
- (9) Injury caused by livestock, snakes, bees, etc.
- (10) Oxygen deficiency or toxic gas in silos, storerooms, etc.
- (11) Heatstroke or dehydration during outdoor work in summer or work in greenhouses.
- (12) Slipping on muddy soil or slopes.

#### **2. Common precautions for all kinds of work**

<<General matters>>

- (1) All incidents experienced during work must be reported to the group the worker belongs to so that opinions may be exchanged regarding the background cause, how to avoid recurrences, etc., and so that accidents are prevented.
- (2) A first aid kit must be kept.
- (3) An emergency contact system should be established, and its details relayed to all workers.
- (4) Clothing and protective equipment appropriate for work must be worn.
- (5) Safety hats and shoes should be actively used.
- (6) Instruction manuals should be read and understood, and precautions relayed via stickers on machines observed. Especially when handling machines for the first time, users should seek instruction from someone who is familiar with the machines, in addition to thoroughly reading the related instruction manual.
- (7) Signs to avoid risks should be posted at any points in the Center that are potentially unsafe.
- (8) Procedures should be put in place to predict any risks involved in the corresponding work, along with related measures to mitigate this risk before beginning the work. Outdoor work must be aborted if thunder is heard nearby.
- (9) Safety equipment on machines must not be removed unless the purpose is to inspect or adjust

the machine.

- (10) All users must possess in-depth knowledge on how to stop machine engines.
- (11) Riding on parts other than the operator's seat is prohibited.
- (12) If any machine failures occur, the person in charge of agricultural machinery must be notified, and machine must not be left unattended.
- (13) All working areas and surrounding vicinity should be kept organized and tidy.
- (14) Regular inspections should be implemented according to an inspection register, in order to ensure proper management of machinery.
- (15) If heavy objects or items with high centers of gravity are to be repositioned, they should be placed on the floor, avoiding shelves and desks, and their stability ensured.
- (16) Caution is also required to protect workers' backs when handling medium- to large-sized livestock.
- (17) Operation of machines that require a license or certificate of completion, such as a driver's license (ride-on tractors, walking tractors, combine harvesters, wagons, etc.), skills training course (slinging work, compact excavators, forklifts, gas welding, etc.), safety and hygiene training (bush cutters), or other special training (mini wheel loaders, cranes, chainsaws, high-lift work vehicles, grinders, arc welding, etc.) should be conducted by those who have completed the corresponding course(s).
- (18) Work that may generate excessive noise or vibration for a long period should only be implemented after appropriate measures are put in place to mitigate these impacts. In addition, vibration control gloves, earmuffs, etc. that are JIS-certified should be used.
- (19) Self-propelled machines should only be used on uneven ground at low speed, and machines that include the operation of hydraulic devices should be stopped by bringing the hydraulic device to the ground (if they can be lifted from the machine), setting the gearshift level to neutral, and turning off the engine with the parking brake on. Starter keys should be removed after use from models that have them.
- (20) When attaching/removing components, work should be implemented by 2 or more people, who should verify each other's safety as much as possible for the duration of the work.
- (21) The Center Office must be notified in any case where an instructor or employee is involved in an accident and seeks treatment at a hospital, clinic, etc., following the administration of first-aid measures.
- (22) In case of emergency, work should be stopped in order to evacuate all workers to the emergency evacuation site at the Center. If residents in the surrounding neighborhood need to be evacuated, and the safety of the Center building has been confirmed, the building should be opened as an evacuation site.
- (23) Testing for radioactive substances should be regularly implemented in relation to soil and products.
- (24) General wellbeing should be maintained by taking regular breaks, preventing heatstroke by



ensuring adequate hydration, etc., as well as using the first-aid office as necessary.

<<Before beginning work>>

- (1) Unreasonable work plans should not be made.
- (2) Risk prediction and prevention training should be implemented on a daily basis.
- (3) Break times should be set.
- (4) Engines should be stopped during refueling.
- (5) Start-up inspections should be implemented.
- (6) The PTO shaft and trailing hitch should be securely connected.

<<After completing work>>

- (1) Sediment, grass, branches, etc., that have adhered to machinery should be removed at the work site.
- (2) Anything that has wound around or become entangled with components should be removed after the engine has been stopped.
- (3) If any component or machine has to be lifted in order to remove foreign matter, steps should be taken to prevent the machine from accidentally lowering.
- (4) During washing of machinery, care must be taken to avoid splashing water on electric parts. In particular, when using a high-pressure washer, splashing water on oiled parts (such as grease nipple areas) should be avoided.
- (5) Where components need to be removed, they should be removed completely.

<<While traveling during work (on-road)>>

- (1) Traveling should be implemented at low speeds, on the left-hand side of the road, by connecting the left and right brakes.
- (2) The PTO should be turned to the "OFF" position.
- (3) The hydraulic elevation device should be set to the "FIXED" position.
- (4) The engine rotation speed should be adjusted using the acceleration pedal as far as possible.
- (5) No person should be allowed to ride on any machinery or trailer component.
- (6) When additional machinery is attached to a tractor or any other vehicle, the vehicle should be operated with caution, and the vehicle width borne in mind.

<<Field work>>

- (1) Prior to starting any machinery, operators should check that there is no one in the immediate vicinity.
- (2) Entry into, and exit from, fields with a step difference should proceed with caution. Foot boards or other step devices that are at least 4 times the length of the step difference should be used.
- (3) Machines should be operated at appropriate engine rotation speeds.

- (4) When navigating ridges, points of minimum level difference should be selected and the speed decreased. The machine should move forward in the direction perpendicular to the ridge, with the moving component stopped and its bottom end lowered to a position about 10 cm from the ground.
- (5) Machinery should never be overloaded.
- (6) Jumping off of or onto moving machines is prohibited.
- (7) The trailing point for trailing work should be set to low.
- (8) If any machine part gets stuck in mud and cannot be extracted without help, other vehicles such as tractors should be used to pull it out, rather than the stuck component being removed.
- (9) When work is conducted within facilities such as glass or plastic greenhouses, caution is required regarding the existence of obstacles and ventilation.
- (10) Engines should be stopped when fixing mechanical failures or removing foreign objects.
- (11) When lifting components featuring hydraulic devices for inspection, measures should be taken to ensure the components do not unexpectedly fall.
- (12) When abnormalities related to noise, vibration, sharpness, control issues, etc. are noticed, work should be aborted and the engine stopped immediately. The person in charge of agricultural machine servicing should then be contacted, and his/her instructions followed.
- (13) When operators feel fatigued, they should take breaks instead of pushing themselves to continue to work.
- (14) Any person who is drunk or under the influence of alcohol should not operate machinery.
- (15) Any person who has taken drugs that may impair their ability to work should not operate machinery.
- (16) Checks should be made regarding the presence of foreign objects in the field before commencing work. If any foreign object is discovered, it should be removed before the work proceeds.
- (17) Work should not proceed if the worker in question is incapable of proper judgment or work due to illness, injury, fatigue, etc.

<<Other notes>>

- (1) Workers should not strain to work in poor weather conditions.
- (2) When work is conducted in hot weather, or in greenhouses in summer, workers should take regular breaks and ensure they take proper hydration measures to prevent heatstroke.
- (3) Work should be conducted at a rotation speed that will not result in excessive vibration, noise, etc.
- (4) In case of assembly work, a director should be specified and communication signals should be set.
- (5) Workers should actively participate in safety lectures on agricultural work.
- (6) Where machine conditions need to be conveyed to other workers during shiftwork, the relevant

information should be recorded in a work journal.

- (7) Battery inspections and liquid replenishment should not be conducted near sources of fire.
- (8) Ignition plugs and wires connected to machines should not be touched while the engine is rotating.
- (9) Bolts, nuts, etc., should be inspected, in addition to the removal of foreign objects, during machine cleaning after operation. If any loose bolts or nuts are observed, they should be tightened or reattached.
- (10) Battery disconnection should start from the negative end.
- (11) In case of accident, the supervisor and Center Office should be notified immediately, and appropriate instructions sought.
- (12) In case of emergency, work should be stopped immediately and workers evacuated to the relevant evacuation site.
- (13) Adequate safety and hygiene signs should be posted at work sites.
- (14) Waste oil generated during the inspection and servicing of machines should be actively used for barn cleaner and not left unattended.

## II. Precautions for work according to major machinery type

### 1. Ride-on tractors

- (1) Tractors should be equipped with safety frames and safety cabs.
- (2) Protective headgear and seatbelts should be worn.
- (3) When heavy machinery is attached to a vehicle, the traveling speed should be lower than normal.
- (4) Vehicles should be driven using the rear two wheels while on-road.
- (5) Climbing of slopes should proceed in a backward direction, at low speeds, when the vehicle body is large and inclines in the longitudinal direction. This includes cases in which the machine is required to traverse a ridge or be loaded onto a truck.
- (6) If the driving wheel slips, or if the front wheel lifts, the operator should step on the clutch pedal immediately in order to mitigate the issue.
- (7) Where work is to proceed in fields containing obstacles, such as concrete manholes buried in soil or covered in grass, the positions of these obstacles should be checked in advance.

### 2. Walking tractors

- (1) The side clutch should not be used when the course of the machine is altered while climbing a slope.
- (2) The main clutch should be connected slowly, as the handle may spring up when the vehicle starts moving in a backwards direction.
- (3) Backward tilling is prohibited.

- (4) During tread adjustment and component attachment or removal, pedestal support should be used.
- (5) For work in facilities such as glass greenhouses, special caution is required with respect to ventilation. When moving tractors in a backwards direction, enough distance should be ensured so that no one may be caught between any building and the machine.

### 3. Mini-wheel loaders

- (1) Start-up inspections should be implemented, and, if any abnormality is found, the machine should be completely serviced prior to use.
- (2) For work involving 2 or more vehicles, signals and the roles of operator and signaler should be specified in advance.
- (3) Persons are prohibited from approaching bending parts of the vehicle body during its operation.
- (4) The bucket should be kept at the “traveling position,” approximately 40 cm from the ground, when the vehicle is traveling.
- (5) Brakes should be used only when necessary.
- (6) The bucket should not be brought above the truck driver’s seat or the heads of other workers.
- (7) The bucket should be operated without being raised too high when handling unstable loads.
- (8) Crane work should not be conducted.
- (9) Riding on parts other than the driver’s seat is prohibited.
- (10) Voluntary inspections should be implemented regularly by registered contractors.

### 4. Rice transplanters (ride-on/walking)

- (1) Additional loading of seedling mats from the auxiliary seedling loading table should be conducted only while the machine is stopped.
- (2) The field should be puddled to minimize unevenness.
- (3) Seedling mats should be handled in postures that are not harmful to the operator’s back.
- (4) When turning onto headland, the traveling speed should be reduced.
- (5) Riding on parts other than the driver’s seat is prohibited.
- (6) For ride-on transplanters, when the operator leaves the vehicle the engine should be stopped by bringing the planter component to the ground, setting the operation lever to neutral, and turning on the parking brake. The starter key should also be removed.
- (7) When crossing over ditches or high ridges, foot boards that are at least 4 times the length of the height difference should be used.

### 5. Combine harvesters and binders

- (1) The cutting/threshing clutch should be turned to the “OFF” position, and the harvesting lifting apparatus to the “FIXED” position during travel. In addition, the grass divider cover should be installed and the side divider and ejection auger stored. The tank should be emptied for grain

container types. The auxiliary grain receiver should also be stored.

- (2) An alarm or similar alert should be sounded to notify people in the immediate proximity of the combine harvester prior to engine startup, or when operational parts begin to move.
- (3) Replacement of binding string, removal of clogged straws, etc., should be conducted only after it has been confirmed that the engine has stopped.
- (4) High-temperature components should be cleaned frequently to prevent the accumulation of foreign matter such as straw.
- (5) Jumping off of or onto moving machines is prohibited.
- (6) Safety during ejection auger operation should be ensured for grain tank-type combine harvesters.
- (7) Caution is required to ensure that fingers or the sleeves of work clothes are not caught in the feeding chain during manual threshing. Gloves should not be used.
- (8) When crossing over ditches or high ridges, foot boards that are at least 4 times the length of the height difference should be used.
- (9) Covers and other parts removed during inspection or cleaning should always be reinstalled prior to commencing work.
- (10) Riding on parts other than the driver's seat is prohibited.

#### 6. Bush cutters

- (1) Checks should be made to ensure that there is no abnormal wearing or cracking on the cutting blade.
- (2) The weight balance should be maintained by adjusting the shoulder strap or handle position.
- (3) Users should be trained on a daily basis with respect to the shouldering type so that they can remove the cutter immediately in case of emergency.
- (4) The cutting-blade cover should always be installed, after stopping the engine, when the cutter is being moved to a new location.
- (5) The cutting blade should be kept above the ground so that the trunk does not move even when the cutting blade begins to turn during startup.
- (6) The emergency-stop device should be checked regularly.
- (7) A shatterproof cover should be attached.
- (8) Persons other than the operator should not be allowed to approach during work.
- (9) Work should be implemented after foreign objects (stones, empty cans, stakes, etc.) have been removed from the site. If the cutting blade strikes a foreign object by mistake, the engine should be stopped and any damage assessed. If damaged parts are noted, they should be replaced. If a foreign object is suspected to be lodged within the cutter, work should continue using only slow rotation speeds.
- (10) Bush cutters with metal blades may become caught when the blade comes into contact with a tree, and may be repelled upon contact with stone or concrete. Caution is therefore necessary to

avoid such contact.

- (11) When using a cutter that involves setting the cutting blade position above waist height, face protection equipment should be used.
- (12) Tree branches should not be cut using bush cutters, even if they are thin.
- (13) While working on slopes, operators should verify the stability of their footing regularly.
- (14) The engine should be stopped when fixing mechanical failures or removing entangled objects.
- (15) When approaching workers, the person approaching should signal in front of the worker and approach only after the engine has stopped.
- (16) Total time of use per day should not exceed 2 hours, and continuous operation periods should not exceed 30 minutes each. A break of 10 to 20 minutes should be taken between each period.

#### 7. Cranes

- (1) When operating a crane, 1 signaling person should always be assigned to provide operational signals.
- (2) If any abnormalities arise within the crane during use, work should be aborted in order to proceed with crane servicing.
- (3) Checks should be carried out to ensure that there are no people or obstacles in the way of cargo transport routes.
- (4) Loads exceeding the maximum specified should not be lifted.
- (5) The operator should not vacate the operating position while the load is being hung.
- (6) The crane should be moved to a safe position and the hook lifted by at least 2m when work has been completed.
- (7) Operation should be conducted properly, with operators having sufficient understanding of the crane's performance and functions.
- (8) Work should be conducted in appropriate clothing.
- (9) Work procedures should be checked prior to commencing work.
- (10) Signals should be checked with support personnel.
- (11) Voluntary inspections should be implemented regularly by registered contractors.

#### 8. Slings work

- (1) No load exceeding the maximum specified should be lifted.
- (2) Wire ropes, belt slings, etc., should only be used after twists have been eliminated.
- (3) In slinging work to lift loads, operation should be paused after the load has been lifted to about 20–30 cm from the floor in order to check safety, including the load balance and how the rope is wound.
- (4) In slinging work to bring loads down, operation should be paused after the load has been gradually lowered to about 20–30 cm from the floor in order to check the safety of the surrounding area, as well as the load. The rope should then be loosened gradually in order to set

the load on the ground.

- (5) Operation should be conducted properly, with detailed understanding of the crane's performance and functions.
- (6) Operation should be conducted in appropriate clothing.
- (7) Work procedures should be checked prior to commencing work.
- (8) Signals should be checked with the support personnel.

#### 9. Compact excavators

- (1) Joint work should only be started after the signs have been specified and checked.
- (2) The ground surrounding the work location should be checked.
- (3) When moving over flat land, the bucket should be closed and kept in the "driving position," at approximately 40–50 cm from the ground. When moving over slopes, a height of 20–30 cm should be maintained.
- (4) Operation of the lever should be checked regularly, including comparisons between operating patterns and actual machine operation.
- (5) Sufficient lighting should be provided for work conducted at night.
- (6) Entry of other people to the work site is prohibited.
- (7) Riding on parts other than the driver's seat is prohibited.
- (8) If there is abnormal noise or other signs of abnormality, the work should be aborted in order to conduct inspections, and repairs if necessary.
- (9) Objects that are buried underground should be taken into account during operation.
- (10) Persons should not be allowed to ride in the bucket.
- (11) Unreasonable excavation work should not be conducted.
- (12) Ground should not be excavated deep at the foot of the machine.
- (13) While slinging work using a hooked bucket is generally prohibited, it is allowed under Article 164 of Ordinance on Industrial Safety and Health and Notice of Labour Standards Bureau No. 542 when the specified requirements have been satisfied (note that a special slinging hook is required).
- (14) Work on soft ground should only proceed after the ground has been cured.
- (15) Voluntary inspections should be implemented regularly by registered contractors.

#### 10. Forklifts

- (1) Machine operation should be conducted in appropriate clothing.
- (2) Joint work should only be started after the signs have been specified and checked.
- (3) The ground surrounding the work location should be checked.
- (4) When traveling, the fork should be raised to about 5–10 cm from the ground and the mast pulled down all the way to the back.
- (5) No load exceeding the maximum specified should be used.

- (6) Riding on parts other than the driver's seat is prohibited.
- (7) If forward visibility is poor, a guide should be appointed and movement should be conducted by moving forward or backward, as appropriate.
- (8) Entry under the fork is prohibited.
- (9) Traveling should be conducted at safe speeds.
- (10) Forklifts without backrests should not be used.
- (11) Voluntary inspections should be implemented regularly by registered contractors.

#### 11. Chainsaws

- (1) Total time of use per day should not exceed 2 hours, and continuous operation periods should not exceed 10 minutes each.
- (2) The safety of the surrounding area should be verified prior to startup.
- (3) No persons should be allowed to approach during operation.
- (4) Work in uneven areas should only be conducted after stable footing has been ensured.
- (5) Caution is required to avoid the saw chain coming into contact with obstacles such as stones.
- (6) The saw chain should be regularly inspected for loosening, as a loose chain can lead to accidents.
- (7) Fuel replenishment should only be conducted once the engine has stopped.
- (8) Thick gloves that help isolate vibrations, etc. should be used.
- (9) The engine should be stopped during travel.
- (10) Work near the machine is prohibited.
- (11) A suitable evacuation location should be selected in advance.

#### 12. High-lift work vehicles

- (1) Work should be conducted in appropriate clothing, including protective caps and safety belts.
- (2) People exceeding the maximum weight capacity should not be allowed to ride on the work floor.
- (3) Vehicles should not be used for purposes other than those specified for the work.
- (4) Work should be aborted in poor weather conditions, including strong winds.
- (5) A safety fence should be installed to prohibit entry into the work radius.
- (6) Riding on areas of the machine other than the work floor is prohibited.

#### 13. Grinders

- (1) Trial operation should be conducted for 1 minute or longer before starting work, and 3 minutes or longer after the grinding stone has been replaced.
- (2) The gap between the work rest and grinding stone should be reduced to 3 mm or lesser.
- (3) The gap between the adjustment plate and grinding stone should be set to 3–10mm.
- (4) Switch operation should always be conducted manually.



- (5) Disc grinders with new grinding stones should be operated with the grinder pulled forward.
- (6) The maximum speed of use should be observed.
- (7) The principle “do not to roll, drop, or strike the grinding stone” should be observed.
- (8) A grinder shield or dustproof glasses should be used for grinding work.
- (9) When the grinding stone is changed on a desktop grinder or similar, the balance should be adjusted accordingly.

#### 14. Gas welding

- (1) Measures to prevent falling should be taken for bombs, etc.
- (2) The area around the parts to be welded should be kept clean, and caution taken to avoid accidental fires caused by flying sparks.
- (3) Welding devices should only be used with the proper safety equipment.
- (4) The pressure regulator installation component, conduit, blowpipe connection components, etc., should be inspected regularly for gas leaks, and should be replaced if any cracks are found.
- (5) All container valves should be closed prior to vacating the welding work location.
- (6) Eye protection and equipment such as leather gloves and aprons should be worn during welding work in order to minimize skin exposure.
- (7) Sufficient ventilation should be ensured in the work location.
- (8) Welding work should not be conducted near flammable materials, and measures should be taken to prevent flying sparks, where appropriate.

#### 15. Arc welding

- (1) The welding machine should be equipped with an automatic voltage-reducing device with an insulated holder.
- (2) Welding cables with an appropriate thickness should be used, and cables that exhibit signs of damaged coating or cracking should be replaced.
- (3) Insulation measures should be taken with respect to cable connection components.
- (4) Welding work should not be conducted in areas where the floor is wet.
- (5) The power to the welding machine should always be turned off when the operator leaves the welding area.
- (6) Eye protection and equipment such as leather gloves and aprons should be worn during welding work in order to minimize skin exposure.
- (7) Sufficient ventilation should be ensured in the work location.
- (8) Welding work should not be conducted near flammable materials, and measures should be taken to prevent flying sparks, where appropriate.

#### 16. Machine tools for metal or wood

- (1) The area surrounding any machine tool should always be kept organized.

- (2) Clothes with tight sleeves and hems, or designated work clothes, should be worn.
- (3) Operators should not wear neckties or scarfs during work.
- (4) Operators should wear shoes that fit their feet, and take measures to prevent slipping.
- (5) Work caps should be worn during operation.
- (6) Startup inspections should be conducted. The power supply switch should be turned off during inspection.
- (7) Any blades that are to be used should be kept sharp.
- (8) Work should not be conducted with safety equipment removed or turned off.
- (9) Operators should only leave the machine after ensuring that it has stopped.
- (10) If the operator experiences any abnormality during operation, the machine should be stopped immediately.
- (11) A person should be selected to be in charge of the work (see Industrial Safety and Health Act: Wood processing).

#### 17. Wagons

- (1) Transport exceeding the carrying capacity is prohibited.
- (2) Operation should not be implemented outside the Center premises.
- (3) During transport, trucks should drive on the left side at slow speed.
- (4) Traveling on paved roads should be conducted using rear two-wheel drive when the driving wheel in the model used can be switched.
- (5) Special caution is required when entering and exiting fields, and this should be done at low speeds.
- (6) No large loads should be applied on the guard frame.
- (7) Riding on places other than the driver's seat is prohibited.
- (8) Trucks should not be driven with the safety equipment removed.
- (9) Trucks should be stopped immediately if the driver notices any abnormality during operation.
- (10) During cleaning and maintenance of hydraulic parts that must be lifted, steps should be taken to prevent the components from accidentally lowering.

### III. Safety management in student practice and research activities

Instructors and technical employees should provide support and instruction so that undergraduate and graduate students who utilize the farm for their studies, for example during practice, experiments, or research activities, are familiar with the following information, and that their field activities are conducted according to the proper safety procedures.

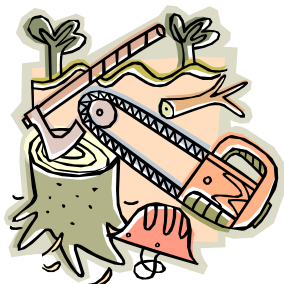
#### 1. Basic precautions for practice, experiments, etc.

- (1) During practice, students should follow the instructions provided by the instructors or technical employees in charge.
- (2) During experiments, students should follow the instructions provided by the instructors.
- (3) Instructors and technical employees should instruct undergraduate and graduate students to avoid working alone.
- (4) If an accident occurs, the instructor in charge, or the Agricultural and Forestry Research Center Office (extension: 2545), should be notified.
- (5) Students who take part in activities such as practice, experiment, research, etc. should confirm that they have purchased insurance, such as “Student Education and Research Accident Insurance.”

## 2. Precautions during the implementation of practice, experiments, research activities, etc.

- (1) Any person who utilizes the Center for survey or research activities must first register to do so.
- (2) Devices and farming tools should be used for survey or research activities only after students have participated in a device utilization explanation meeting\* held at the Agricultural and Forestry Research Center, and following the instructions provided by the instructor or technical employee in charge.
- (3) Clothes, shoes, etc., that are easy to move in should be worn during work. Handling of spades, sickles, knives, etc., must be done carefully. In addition, proper hydration measures should be taken for activities conducted during the hot season, and regular break times should be specified.
- (4) When handling livestock, instructions provided by the instructor in charge should be followed. Especially when handling large animals such as cattle, working alone should be avoided.
- (5) Any persons who use agricultural chemicals in research activities should participate in an agricultural chemical utilization explanation meeting at the Agricultural and Forestry Research Center after reporting their usage plan during registration.
- (6) Other aspects that may lead to risks should also be noted.

\* For questions about use of the Center, devices, or agricultural chemicals, contact extension 2569 or  
see URL: <http://www.nourin.tsukuba.ac.jp/>.



## ◇ Safety Management in University Forests

### I. Safety measures in outdoor work

#### 1. Application for outdoor work

- (1) When outdoor work is planned, sufficient discussions should be conducted, and should include people who are not directly related to the work. These discussions should include: (a) whether the planned location is considered appropriate for the corresponding instructors (or students under instruction); and (b) whether the work matches the annual or monthly plan of the University Forests or the corresponding instructor (and students under instruction).
- (2) A preliminary meeting should be held on the day prior to the work to reconfirm the above points. In addition to checking the destination and members, the following items should be verified:
  - (c) Degree of risks, and whether safety measures to mitigate these risks (including equipment) have been prepared;
  - (d) Whether the work is reasonable with respect to the time and labor allowed (in principle, workers should return to the vehicle by the end of the day); and
  - (e) Who will receive communications arising from the work (a designated individual should be identified).
- (3) An “Outdoor Work Schedule” that can be used to specifically check the above points should be submitted to each University Forest Office. The form should be prepared by each University Forest Office for download from the website.

#### 2. Meeting before departure

- (1) A meeting should be held for all workers and those standing by at the office either prior to departure on the day, or on the day previous to this.
- (2) The contents of the “Outdoor Work Schedule” should be reconfirmed after checking the latest weather information, and the schedule submitted to the person standing by, with amendments made where necessary. The person standing by should keep the schedule in an easily accessible place until notice has been received that the party has returned.
- (3) The planned time of return, communication method, and contact person should be carefully verified. In case the contact person cannot stand by at the office at the planned time of return due to unavoidable circumstances, another person should be appointed to receive the notice, and this should be stated clearly in the “Outdoor Work Schedule.”

#### 3. Ensuring communication measures

- (1) Since the only available mode of communication is business-use radio in Ikawa University Forest (including peripheral area), parties should only commence outdoor work when someone capable of receiving radio communication is able to stand by at the office. Any group

commencing outdoor work should always take at least 1 unit of business-use radio with sufficient charge.

- (2) Cell phones should be used in Yatsugatake University Forest (including peripheral area) and Tsukuba Experimental Forest (including peripheral area). If members working outside split up to work on more than 2 different locations, mutual communication on cell phones is acceptable.
- (3) Specified low-electricity transceivers or emergency whistles should be taken when working in multiple groups and splitting up within the mountain area. If it is possible to prepare the same number of units as members, it is also acceptable to use business-use radios.
- (4) The contact person should be notified when the work party returns to the vehicle from any of the University Forests.
- (5) In each University Forest, an emergency communication network should be specified and posted near the phone, etc.

#### 4. Measures in case of emergency

- (1) While first-aid and life-support measures should be provided in case of accident, avoiding secondary accidents should be considered the highest priority. Rescue should be requested immediately following the accident on a business-use radio or cell phone. If the location is away from the forest or other road, the precise location of the accident should be determined using a portable GPS, and the coordinates notified.
- (2) The office contact person should notify the fire department, police, supervisor of University Forest, Agricultural and Forestry Research Center Office, etc. with reference to the emergency communication network, depending on the type of accident, and prepare a map of the site immediately to be given to the relevant parties.
- (3) If the contact person is not notified of return by the planned time of return or the time of initial response noted on the "Outdoor work schedule," he/she should notify the relevant parties and start to search with reference to the emergency communication network, in a similar fashion to the procedure outlined in point (2), after seeking advice from the University Forest supervisor or Agricultural and Forestry Research Center Office.
- (4) If any person joins a search or rescue party, instructions from the police and fire departments should be followed, with highest priority given to preventing a secondary disaster, and communication personnel should always be assigned at the office.

#### 5. Safety equipment

- (1) Necessary equipment should be specified for each University Forest, and articles that the parties are required to carry should always be prepared as part of the University Forest budget, including those for students in principle (excluding phones, rainwear, and food).
- (2) Examples of equipment that are common for use in local University Forests include:

rubber-soled socks/shoes with hobnails, helmets (protective caps), leather gloves (or work gloves), rainwear (top and bottom), radios (or cell phones), flashlights (waterproof), portable GPS, maps (with topographical/forest details), compasses, spare batteries (for GPS and flashlights), first aid kits (dressing, triangular bandage, ointment, etc.), etc.

- (3) Examples of necessary equipment depend on the time, location and number of people involved, but may include: ropes (including rescue ropes), waterproof matches or lighters, rescue sheets, bear-deterrent bells, bear-repellent spray, emergency food, radios, life jackets, and poison remover.

## II. Precautions on handling of vehicles, machinery, and tools

### 1. Driving automobiles (standard size/truck)

- (1) Vehicles should not be used for purposes other than work in University Forests.
- (2) Inspections should be implemented prior to commencing work, and details recorded in the operation journal after the work.
- (3) Seatbelts should always be worn on all occupied seats, including the rear seat, while vehicle is in motion.
- (4) Since conditions in University Forests in the mountains are conducive to natural disasters (falling rocks, mudslides, shoulder collapse, fallen trees, etc.), vehicles should be driven carefully while maintaining sufficient speed to stop at any time in case of emergency.
- (5) After driving through puddles or waterways, checks should immediately be made to ensure that the brakes work properly.
- (6) Even for temporary stopping, the engine should be turned off and the side brake enabled with gears set to “low,” “reverse” or “park” when leaving the vehicle, and sprags should be used on sloped roads.
- (7) When parking, a flat place with minimum risk of falling rocks and little wind should be selected whenever possible, and the vehicle should be parked by turning off the engine, with the side brake enabled, and gears set to “low,” “reverse” or “park,” and sprags in front of and behind the wheels.
- (8) Tires should be exchanged for studless tires early in winter to prepare for frozen road surfaces and snowfall. Tire chains, etc. should be used if necessary. Safe driving should be practiced at low speeds, without erratic starts, braking, or steering.

### 2. Work using vehicle-type construction machinery (excavators, snowplows, etc.)

- (1) Operation should only be conducted by those who have achieved the necessary qualifications by completing the relevant construction machinery operation skills training course.
- (2) Inspections should be implemented prior to commencing work, and details recorded in the operation journal after the work.

- (3) When working on mountains or sloped ground, machines should not be operated under unstable conditions.
- (4) Cliffs, soft shoulders, slope bottoms, etc., should be approached with caution.
- (5) In order to prepare for sudden accidents, machines should be operated in such a way that the operator can cease operation or exit the vehicle at any time during the work.
- (6) Operation under unfavorable conditions or exceeding the capacity of the machine should be avoided.
- (7) Work should be conducted by 2 people as a pair. Signals should be agreed between the signaling person and the operator and the signaling person should signal clearly, using distinct, broad movements, at a location that is an adequate distance, yet still visible, from the vehicle work range.
- (8) Persons other than the operator should not be allowed to ride near the operator's seat or other area of the machine.
- (9) When leaving the machine, the engine should be stopped after lowering the bucket or blade to the ground and engaging the parking brake.
- (10) When park, flat ground should be selected and all switches turned to "OFF" with the parking brake enabled. The operation lever, gear-shift lever, etc., should be locked into the neutral position.
- (11) In work conducted during winter, tire chains should be used and caution exercised in order to avoid skidding on frozen road surfaces or snowfall.

### 3. Carrying work using aerial ropeways (carrying materials, equipment, etc.)

- (1) Handling of aerial ropeway devices should only be conducted by qualified operations chiefs of forestry cableway and yarder operators.
- (2) Inspections should be implemented prior to commencing work, and details recorded in the operation journal after the work.
- (3) Regular checks should be conducted on the conditions of wire ropes and anchor components, inclination and deterioration of the prop, bearing wood under wires, etc., and maintenance conducted to ensure safe operation.
- (4) Transport work should be conducted by 2 or more people, and the operating conditions for the device should be observed closely during ropeway operation, using a clear system to notify to the operator immediately in case any abnormality is observed.
- (5) Operation should be conducted at low speeds, to allow for emergency stops in case of abnormalities.
- (6) No persons should enter the wired area during ropeway operations.
- (7) Complete load hanging, as well as fastening of the load carrier grip, should be checked.

4. Work using chainsaws, bush cutters, etc. (weeding, improvement cutting, felling, etc.)
  - (1) Total time of use per day should not exceed 2 hours, and continuous operation periods should not exceed 10 minutes each for chainsaws, and 30 minutes each for bush cutters (as per the Ordinance on Industrial Safety and Health).
  - (2) The safety of the surrounding area should be verified prior to commencing work.
  - (3) No persons should be allowed to approach during work.
  - (4) When using bush cutters, shoulder bands should always be worn during operation or movement.
  - (5) Work on slopes with poor footing should only be conducted after stable footing and balance has been ensured.
  - (6) Caution is required to avoid the saw chain or blade coming into contact with obstacles such as stumps and stones.
  - (7) The saw chain should be regularly inspected for loosening, as a loose chain and a damaged blade can lead to accidents.
  - (8) The engine should always be stopped when refueling or moving to another location.

### III. Safety management in student practices, etc.

Instructors and University Forest employees should provide support and instruction so that the field activities are conducted under accepted safety practices by sufficiently informing undergraduate and graduate students about the following items related to practice, experiments, research activities, etc.:

1. Basic precautions for practice, experiments, etc.
  - (1) During practice, places of danger should be avoided or safety measures implemented (including putting up ropes to prevent falling), and workers should wear helmets, as well as shoes and clothes appropriate for outdoor study. Adequate time should be allocated to safety training provided by University Forest employees, which should sufficiently explain the risks by including case examples of accidents (this can be included in the orientation session provided in the Tsukuba region).
  - (2) Students should be accompanied by technical employees as instruction assistants in practice or experiments if necessary.
  - (3) Where studies are solely conducted by students, employees of the University Forest should accompany them wherever possible.
  - (4) In principle, vehicles owned by the university should be used to enter/exit the University Forests.
  - (5) Sufficient meetings should be held with users to discuss the activity schedule and daily activity plan during the period of use.
  - (6) Students conducting studies such as research activities should be asked to take cell phones or



portable radios with them, and should be given instructions on how to communicate using these so that they can be contacted at any time.

- (7) When students are conducting studies such as research activities, the conditions of the study subject area should be explained to them in detail so that they are able to understand them well. Employees should accompany students to study areas that may be dangerous.
- (8) When students are required to stay overnight at field offices in University Forests, they should be instructed about the correct handling of generators, water heaters, gas, etc.
- (9) Locations of first-aid kits, medicines, etc., at the field offices in University Forests should be clearly indicated.
- (10) Employees of University Forests should be instructed to immediately seek direction in case of accidents.

## 2. Precautions during the implementation of practice, experiments, research activities, etc.

- (1) When conducting research activities, graduate students should ensure that all planning, meeting, equipment preparation and notification requirements are met, in line with the guidelines provided by the instructor. An “Outdoor work schedule” must also be submitted.
- (2) Clothing, shoes, etc., that fit the body and that are easy to move in should be worn.
- (3) Depending on the situation, helmets borrowed from the University Forests should be worn.
- (4) Caution is required to avoid falling or rolling rocks while walking or working.
- (5) Caution is required when handling bladed tools such as hatchets, saws, sickles, etc.
- (6) Undergraduate and post-graduate students participating in practice, studies, etc. in University Forests should purchase “Student education and research accident” insurance.
- (7) Other matters that carry risks should also be noted.



### ◇ Safety Management in the Handling and Storage of Agricultural Chemicals, etc.

Handling and storage of agricultural chemicals should be conducted according to relevant laws and regulations, as well as the “University of Tsukuba Safety and Hygiene Manual” and “Internal Rules on Agricultural Chemical Storage Utilization.” The volume of storage should be minimized to ensure no excess stock is carried.

## I. Storage of agricultural chemicals

- (1) Agricultural chemical storage and lockers in storage should always be locked, with proper measures put in place to prevent theft and loss.
- (2) Poisonous and deleterious substances should be stored in specified (red) lockers, which can be identified via their “Non-medical poisonous and deleterious substances” label. Such substances should also be distinguished from ordinary materials.
- (3) Measures should be taken to prevent plastic and glass bottles from falling, including inserting them into plastic cases.

## II. Proper use of agricultural chemicals

Users of agricultural chemicals should observe the “Standards on the Use of Pesticides” and “Trace-standard of agricultural chemicals” (0.01ppm) (Food Sanitation Act) specified to ensure the safety of crops.

- (1) Before use, applicable crops, quantity of use, dilution concentration, timing of use, usage count, etc., should be verified by checking the label of each agricultural chemical container.
- (2) Any use should be recorded in the agricultural chemical usage register.
- (3) Extreme care and appropriate measures should be taken to prevent dispersion (drifting) when spraying.

## III. Use of pest control machines

When using speed sprayers, power sprayers, and power dusters, inspections should be conducted on screws, hose bands, etc., beforehand.

- (1) Special preventive clothing and protective equipment (goggles, mask, gloves, etc.) for chemical spraying should be worn.
- (2) When spraying agricultural chemicals, the cautionary information on the container should be checked and followed.
- (3) Users should rinse their mouths and wash hands and faces after completion of the work, and take a shower when necessary.
- (4) To prevent dispersion (drifting), spraying should be conducted on windless days or with appropriate measures in place, such as adjusting the sprayer pressure, use of a shielding sheet and dispersion (drifting) reduction nozzle, etc.

## IV. Prevention of environmental pollution from agricultural chemicals, etc.

### 1. Prevention of environmental pollution from agricultural chemicals

- (1) To prevent overflow, operators should not leave machines unattended when filling them with water.

- (2) Fans should not be operated during travel.
- (3) Spraying should be conducted so that the agricultural chemical does not drift and disperse outside of the intended area.
- (4) The chemical tank should be washed thoroughly after completion of the work, and efforts made to prevent environmental pollution from the waste liquid.
- (5) Used agricultural chemicals should be stored in the specified containers and using appropriate methods, and carried to the location specified by the environmental safety management office at the date and time of disposal.

## 2. Prevention of environmental pollution from salts

- (1) When using salts, the relevant permission should be obtained beforehand from the Education and Research Planning Group at the Agricultural and Forestry Research Center by submitting an application that details the type, quantity, concentration, treatment method, test information, and location of use for the substance in question.
- (2) Treatment of salts should be limited to pot tests and hydroponic cultures, and should not be conducted directly on fields or soil within the facility.
- (3) Plastic sheets of a sufficient size should be spread at the test location to prevent outflow of treated salts into the soil.
- (4) Unused salt solution should be disposed of in general drains by diluting to a concentration of 1% or lower, or removed from the Agricultural and Forestry Research Center.
- (5) Water used to rinse salt-treated soil or materials should be disposed of after ensuring that the concentration is 1% or lower, and should not be allowed to flow out into the soil at the Agricultural and Forestry Research Center.
- (6) Salt-treated soil and materials should not be exposed to rain.
- (7) Salt-treated soil and materials should be removed by the person responsible for testing, and should not be disposed of within the Agricultural and Forestry Research Center.
- (8) The type and quantity of substance actually used for testing; the quantity of treated soil; the volume of treated solution (in case of hydroponic culture); and the date and method of disposal of soil, materials and rinsing solution should be reported to and checked by the Education and Research Planning Group at Agricultural and Forestry Research Center when the test is completed.

## 3. Environmental pollution from heavy metals

- (1) When using heavy metals, or materials containing heavy metals, permission should be obtained in advance from the Education and Research Planning Group at the Agricultural and Forestry Research Center by submitting an application that details the type, quantity, concentration, treatment method, test information, and location of use of the substance in question.
- (2) Treatment of heavy metals, and materials containing heavy metals, should be limited to pot tests

and hydroponic cultures, and should not be directly conducted on fields or soil within the facility.

- (3) Plastic sheets of a sufficient size should be spread at the test location to prevent outflow of treated heavy metals into the soil.
- (4) Unused heavy metals, or treatment substances containing heavy metals, should be removed from the Agricultural and Forestry Research Center and disposed of properly according to the treatment method for solid wastes from experiment systems (see “University of Tsukuba Safety and Hygiene Manual: Guideline on Handling Wastes”).
- (5) Soil treated with heavy metals should be removed from the Agricultural and Forestry Research Center and disposed of properly according to the treatment method for solid wastes from experiment systems (see University of Tsukuba Safety and Hygiene Manual, “Guideline on Handling Wastes”).
- (6) Soil and materials treated with heavy metals should not be exposed to rain.
- (7) The type and quantity of substance actually used for testing; the quantity of treated soil; the volume of treated solution (in case of hydroponic culture); and the date and method of disposal of soil, materials and rinsing solution should be reported to and checked by the Education and Research Planning Group at Agricultural and Forestry Research Center when the test is completed.

#### V. Procedure for handling bottles and bags of agricultural chemicals

Used bottles and bags of agricultural chemicals should be treated according to the “University of Tsukuba Safety and Hygiene Manual.”

##### 1. Containers of agricultural chemicals (PVC/glass bottles)

- (1) Caps and bottles should be rinsed at least 4 times with water when the agricultural chemical has been used up, and the rinsing water should be used to dilute the chemical.
- (2) After checking that no agricultural chemical remains or has adhered to the inside of the bottle, it should be disposed of in isolation for waste collection by the city, with the word “cleaned” clearly displayed on the bottle label in red.

##### 2. Containers of agricultural chemicals (waterproof bags)

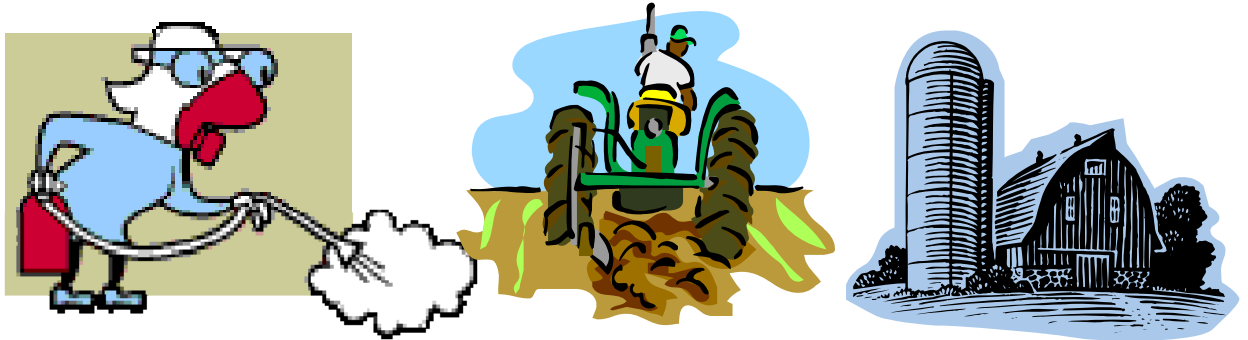
- (1) Bags should be rinsed at least twice with water when the agricultural chemical has been used up, and the rinsing water should be used to dilute the chemical.
- (2) After checking that no agricultural chemical remains or has adhere to the inside of the bag, it should be disposed of as non-flammable waste for waste collection by the city, with the word “cleaned” clearly displayed on the bag in red.

##### 3. Containers of agricultural chemicals (paper bags)

- (1) When agricultural chemicals have been used up, any final drops should also be sprayed to

ensure that no chemical residues remain in the bag.

- (2) Used bags of agricultural chemicals should be sealed and stored in a clear plastic bag.
- (3) Bags should be disposed of as solid waste (other wastes) in the experimental waste class.



## ◇ Safety Management in the Handling of Chemicals, Hazardous Materials, and Biological materials

### I. Handling and treatment of chemicals and hazardous materials

1. Handling of chemicals and hazardous materials, treatment and storage of experiment waste liquid, and treatment of tools and containers
  - (1) When handling chemicals and hazardous materials, relevant laws, as well as the University of Tsukuba Safety and Hygiene Manual's "Guideline on Handling Experimental Wastes" and "Guideline on Handling Wastes" should be followed.

University of Tsukuba Safety and Hygiene Manual: <http://anzenmon.jp/category/tsukuba/>

### II. Management and treatment of biological materials

1. Prevention of infectious animal diseases and measures in case of occurrence
  - (1) Livestock must be produced without using pathogens, as specified by the Act on Domestic Animal Infectious Diseases Control, based on Standards of Rearing Hygiene Management and Specific Domestic Animal Infectious Disease Quarantine Guidelines.
  - (2) In order to produce livestock without pathogens, livestock should be managed according to the "Guidelines for Overall Promotion of Animal Epidemic Prevention" (September 6, 2001) specified by the Ministry of Agriculture, Forestry and Fisheries and the "Guidelines on Animal Epidemic Prevention at University Farms, Centers, etc." (enforced on October 8, 2002; revised on October 14, 2003) specified by the National Council of University Farms.
  - (3) Specific management should be conducted based on the "General Hygiene Control Manual" (partially revised on December 1, 2000) with respect to:

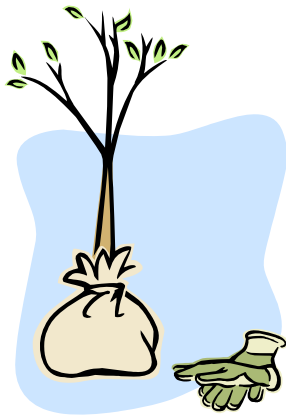
- A. Carrying livestock feeders, carrying in and storing feed, etc.;
  - B. Hygiene control, cleaning, disinfection, etc., of facilities and equipment;
  - C. Procedures for livestock health control, etc.;
  - D. Precautions on livestock transport and shipment; and
  - E. Hygiene control, training, etc. for workers.
- (4) In case a pathogen specified by the Act on Domestic Animal Infectious Diseases Control is found in livestock, measures should be taken according to the instructions provided by the livestock hygiene service center.
  - (5) If livestock death occurs due to infection by a pathogen specified by the Act on Domestic Animal Infectious Diseases Control, measures should be taken in accordance with “Treatment of Corpse and so forth in case of Animal Epidemic” (see Notification by Health Department Manager, Livestock Industry Bureau, Ministry of Agriculture, Forestry and Fisheries dated August 3, 2000).
  - (6) Control on feed: To prevent transmissible spongiform encephalopathy, feed should be classified as “Feed A,” to be handled with care, and not mixed with animal protein or similar, as it may be given to ruminants (cattle, sheep, goats, and deer) or “Feed B,” to be given to others, based on the “Ministerial Ordinance on Ingredients Standard on Feed and Feed Additives” (dated September 16, 2003, 2003 Food Safety and Consumer Affairs Bureau No.1570). Measures to separate these feed classifications completely, etc. must be taken during the various processes of manufacture, import, distribution, storage, supply, etc.
  - (7) When disposing of livestock, appropriate measures should be taken according to the “Basic Rule for Abandoned Animals and Killing Animals” (July 4, 1995, Notification of Prime Minister’s Office No. 40) and “Basic Rule for Keeping and Managing Industrial Animals” (1987 Notification of Prime Minister’s Office No. 22).
  - (8) Livestock feces should be handled according to the “Law on Promoting Proper Management and Use of Livestock Excreta” (July 28, 1999, Law No. 112).

## 2. Plant-derived waste

Plant-derived waste (rice straw, wheat straw, rice husks, crop stems and leaves, fruits, vegetables, petals, cut grass, etc.) generated during the production of various crops should be recycled as far as possible.

- (1) Plant-derived waste that can be used as compost or stable manure should be collected and carried to the location in question.
- (2) Other waste should be disposed of so as to be collected by the city, or disposed of as industrial waste, with proper separation.
- (3) In case of a disaster or unexpected situation, measures should be taken promptly using the emergency communication network at the Center.
- (4) The latest safety information on agricultural machinery can be viewed at the following websites:

- Farm Work Safety Information Center: <http://brain.naro.affrc.go.jp/anzenweb/>
- Japan Agricultural Mechanization Association: <http://www.nitinoki.or.jp/>



## ◇ Case Examples of Unexpected Incidents and how to Prevent their Reoccurrence

### 1. University Farm

#### [Case Example – 1]

While riding a ride-on bush cutter (“Masao” model) was being driven on a paved road within the Center following the completion of bush-cutting work, the driver noticed something drop from the vehicle, and stopped to check the surrounding area. He found that a bolt had fallen from the left front wheel. Since work had already been completed, he attached the bolt there and then drove it to the service building.

#### ◆ Possible cause

The operator did not notice the bolt loosening as weeds had adhered to the machine after the work.

#### \* Measures or proper actions

Weeds that adhere to the machine during work should be removed at the site of the work.

#### [Case Example – 2]

While using a hammer knife mower to cut grass on a slope that was thickly covered with weed, the operator lost his balance as the incline increased. He tried to hold on, but fell.

(He did not suffer any external injuries or sprains, as he let go of the hammer knife mower as he fell.)

#### ◆ Possible cause

Because the grass cutting was taking place on a slope that was thickly covered with weed, it was too late for the operator to prevent his fall by the time he noticed the steep slope.

#### \* Measures or proper actions

Grass cutting on slopes should only commence after checking how steep the slope is.

#### [Case Example – 3]

A worker was conducting a normal inspection on a ride-on tractor, and was about to leave the

tractor to open the garage door. He noticed the tractor beginning to move backwards as the gear shift lever was in the backward position, and stopped the tractor immediately. Since the clutch operation was slow and the engine rotation low, with sufficient space between the tractor and the machine stored behind it, no accidents occurred.

◆ Possible cause

The previous user neglected to follow instructions for parking in the safety manual, and failed to set the gear shift lever to neutral. The operator also failed to check that the gear shift lever was set to neutral before leaving the machine.

\* Measures or proper actions

This case example should be reported to employees, along with instructions to re-check the safety manual and exercise proper caution.

[Case Example – 4]

When an operator stepped on a ride-on tractor to move it to a field, he found that the connection between the right and left brakes was not engaged. He moved the tractor only after connecting them. No accident occurred, as the brakes were connected before he began driving the tractor.

◆ Possible cause

The previous user neglected to follow the instructions provided in the safety manual, including connecting the brakes when moving the tractor outside of field areas.

\* Measures or proper actions

This case example should be reported to employees, along with instructions to re-check the safety manual and exercise proper caution.

[Case Example – 5]

When using a food grinder to compact excess harvest that had been temporarily stored in a harvest container, the harvest was carried to the grinding location in the container using a wagon. When the container was lifted and moved in order to pour the excess harvest into the food grinder opening, it fell forward as it was unbalanced. No serious accidents resulted as there was another container in front.

◆ Possible cause

Because the contents of the container were not consistent, with some of the contents being heavier, the balance was disturbed

\* Measures or proper actions

When pouring material from a container into a grinder, the weight should be reduced first.

## 2. University Forests

[Case Example – 1]



An operator lowered a chainsaw before the blade rotation had completely stopped after he pressed the stop switch, thereby cutting his pants.

◆ Possible cause

The operator was glad to finish the work and press the stop switch on the chainsaw, and overlooked, or was not aware of, the fact that the blade rotates for a while even after the stop switch has been pressed (his pants served to protect his body).

\* Measures or proper actions

Operators should develop the habit of pressing the switch and then waiting until the blade stops after finishing work. By also wearing the correct equipment, safety can be increased further.

[Case Example – 2]

A driver stopped his vehicle extremely close to the shoulder in order to ensure the route was clear for other vehicles while driving the vehicle for work. In doing so, the vehicle nearly fell from the forest road.

◆ Possible cause

Although it is necessary to clear the route for other vehicles while working, the driver neglected to assign a guide in proximity to the edge of the road when parking the vehicle, etc.

\* Measures or proper actions

In areas where there is a risk of falling, guides should be assigned to ensure safety.

[Case Example – 3]

An operator stopped his pruning machine after use; although he stopped it correctly, he stored it in the machinery garage and left it while its engine was still hot. Another employee found that the bag of fertilizer was touching the pruning machine, and had melted. No serious incident resulted, as the bag of fertilizer was removed from the vicinity of the pruning machine immediately.

◆ Possible causes

- (1) The machinery garage was disorganized, and the half-used bag of fertilizer was stored in the same place as the machines. In addition, the pruning machine had been carelessly placed in contact with the fertilizer bag.
- (2) The pruning machine was stored when the engine was still hot after use.

\* Measures or proper actions

Storage locations should be kept organized. In particular, machines with engines should be stored away from flammable materials.

Machines should be stored in a safe place after use, and after they have cooled.

[Case Example – 4]

Kick-back occurred as a bush cutter hit a stump during grass cutting.

◆ Possible cause

The stump was not visible to the operator as it was covered in long grass. The part of the bush-cutter blade that is prone to kick-backs was brought into contact with the stump.

\* Measures or proper actions

Grass should be cut in two steps when it has grown high: first at a medium height from the ground to make the ground area visible, and second at ground level. If stumps can be seen before the grass is cut, relevant signs should be posted.

[Case Example – 5]

During thinning practice, the students did not retreat until just before the tree fell.

◆ Possible cause

Safety was not thoroughly ensured.

The students lacked awareness that accidents such as getting caught under a fallen tree may occur during thinning.

\* Measures or proper actions

Safety should be thoroughly ensured prior to felling. Clear instructions should be given to ensure that those around the tree retreat immediately, and that information provided by the instructor or technical employee is closely followed.

[Case Example – 6]

A student in practice cut himself with a hatchet (resulting in a mild cutting injury) when trying to remove the hatchet from its case.

◆ Possible cause

Failing to conduct sufficient checks when taking out the hatchet.

\* Measures or proper actions

The area around the hands should be checked when handling blades. Handling of blades should be conducted with caution while on site.

[Case Example – 7]

When the operating handle of a Tirfor was hooked onto a tree during thinning practice for tree processing, the operating rod hit the arm of a nearby student as the rod was released (resulting in light bruising).

◆ Possible cause

Horizontal rotation occurred in the Tirfor as the wire was twisted.

\* Measures or proper actions

People other than the operator should not be allowed to approach during Tirfor operation.

[Case Example – 8]

An instructor was stung by a hornet from a nest located near the experiment building during practice with students from another university in one of the University Forests (resulting in mild symptoms of inflammation in the affected area).

◆ Possible cause

The hornet had not been detected immediately.

\* Measures or proper actions

No one should approach areas where there may be hornets' nests. The area should be checked beforehand, and nests should be removed immediately when discovered.

[Case Example – 9]

During map-preparation practice in an outdoor geology experiment, a male student was hit by a falling rock on a forest road near the University Office. The rock hit the rim of his helmet and fell on the forest road after grazing his shoulder (the student received diagnosis from a clinic after first aid measures were applied. The injury was light, and did not require treatment later).

◆ Possible cause

The area around the University Forest originally had weak bedrock and was prone to falling rocks. The map-preparation practice was being conducted along a forest road with exposed bedrock, and practices involving rock and strata observation or map preparation are often conducted in areas that face danger of falling rocks.

\* Measures or proper actions

As it is possible for accidents like this to happen in the University Forests for reasons such as the forests' geological characteristics and steep mountain slopes, it is difficult to completely prevent all accidents. Therefore, it is important that there is a system in place to minimize the damage and take proper measures at any time where needed.

© Types of implements and evaluation of risk

[University Farm]

	Name of implement	A Frequency of use (High: 3, regular: 2, irregular: 1)	B Degree of injury in case of accident (High: 3, medium: 2, low: 1)	C Risk of health damage (High: 3, medium: 2, low: 1)	A + B + C Overall risk assessment (total score)	Need for qualifications, safety meetings, etc. (required/not required)
Vehicles owned by the university		3	3	1	7	Required
Ride-on tractors		3	3	1	7	Required
Implements to be attached on ride-on tractors	Manure spreader	2	3	1	6	Required
	Plow	2	3	1	6	Required
	Disc harrow	2	3	1	6	Required
	Lime sower (fertilizer distributer)	2	3	1	6	Required
	Rotary (harrow/leveling machine)	3	3	1	7	Required
	Broadcaster	2	3	1	6	Required
	Flail mower	3	3	1	7	Required
	Drum mower	1	3	1	5	Required
	Disc mower	1	3	1	5	Required
	Subsoiler (pan breaker)	1	3	1	5	Required
	Compressed sower	2	3	1	6	Required
	Boom sprayer (running-type pest-control machine)	2	3	3	8	Required
	Vacuum + slurry subsoiler (vacuum tank spreader)	2	3	1	6	Required
	Forage harvester (reaper)	2	3	1	6	Required
Forage wagon (roughage carrier)	2	3	1	6	Required	

Implements to be attached on ride-on tractors	Rotary harrow (puddling machine)	2	3	1	6	Required
	Grand sower (fertilizer distributor)	1	3	1	5	Required
	Digger	2	3	1	6	Required
	Trencher (deep tillage machine)	1	3	1	5	Required
	Mount cutter (cutting machine)	1	3	1	5	Required
	Packer (roller)	1	3	1	5	Required
	Chipper (crusher)	2	3	1	6	Required
	Spike-tooth harrow (pointed-break harrow)	1	3	1	5	Required
	Ridger (wing hiller)	1	3	1	5	Required
	Potato planter	2	3	1	6	Required
	Rotary mulcher (covering machine)	2	3	1	6	Required
	Rotary seeder (fertilizer sower)	2	3	1	6	Required
Tight baler (hay baler)	1	3	1	5	Required	
Ride-on machines	Backhoe	3	3	1	7	Required
	Wheel loader	3	3	1	7	Required
	Forklift	2	3	1	6	Required
	High-lift work vehicles	1	3	1	5	Required
	Ride-on rice transplanter	2	3	1	6	Not required
	Speed sprayer (self-propelling power pest control machine)	2	3	3	9	Not required
	Sweet-potato harvester	2	3	1	6	Not required
	Power tiller	1	3	1	5	Not required
	Combine harvester	2	3	2	7	Required
	Wagon	3	3	1	7	Required
Mower (lawnmower)	3	3	2	8	Not required	

Self-propelled and hand-pushed machines	Walking rice transplanter	2	2	1	5	Not required
	Power tiller	2	2	1	5	Not required
	Binder	2	2	1	5	Not required
	Remaining stem cutter	1	2	1	4	Not required
	Cultivator	2	2	1	5	Required
	Harvester (self-propelled threshing machine)	2	2	2	6	Not required
	Hammer-knife mower	3	2	1	6	Not required
	Rotary mower (lawnmower)	3	2	1	6	Not required
	Clean sprayer (power sprayer)	3	1	3	7	Not required
Machine tools for metals, wood, etc. (fixed/used during work)	Lathe	3	2	2	7	Not required
	Milling machine	3	2	1	6	Not required
	Vertical lathe/shaper	3	2	1	6	Not required
	Drilling machine	3	2	1	6	Not required
	Band saw	3	2	2	7	Not required
	Circular saw	3	2	2	7	Not required
	Automatic planing machine	3	2	2	7	Not required
	Gas welding	2	2	3	7	Required
	Arc welding	3	2	3	8	Required
Machines that are fixed during work	Grain drier	3	1	1	5	Not required
	Rice husker	2	1	2	5	Not required
	Rice milling plant	2	1	1	4	Not required
	Crane work	2	2	1	5	Required
	Slings work	2	1	1	4	Required
Hand-held work machines	Free grinding stone	3	3	3	9	Required
	Bush cutter	3	3	3	9	Required
	Felling (chainsaw)	2	3	3	8	Required

◎ Types of implements and evaluation of risk

[University Forests]

① Yatsugatake/Kawakami University Forest

	Name of implement	A Frequency of use (High: 3, regular: 2, irregular: 1)	B Degree of injury in case of accident (High: 3, medium: 2, low: 1)	C Risk of health damage (High: 3, medium: 2, low: 1)	A + B + C Overall risk assessment (total score)	Need for qualifications, safety meetings, etc. (required/not required)
Vehicles owned by the university	Passenger vehicle	3	3	1	7	Required
	Truck	3	3	1	7	Required
Ride-on machines	Hammer-knife mower	2	2	1	5	Not required
	Backhoe	2	3	1	6	Required
	Tractor shovel	2	3	1	6	Required
	Tractor shovel (with winch)	3	3	1	7	Required
Hand-held machines	Bush cutter	3	2	3	8	Required
	Chainsaw	2	3	3	8	Required
Machine tools for metals, wood, etc.	Arc welding	1	2	1	4	Required
	Band saw	1	3	1	5	Not required
	Circular saw	1	2	1	4	Not required
	Automatic planing machine	1	2	1	4	Not required
	Lathe	2	2	1	5	Not required

② Ikawa University Forest

	Name of implement	A Frequency of use (High: 3, regular: 2, irregular: 1)	B Degree of injury in case of accident (High: 3, medium: 2, low: 1)	C Risk of health damage (High: 3, medium: 2, low: 1)	A + B + C Overall risk assessment (total score)	Need for qualifications, safety meetings, etc. (required/not required)
Vehicles owned by the university		3	3	1	7	Required
Ride-on machines	Wheel loader	1	3	1	5	Required
Hand-held work machines	Chainsaw	2	3	3	8	Required
	Bush cutter	2	3	3	7	Required
	Pruning machine	1	3	3	7	Required
Fixed machines	Aerial ropeway	0	3	1	4	Required
	Yarder	0	3	1	4	Required
Machine tools for metals, wood, etc.	Gas welding	1	2	1	4	Required
	Arc welding	1	2	1	4	Required

③ Tsukuba Experimental Forest

	Name of implement	A Frequency of use (High: 3, regular: 2, irregular: 1)	B Degree of injury in case of accident (High: 3, medium: 2, low: 1)	C Risk of health damage (High: 3, medium: 2, low: 1)	A + B + C Overall risk assessment (total score)	Need for qualifications, safety meetings, etc. (required/not required)
Vehicles owned by the university		3	3	1	7	Required



Ride-on tractors		3	3	1	7	Required
Implements to be attached on ride-on tractors	Rotary	3	3	1	7	Required
	Chipper	3	3	1	7	Required
Ride-on machines	Wheel loader	3	3	1	7	Required
	Wagon	3	3	1	7	Required
	Ride-on mower	3	3	1	7	Not required
Hand-held work machines	Free grinding stone	3	2	2	7	Required
	Bush cutter	3	2	3	8	Required
	Chainsaw	3	2	3	8	Required
	Hedge trimmer	2	2	3	7	Not required
Self-propelled and hand-pushed machines	Cultivator	3	2	1	6	Not required
	Hammer-knife mower	3	2	2	7	Not required
	Rotary mower	3	2	1	6	Not required
	Clean sprayer	3	1	1	5	Not required
Machine tools for metals, wood, etc.	Band saw	1	1	1	3	Not required
	Automatic planing machine	1	1	1	3	Not required
	Slide-type circular saw	3	1	1	5	Not required
	Arc welding	3	2	2	7	Required

© Qualifications of technical staff and the state of skills training, special training, and safety training according to the Industrial Safety and Health Act

[University Farm]

Name of license, safety training, etc.	Supported types (names of machines, etc.)	Remarks
Large-sized motor vehicle license		
Ordinary motor vehicle license	trucks, dump trucks, car	Including small-sized special motor vehicles (tractors, wagons, etc.)
Large-sized special motor vehicle license		
Large-sized special motor vehicle license (limited to farming vehicles)	Large-sized tractors for farming	Vehicles with displacement 1500cc or larger and output exceeding 30 horsepower (for farming vehicles)
Towing license (limited to farming vehicles)		
Hazardous materials engineer (Class B, Type 4)	Storage facilities for heavy oil, light oil, kerosene, and gasoline	
Completion certificate for skills training course for gas welding		
Completion certificate for skills training course for arc welding		
Completion certificate for skills training course for forklift operation	Forklifts	Maximum load 1 ton or larger
Completion certificate for skills training course for vehicle-type construction machine	Compact excavators	Base machinery of 3-ton mass or larger
Completion certificate for skills training course for slinging operation		Slinging load or load limitation of 1 ton or larger
Completion certificate for skills training course for operation chief of woodworking machine		For fixed use of 5 or more units including circular saw, wood planing machine, etc.
Completion certificate for special training for crane operation		Slinging weight less than 5 tons

Completion certificate for special training for small-sized vehicle-type construction machine operation	Compact excavators/wheel loaders	Base machinery mass less than 3 tons
Completion certificate for special training for high-lift work vehicle operation		Height less than 10 meters
Completion certificate for special training for felling	Chainsaws	
Completion certificate for special training for work, including free grinding stone	Desktop grinders/portable grinders	
Completion certificate for safety training for bush-cutter handlers	Bush cutters	
Person handling poisons or deleterious substances		Sales of poisonous and deleterious substances
Special training on handling of small-sized boilers		
Food sanitation supervisor training		Food processing
Auto mechanic		Gasoline engine
Demolishing (breaker)		

© Qualification of technical staff and the state of skill lessons, special training, and safety training according to the Industrial Safety and Health Act

[University Forests (Tsukuba Experimental Forest, Yatsugatake/Kawakami University Forest, Ikawa University Forest)]

Name of license, safety training, etc.	Supported types (names of machines, etc.)	Remarks
Ordinary motor vehicle license	Trucks, dump trucks, corporate vehicles	Including small-sized special motor vehicles (tractors, wagons, etc.)
Large-sized motor vehicle license	Large-sized tractors	
Completion certificate for special training related to felling work, etc.	Chainsaws	

Completion certificate for safety and hygiene training for bush-cutter handlers	Bush cutters	
Completion certificate for special training for skyline logging cable crane operation		
Completion certificate for special training course for slinging operation		
Completion certificate for skills training course for slinging operation		
License for operations chief of forestry cableway		
Completion certificate for skills training course for operations chief of cargo piling		
Completion certificate for safety training for logging workers using forest working vehicle		
Completion certificate for skills training course for transporting vehicles on rough terrain (1 ton or larger)		
Completion certificate for special training for walking crane operation		
Completion certificate for skills training course for small-sized walking crane operation (1 ton or larger, and smaller than 5 ton)		
Completion certificate for skills training course for forklift operation (1 ton or larger)	Forklifts	
Completion certificate for special training for vehicle-type construction machine operation (3 tons or larger)		Base machinery mass 3 tons or larger

Completion certificate for special training for small-sized vehicle-type construction machine operation (less than 3 tons)	Compact power shovels	Base machinery mass less than 3 tons
Completion certificate for skills training course for operations chief of excavating natural ground		
Completion certificate for special training for work, including free grinding stone	Portable grinders	
Completion certificate for skills training course for arc welding		

## Acknowledgements

It has been 4 years since the issuance of Version 3 of this manual. During this time we experienced an unprecedented earthquake disaster, and certification of the conventional environmental management system (ISO 14001) was aborted in order to construct a management system proprietary to the Center. This system was to utilize the results of an internal audit in the environmental management system (ISO 14001) we had managed since the certification in 2003, as well as our experience in conforming to environment-related laws and regulations through an external audit.

Based on these experiences, we have revised the Agricultural and Forestry Research Center's "Safety Management Guidelines and Safety Management Manual." In the future, we would like to revise it more regularly, in order to make it a better safety-management manual. We would like to express our gratitude to those who provided advice and cooperation during this revision, which has enabled us to issue this version.

○ Agricultural and Forestry Research Center Safety Management Committee members (as of September 2012)

Chairperson	Center Director, Tomohiro Takigawa
Member	Assistant Director, Professor, Atsushi Tajima
Member	Associate Professor, Naoya Fukuda
Member	Associate Professor, Tatsuyuki Seino
Member	Technician, Kazunori Yonekawa
Member	Technician, Yasuhiro Matsumoto
Member	Technical Expert, Hiroshi Hiki
Member	Technical Expert, Miho Sato
Member	Chief Expert Employee, Toshiyasu Kawasaki
Member	Expert Employee, Yoshinori Yaguchi