



Royal Rangers

Merit Requirements: Silver-Bordered Merit

FARM MECHANICS MERIT

1. Visit ONE of the following farm options listed below and interview the owner, manager, foreman, or designated representative. Write a report about your visit and include the information about equipment and equipment maintenance.
Farm options:
 - Rice farm
 - Farm that produces nuts (peanuts, walnuts, almonds, etc.)
 - Farm that produces vegetables (tomatoes, lettuce, cabbage, etc.)
 - Farm that produces a field crop (corn, wheat, oats, soybeans, etc.)
 - Farm/orchard that produces fruit or berries (apples, oranges, strawberries, etc.)
 - Other type of farm (must have prior approval from your commander)
 - a. List all farm equipment for operations, from tilling the ground to spraying the crops to harvesting the crop. List the total number of pieces of equipment.
 - b. List the winter and summer maintenance schedule for each piece of equipment.
 - c. Describe the farm's maintenance program. Is there a maintenance crew? If there is a foreman, list his duties. Ask if there is a maintenance shop for maintaining equipment. List the percentage of the farm's budget spent on maintenance.
2. Do a safety inspection at the farm that you visit in Requirement 1, writing your own notations. You must have permission from the person you interviewed before completing this requirement. List the power equipment and tools used on the farm and in the maintenance shop. Note any concerns or possible safety problems. Indicate what might be done to make the site safer.
Use the following as a guide:
 - a. Are hand tools, such as hammers, sockets, and socket wrenches, shovels, and rakes, put in their proper places or are they scattered about and disorganized? Why do you think it would be safer to have tools stored properly?
 - b. Does the equipment used for repair seem to be properly maintained? Is the lift equipment, such as hoists, wenchers, and chain lifts, in good shape, clean, and in good working order?
 - c. Are the floors clean of debris and fluids, or does the area seem cluttered and hazardous for walking?
 - d. What precautions do those working on the equipment take? Is safety apparel and equipment used when operating a grinder, wire-brush wheel, drill, or welder? Explain. List the safety apparel that should be worn for the machines listed.
 - e. Would you want to work at this site? Why or why not?
3. Do any TWO of the following. Ask the farm owner, foreman, or representative to check your work. List the tasks you performed and critique your work.
 - a. Replace the handle on a broken shovel, axe, hoe, or other hand tool.
 - b. Sharpen an axe.
 - c. Make a toolbox (wood or sheet metal) that can be used as a tote to carry tools.
 - d. Make a tool rack to organize and store tools. Use siding or plywood with hardwood dowels for hangers or Peg-Board. Outline the tool to make replacing the tool easier.
 - e. Organize a rollaway toolbox. Clean all tools and place them neatly and orderly in drawers with like tools, e.g., all pliers in one drawer, wrenches in another, screwdrivers in another.
 - f. Make a rack or shelving that has bins for bolts, washers, nuts, or other fasteners. Sort at least one thousand pieces in these bins. Bolts and nuts should be organized so that all pieces in a bin are the same size of bolt and thread classification.
 - g. Repair ONE of each of these tools:
 1. Chisel: Sharpen the tool and grind off the mushroom head off the handle end.
 2. Hacksaw: Replace the broken blade with a new blade.

3. Screwdriver: Correctly grind the screwdriver tip (be careful not to overheat and change the temper).
4. Hammer: Check for a loose handle and tighten it properly with wedges, or replace the hammer handle if needed. Grind or file the face of the hammer if damaged.
4. Do any FOUR of the following maintenance operations on a piece of equipment for a summer season. Write a report describing the operations you completed. List the parts changed, the manufacturer of the parts, and the part numbers. Ask the farm owner, foreman, or representative to observe the maintenance that is done and critique your work. Include the comments made by the farm personnel in your report.
 - a. Change the air cleaners.
 - b. Change the spark plugs in a gasoline engine.
 - c. Change the fuel filter(s) on a gas or diesel engine.
 - d. Complete lubrication requirements: Change the oil and oil filter; grease fittings; check all lubricating fluids, including power steering, automatic transmission, gearboxes (such as a manual transmission), differentials, steering boxes (if manual), and other hydraulic systems. Be sure you know what lubricant to add before doing the maintenance. Serious harm to equipment could occur if wrong fluids are added.
 - e. Clean and flush the cooling system. Refill with the proper amount and mixture of water and antifreeze. Clean the radiator fins, being careful because they bend and damage easily. Explain why it is important to use antifreeze in summer and winter operations.
 - f. Check the brake system. Pull the wheels and check the brake shoe/pad wear, drum/disc wear, brake hardware condition, etc. Check the brake fluid master cylinder level and add fluid if needed. Be sure the brake pedal is never pushed while the drum is off. The equipment or vehicle must be properly and safely supported with a heavy-duty stand or support. Do not rely on a jack or lifting device to keep the equipment in the air.
 - g. Check all suspension and steering parts and be sure that all bolts are tight. Inspect the suspension springs to verify that they are not broken or loose. Be sure the steering linkage is not bent or damaged. Check for tie-rod or idler arm looseness and kingpin or ball joint wear. Check for leaks in hydraulic systems. Inspect the tires for wear, bent rims, etc.
 - h. Clean the equipment inside and out. Use pressure hoses after you are given instruction where and where not to spray. Clean the interior compartment, vacuuming and giving it a thorough cleaning.
5. Do ONE of the following:
 - a. Visit a dealer that maintains and sells farm equipment. Talk to the manager or service technician and get advice on how to provide good preventative off-season maintenance. Write a report explaining why off-season maintenance is important. List the costs to do the maintenance and contrast the costs (monetarily and physically) if it is not done regularly.
 - b. Prepare any farm machine for off-season storage. List the things you did and why.
6. Explain how power is produced or transferred in each of the following:
 - a. Diesel engine
 - b. Gasoline engine
 - c. Hydraulic ram (used to produce work)
 - d. Transmission or any other gearbox (or hydraulic box)