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WELDING AGRICULTURAL EQUIPMENT IN FIELD CONDITIONS

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Abstract. The welding of agricultural machinery in field conditions is a vital element in ensuring the continuity of agricultural production. During operation, machines and units are subjected to significant loads, leading to wear and tear and breakage. Conducting welding work directly in the field allows for the prompt elimination of malfunctions, reduces machinery simplicity, and increases the efficiency of agricultural work. The work examines the specifics of organizing welding in field conditions, the equipment used, power sources, as well as requirements for the quality and safety of work execution.

Keywords welding in field conditions, agricultural machinery, equipment repair, mobile welding units, arc welding, autonomous power sources,

Аннотация. Сварка сельскохозяйственной техники в полевых условиях является важным элементом обеспечения непрерывности аграрного производства. В процессе эксплуатации машины и агрегаты подвергаются значительным нагрузкам, что приводит к износу и поломкам. Проведение сварочных работ непосредственно в поле позволяет оперативно устранять неисправности, снижая простои техники и повышая эффективность сельскохозяйственных работ.

Ключевые слова сварка в полевых условиях, сельскохозяйственная техника, ремонт оборудования, мобильные сварочные установки, электродуговая сварка, автономные источники питания,

Annotatsiya. Qishloq xo‘jaligi texnikasini dala sharoitida payvandlash qishloq xo‘jaligi ishlab chiqarishining uzluksizligini ta’minlashning muhim elementi hisoblanadi. Ishlatish jarayonida mashina va agregatlarga katta yuklamalar ta’sir etadi, bu esa yeyilish va buzilishlarga olib keladi. Payvandlash ishlarini bevosita dalada olib borish nosozliklarni tezkorlik bilan bartaraf etish, texnikaning bekor turib qolishini kamaytirish va qishloq xo‘jaligi ishlari samaradorligini oshirish imkonini beradi.

Kalit so‘zlar: dala sharoitida payvandlash, qishloq xo‘jaligi texnikasi, uskunalarni ta’mirlash, ko‘chma payvandlash qurilmalari, elektr yoy yordamida payvandlash, avtonom quvvat manbalari,

Welding agricultural machinery in field conditions is a critically important process for the operational repair of tractors, combines, seeders, and soil-cultivating tools (ploughs, harrows, cultivators) directly at the breakdown site. In the absence of an electrical grid, repairs are carried out by mobile teams (PARM) using autonomous equipment.

Features of work execution

1. Driving crews: Repairs are carried out by specially equipped vehicles (flyers) equipped with welding machines, gas cutters, tools, and necessary materials.

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2. Welding of structures: When repairing large-sized frames and containers, load-bearing mechanisms (manipulators) are sometimes required.

Safety requirements

- Electrical safety: It is prohibited to operate welding units in the rain without covering.
- Fire safety: Welding should be performed away from flammable materials, GSM, and dry wood, especially considering the high risk of ignition from sparks.
- Preparation of the site: It is prohibited to perform welding on fuel tanks or containers made of fuel without preliminary degassing.
- Using high-quality boring for autonomous welding allows for minimizing machinery costs during sowing or harvesting operations.

Features of field welding

It is not always possible for a welder to work at their primary workstation, which is equipped with all the necessary devices and tools. Sooner or later, it becomes necessary to perform welding work in field conditions, i.e., in the absence of a high-quality power source, or without the possibility of connecting to a stationary power source at all. This material is dedicated to the specifics of welding in field conditions.

Field welding equipment

A significant support and, in fact, the main condition for high-quality welding in field conditions is the correct selection of equipment. For arc welding outside the welder's stationary workstation, there are four main types of equipment:

- a welding machine supplemented with a diesel or gasoline generator;
- multifunctional welding apparatus combined with a current generator;
- welding inverter (for welding at unstable and low-quality electricity sources);
- welding generator, including gas welding generator, to which the welding apparatus is connected.

When choosing one type or another of equipment, one should be guided by the necessary welding parameters and the availability of electricity sources. Welding inverters, at a price affordable for most welders, perform a wide range of welding operations and ensure good welding quality. Therefore, in most cases, if there is a domestic power source, they are used.

Additional instrument and consumables for field welding

When a welder works outside of a stationary workstation, it is necessary to equip a temporary workstation and ensure sufficient quality of consumables:

1. to eliminate the possible impact of environmental conditions on welding quality, a tent for the welder is used;
2. fireproof fabric is used to prevent the ignition of surrounding materials;
3. to maintain high electrode quality, thermal panels for electrodes with a temperature maintenance function are used;
4. To prevent equipment breakdown, current stabilizers and power correctors are used.

The use of specialized tools and equipment allows for high-quality welding, cutting, and surfacing of metals in field conditions and under any climatic conditions. Welding agricultural machinery in field conditions is a critically important process for the prompt repair of tractors, combines, seeders, and soil-cultivating tools (ploughs, harrows, cultivators) directly at the breaking point. In the absence of an electrical grid, repairs are carried out by mobile teams (PARM) using autonomous equipment.

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Basic methods and equipment for field welding.

1. Autonomous welding units: This is the most effective solution, where an internal combustion engine (gasoline or diesel) turns the generator, converting mechanical energy into electrical energy.
2. Welding generators: Allows for manual arc welding (MMA), which is most in demand due to the lack of concern for metal purity and the ability to operate in windy weather.
3. Semi-automatic welding (MIG/MAG): Used in the presence of powerful generators for rapid repair of frames and housings.

Features of work execution

1. Driving crews: Repairs are carried out by specially equipped vehicles (flyers) equipped with welding machines, gas cutters, tools, and necessary materials.
2. Welding of structures: When repairing large-sized frames and containers, load-bearing mechanisms (manipulators) are sometimes required.
3. Preparation: In field conditions, it is important to thoroughly clean the welding site of rust and dirt to achieve a strong connection.

Safety requirements

- ❖ Electrical safety: It is prohibited to operate welding units in the rain without covering.
- ❖ Fire safety: Welding should be performed away from flammable materials, GSM, and dry wood, especially considering the high risk of ignition from sparks.
- ❖ Preparation of the site: It is prohibited to perform welding on fuel tanks or containers made of fuel without preliminary degassing.
- ❖ Using high-quality equipment for autonomous welding allows for minimizing equipment costs during sowing or harvesting operations.

Conclusion. The welding of agricultural machinery in field conditions is an effective method for the rapid restoration of machinery's performance. The use of mobile equipment and appropriate technologies significantly reduces downtime and increases the productivity of agricultural work. At the same time, compliance with safety requirements, the correct selection of welding methods, and ensuring the quality of completed joints remain important. Overall, organizing welding operations in the field contributes to increasing the reliability and efficiency of equipment operation.

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