

ERA Technical Committee - TRAINING - Needs for a level 2 trained engineer

1 Perform preventive maintenance	1.1	Interpret maintenance intervals and the conditions of use of the device		
	1.2	Reset maintenance messages after maintenance		
	1.3	Consult error log (not to repair)		
	1.4	Knowledge of analyzer (do's and don'ts for a level 2)	1.4.1	Read error codes
			1.4.2	Basic calibration joystick
	1.5	Maintenance of the machine	1.5.1	Replace filters (air, oil, fuel, hydraulics, ...)
			1.5.2	Checking of carbon brushes (as part of the maintenance)
			1.5.3	Lubrication of the machine
			1.5.4	Cleaning sliding surfaces
			1.5.5	Adjusting clearance of various components
	1.6	Adjust the mast / boom	1.6.1	Chain / cables tension (only basic adjustment)
			1.6.2	Adjust wear pads
			1.6.3	Lubricate the mast
			1.6.4	Replace wear blocks
	1.7	Brakes	1.7.1	Replace brake parts (brake drum, brake discs, brake pads, ...)
		1.7.2	Adjusting the brake system	
		1.7.3	Parking brake adjustment	
1.8	Repair hydraulic leaks	1.8.1	Be aware and educated about the dangers of hydraulic oil and high pressure	
		1.8.2	Depressurise the system to safely replace components	
		1.8.3	Remove / install hydraulic cylinders	
		1.8.4	Replace seals of non-complex components	
		1.8.5	Replace hydraulic lines	
		1.8.6	Replace valves (except complex valves and main valves)	
1.9	Replace electrical components	1.9.1	Switches	
		1.9.2	Lamps	
			Joystick, accelerator pedal and calibration of this part if no special adjustments are required	
		1.9.3	Starter battery	
		1.9.4	Traction battery	
			Check if the battery and battery charger match (charging current, voltage, battery type, battery capacity, ...)	
1.10	Battery charger and traction battery	1.10.1	Check if the parameters of the charger are set correctly	
		1.10.2	Adjust battery chargers for customer use (mains supply, plug, ...)	
1.11	Replace wheels			
1.12	Adjust the undercarriage and tension on tracks	1.12.1	Check the tension of the tracks and adjust if necessary	
		1.12.2	Full repair of the undercarriage should only be done by specialists	
1.13	Check machine operating speeds: recognize and 'feel' errors (safe use of the machine), but not changing or repairing them	1.13.1	Lifting time	
		1.13.2	Fall time	
		1.13.3	Swing	
		1.13.4	Driving	
		1.13.5	Jib	
		1.13.6	Rotating basket	
		1.13.7	...	
1.14	Knowledge of recent combustion engines and aftertreatment systems	1.14.1	Recognize the dangers of the high pressure injection system	
		1.14.2	Cleanliness/visual evaluation of aftertreatment system and fuel system	
		1.14.3	Perform parked regeneration (without software/special tools)	
2 Perform simple repairs	2.1	Identify simple machine problems, also evaluate basic issues from distance		
3 Understand the technical documentations from the OEMs		Electric diagram, hydraulic diagram, manuals, ...		
4 Understand the basics of an electrical and hydraulic diagram		Understanding the basics of the machine		
5 Prepare the annual / periodic inspection		Different for each country		