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Analysis of Modern Grinding Machines Using Flooring Technology

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Abstract--- *In this article describes mosaic floor of covering by motion of practical using, also machines by technic economic indicators. Developing technical specifications and develop a new self-propelled grinding machine, taking into account the need for faster mass production of self-propelled grinding machines with their strictly known technological and design parameters.*

Keywords--- *Buildings, Construction Organizations, Flooring Technology, Equipped, Mosaic-grinding Machines, Traverse, Structures.*

I. INTRODUCTION

Various types of mosaic-grinding machines and units are widely used for mechanized grinding of mosaic floors of buildings and structures. The choice of a particular machine depends on the surface area and the load on the machines, which is especially important for finishing mosaic floors.

Low-floor flooring: a narrow corridor along walls and columns, as well as IE-8201 and IE-6103 mechanical grinders are widely used for mechanized grinding of hard-to-reach spots.

These machines have a three-phase asynchronous voltage of 0.85 kW. The windshield is equipped with a clamping casing, which is designed to connect a flexible shaft conductor to the electrode and to protect the working body from the electrode.

A flexible transfer shaft is used to transmit circulating movements from the spark plug to the grinding head spindle. Grinding heads (straight and angled) are interchangeable and made of vibration protection. The main design feature of the IE-8201 grinding machine is that its angular grinding head is equipped with a barrel-shaped nozzle and serves to direct water to the grinding site. The weight of the grinding heads in these machines is about 4.2-4.3 kg.

II. METHODS OF RESEARCH

The most common mosaic grinders for mechanized grinding of mosaic floors include SO-17, SO-36, and SO-91, SO-17 and SO-36 mosaic grinders consist of the following main components: gearboxes, electric cutters, steering gears, undercarriage and protective cover.

Mosquito grinders are equipped with three-tier boards. are required for fastening abrasive elements (stones).

Two traverses rotate in the opposite direction to each other. This position frees the machine from reactive torque and makes it a little easier to move around the work surface. Each traverse is connected to the plate with a shock

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absorber made of rubber tape to ensure smooth absorption and smooth operation of the abrasive elements of the machine. Working traverses are driven by an electric motor with a flange.

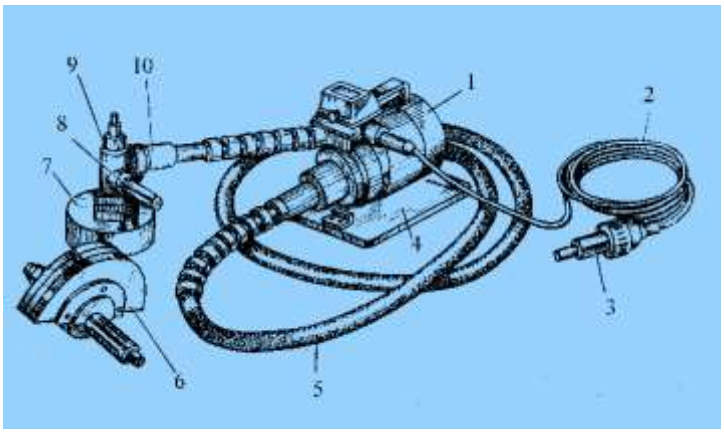

Figure 1: IE-8201 Electric Grinder

1-electric motor; 2-voltage power cable; 3-pin connection; 4 stand; 5-bending shaft; 6 direct grinding head;7-case; 8- main work handle; 9-barrel valve; 10-extra pen

Figure 2: Mosaic-grinding machine SO-353

Figure 3: Mosaic-grinding machine SO-91

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The electric motor is mounted on the gearbox cover so that it is connected to one of two gears mounted on the gearbox shaft in the gearbox. The gears of each transverse gear are located together.

Such a constructive bite of the gear transmission allows the traverses to turn in different directions and, in turn, creates the correct movement of the lane of the machine.

The presence of a P-shaped handle with two rubber tires on the SO-17 grinder greatly facilitates control than the SO-36. By its characteristics, SO-17 is superior to the machine SO-36. For example, an SO-17 machine weighs 214 kg, its working capacity is 7.5 square meters, SO-36 weighs 105 kg, and its productivity is 4-6 m^2/hour. It should be noted that the machines SO-17 and SO-36 were discontinued from mass production and are still used by most construction companies.

The mosaic-grinding machine CO-91 was made at the Odessa construction and finishing machine and is widely used in Uzbekistan.

Unlike grinding machines SO-17 and SO-36, SO-91 has a short base (the distance between the abrasive heads and wheels), which can easily be overtaken if it is necessary to replace the abrasive elements. The car is designed to connect to the wheels. This makes it easy to replace rubber tires that may break during use.

A barrier is provided to prevent the vehicle from moving. Compared to other machines, SO-91 has more durability than individual parts and assemblies.

However, the experience of using grinding machines SO-91 in various construction organizations has a number of drawbacks: in addition to being able to easily overtake abrasive elements, its small base transfers its weight to the wheels, thereby reducing the relative pressure of the abrasive on the treated surface; The machine requires frequent adjustment, even if the abrasive elements are slightly deteriorated; The technical capacity of the machine SO-91 does not reach the passport mark and is 4-8 m^2 per hour; there is no device for supplying water to the grinding site, and the electrical protection of the drive from machine parts is less reliable.

Taking into account the above-mentioned shortcomings, Odessa Construction and Finishing Engineering Company developed a serial model of high-performance mosaics. Its working head is attached to the chassis, electric self-propelled handle, gear, shock absorbers, grills, waterproofing equipment and a protective cover. Due to the proximity to the center of the gearbox and the excitation of the working head and working head, a uniform distribution of the load between all abrasive elements is ensured and a spontaneous reduction of the size of the absorber occurs.

In the recently adopted mosaic-grinding machine, the mass tension of all parts of the working head is transmitted to the abrasive element together with the electricizer and provides a relative pressure of 0.45 J/m^2. Such pressure, along with high grinding speeds, provides the most rational conditions for mosaic floors.

The new coffee grinder is equipped with an improved structural protective cover. It can move vertically and be fixed in the raised position. The holster is made of steel tape for fastening to the seamstress and is attached to the elastic with bolts. The technical characteristics of the new mosaic grinder and other serial grinders are shown in Table-1. As shown in Table 1, the grinders are less suitable for mechanized decoration of large mosaic floors in

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industrial and public buildings. The experience of a number of construction companies and our analysis show that self-grinding machines and high-performance units are best suited for grinding large-sized mosaic floors in the short term.

In recent years, many construction companies have developed designs for self-assembly of mosaic-grinding machines with a capacity of 50 m^2 or more. The transmission of these machines is mainly carried out on electric tractors.

For this purpose, electric cars and cars, and in some cases light wheeled tractors, were used. Below are the designs of self-propelled mosaic grinders. They are currently used and are of most interest.

Table 1: Technical characteristics of mosaic grinding machines

Parameters	**unit of measurement**	**Machine Type**					
		IE-8201	**IE-6103**	**SO-36**	**SO-17**	**SO-91**	**New example**
1Performance (passport)	m^2/hour	1 – 1,5	1,5 – 2	4 – 6	7,5	12	15 – 20
2. Corridor width of grinding	mm	125	125	530	570	570	570
3. Number of Traverses	pieces	1	1	2	2	2	2
4. Number of abrasives	pieces	1	1	6	6	6	6
5. Electric motor power	-kWt	asynchronous three-phase 0,8		AOL2-21-2 1,5	AO-42-4-2 2,8	AOA2-32-4 3	AOA2-32-2 3-4
6. Rotation Number (Frequency)	Min^{-1}	2800 3900		250	250	280	600-650
7. Dimensions: length of Width height	mm	262 318 210 235 255 195		920 590 945	880 610 850	950 650 1000	900 650 900
8. weight	kg	2,5 4,3		105	214	150	140

Self-propelled mosaic-grinding machine 12M84 produced by construction trust No. 12 in Belarus.

It consists of a walking part, a working body and a lifting mechanism. The bridge consists of a two-wheeled stroller with a separate transmitter wheel, with an electrical equipment control panel. There are two traverses with three stones with abrasives in the body.

Traverses are connected to red redshafts with snow loops. Thus, smooth pressing of abrasive stones on a polished surface will be ensured. A tube is attached to the bottom of the gearbox, with which the rod is attached to the frame of the walkway. The hinge tip comes out of the front of the car, and the lifting mechanism of the working body is equipped with a screwdriver for the screw. This makes it easy to replace abrasive elements. The lift screw is removed while the machine is running.

A feature of the 12M84 is that it can be controlled remotely using a push button switch. This greatly improved the operation of the machine, eliminated the effects of vibration on the operator and protected him from electric shock. The machine weighs 250-300 kg and has a capacity of about 20 m^2 per hour.

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Small-sized self-propelled grinding machine was created by the design bureau in Rostov. It is used on relatively congested surfaces of machined surfaces, such as the 12M84. The car has four-wheel drive and moves from the electric motor to the wheels.

As a working body, three SO-91 grinding machines are mounted on a hinge on the wheel frame and are raised and lowered using a special mounting mechanism for easy use. There is a remote control on the pole. In terms of performance, this car is superior to 12M84, but because of its large weight (1050 kg), it has limited power for transmission.

The Lithuanian construction trust has also developed a mosaic-grinding unit with high productivity (35 m^2 / h) and lower weight (about 800 kg). The unit consists of a working body, a movable part and a lifting mechanism for working bodies, which form a plate of a disc with a rubber band. Nozzles are attached to the board using special abrasive blades (DS 2464-97) using bolts.

The work of working bodies from an electrician is carried out through a cement loader S-362. Walking consists of two-wheeled frames, where each wheel has its own special transmitter from the electric drive to the gear transmission.

The wheels have their own transmitter, which increases the maneuverability of the unit and allows it to rotate with a minimum radius of 1700 mm. The lifting mechanism of the working body is mounted on the track frame and consists of a system of handles and a gear transmission. The unit is controlled by an operator who has space in the aisle.

The mosaic grinding machine created by Construction Trust No. 38 in St. Petersburg has a productivity of 80-86 m^2/hour, which is higher than that of the machine described above. All parts of the machine are mounted on a common tube frame. The car has a two-wheel drive with front-wheel drive and a separate transmitter from the transmission through the gearbox, gear transmission and chain transmitter. The rear wheel is located in the longitudinal plane of the machine and can rotate freely around its vertical axis during maneuvering the machine.

For the Ramada operator, there is a seat with two Machine controls. As working bodies used mosaic-grinding machines CO-91. The steering wheel and wheels are separated from it. The working hinges are suspended in front of the hinge and in front of the common frame so that one of the machines fits one into the other behind the other. The lifting of the working bodies is carried out using a flexible (shoulder) device. A 40 liter water tank is placed between the grinder's working frames as part of the walk.

A mosaic-grinding machine, similar to this design, was developed at construction trust No. 10 in Belarus.

Unlike the aforementioned machine, all parts of this machine are mounted on a common metal frame, and two-wheeled walkers. At the same time, the traverses of the hinges of the SO-17 machine are hollow and through which water is supplied directly to the center of the grinder. In this case, the grinding process is significantly accelerated and allows a longer use of abrasive elements. The machine is small in size and very maneuverable, and surpasses the Truck No. 38 sander in St. Petersburg.

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The mosaic-grinding machine SM-104 has a capacity of 100-120 m^2 / hour and was developed in the mechanical department of the Trust Construction Organization of Moldova. A distinctive feature of this machine is the ability to adjust the width of the grinding strip. This is a self-propelled wheelchair with a rotating traverse. It has a grinding block consisting of a frame, a transmitter, a traverse swing mechanism and a steering wheel. The front wheels are mounted on the front wheels, transverse rotating shafts and slewing gears.

The car is equipped with a 2.2-kilowatt electric motor, cone and gear transmission. The gears are mounted on the drive shaft. The output shaft of the bevel gearbox is connected to the drive shaft of the gearbox by a muffler. The back is enclosed in a hollow shaft, and the shaft is attached to the gear housing. It has a steering wheel and a steering wheel. The gear rollers mounted on the gearbox shaft will rotate together and set the machine in motion. The traverse is made of a frame and has a parallelogram mechanism with a rotating shaft and three SO-17 grinding heads. The grinding heads are arranged so that when the two heads of the front row are most separated, the space between them is covered with abrasive elements of the third row.

The grinding strip is adjusted by moving the axis of the front axle to the transverse fault line. Traverse traverse is carried out using the mechanism by which the electric motor moves. The driver controls the car with a steering column mounted next to the seat. Ashgabat mechanical-repair enterprise launched the production of this car.

In Kursk, the trust of an industrial building is equipped with a mosaic-grinding device, in which the improved ET-250 series is used as a walking device. It has a battery and a three-phase electrified 4.5 kW instead of electric current. Cars of the CO-17 series of two series were used as working bodies with a hinge attached to the front of an electric wheelchair. Raising and lowering the working bodies is done manually. A standard abrasive grinding element is used as an abrasive stone. To this end, machine guns were improved SO-17. There are two workers who work on the unit.

An independent mosaic-grinding unit was created at construction trust No. 13 in Novgorod. It was used by an electrician as a walking device. This block consists of an electric motor and a grinding case mounted on it. Grinding a working medium of a common base, mounted on a bar sharnirli SO-17 four car wagons. A screwdriver with a spring roller is attached to the floor surface of the electric frame for cleaning and grinding waste. This machine also serves two workers, because the operator cannot visually control the surface polished from his workstation.

A large mosaic-grinding machine based on the AK-1 machine was created and put into operation at OAO Bashkirkurilish, Ufa. Three machines for grinding pipes CO-91 mounted on a frame. Vertical movement of the machine is carried out on a special jack. Unlike other machines, the transmission is produced from a two-speed (1450 and 940 min-1) electric motor through a gearbox attached to a car screwdriver.

The machine is equipped with a water tank to moisten the surface where water passes through a hose to the spray gun. Sprayers are attached to the front of the working body. The machine is controlled by the operator using an electric remote control mounted on the steering column. The weight of the car is about 340 kg. The larger size of the car makes it more maneuverable, especially in busy places.

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III. RESULTS

In the Rostov-experimental-mechanical enterprise, a mosaic-grinding machine was created on the basis of the T-40M tractor and tested under production conditions. This machine is used for grinding mosaic floors in one-story industrial buildings. Suspension devices were used as working bodies. It has a special traverse and thirteen spindles with a grinding segment stone (three on each spindle).

Spindle rotation is carried out through an electric drive through a V-belt drive, a bevel gear and a chain drive. Traverses with special towers - the working body hangs on a tractor. Raising the beam in the transport position and putting them into action is carried out by the hydraulic system of the tractor.

The design uses a gear pump with an extension from an additional outlet to provide hydrothermal performance. Electricity is transmitted through a protective circuit breaker, which trips in the case of a cable breaker with a voltage of 380/200.

The spindle shafts are telescopically mounted to provide continuous sealing of the grinding segments with uniform pressure on the machined surfaces and spindles.

In Kiev, the Research Institute of Construction Production developed a grinding machine based on the T-25 tractor. Its structure is slightly different from the above, which means that the working body has a different grinding. The head is made of a pair of bevel gears, housings, working boards and strips with abrasive teeth, a planetary gear and a protective housing. Power from the tractor shaft is transmitted through a snowflake valve to a pair of bevel gears, planetary gearboxes and three trims. Twelve abrasive stones are attached to drywall.

The pressure on the abrasive stones is transmitted by a special cut (fork) with the hydraulic cylinder voltage present on the tractor. The pressure of these stones and their gradual erosion can be achieved by strengthening the gearbox board.

A plastic rubber shock absorber is placed on the tablet. Unlike the T-40M tractor grinding machine, this machine is unique in that it can be sanded close to the wall. In this case, the grinding head can rotate in a horizontal plane using a rotating hydraulic cylinder from the long axis of the tractor to one or the other side. To replace grinding stones, the working body is rotated 900 (horizontal) with respect to the horizontal plane and marked on the axis.

The tile-grinding unit based on the DT-20 tractor was used in the Bashkirneftsanoat Construction trust in Neftekamsk. By its design, the working body consists of a 1500 mm case attached to the tractor frame in a suspended position.

IV. CONCLUSION

On the body is a gearbox with a gear ratio of 1:7. The transmitter moves through the tractor's power shaft. Rotation from the gearbox is transmitted through the clutch to the working disk. The drive is equipped with disc (s). Grinding is carried out by six round stones with a diameter of 200 to 350 mm.

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At the front of the tractor, the crankshaft is attached to a 200-liter water tank to preserve the surface treated during grinding. The unit is controlled by one operator and has a higher productivity than other grinding units based on the tractor.

By analyzing the design and operational features of self-propelled mosaic-grinding machines and units used at many construction sites, we can formulate their general characteristics.

Most grinders are SO-17 series grinders mounted on a walking frame. In some units, the working bodies are attached to the outboard machine on the tractor. In this case, the transmitter of the body of the workpiece is driven by a tractor power source.

All self-propelled vehicles without series are significantly different from each other.

It is necessary to develop technical specifications and develop a new self-propelled grinding machine, taking into account the need for faster mass production of self-propelled grinding machines with their strictly known technological and design parameters.

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