METHODOLOGY FOR COMPUTER CALCULATION OF A MACHINE-TRACTOR UNIT BASED ON A TRACTOR SELF-PROPELLED CHASSIS

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In general, the calculation methodology represents an optimization algorithm for the "tractor self-propelled chassis (TSC) - mounted implement" system with variable input parameters. In this form, the methodology is universal and is used to develop a computer calculation program. The program allows for the study of aggregates with any combination of such chassis, which are accounted for by changes in the weight distribution G_p and G_3, while their traction class is determined by the tire load capacity q.

The selection of input data and its entry into the computer is a critical part of the methodology, as it determines the program's sequence of operations and the quality of the obtained results. Therefore, the methodology includes typical dynamic loading schemes for TSC-based aggregates and a nomenclature of calculation data for each variant. The operator matches the calculation case to a typical aggregation scheme and assigns numerical values to the parameters listed in the nomenclature.

When selecting non-standard data, the following is considered:

a) The horizontal component of soil reaction R_x on the working tools has little effect on the redistribution of vertical loads and is thus treated as a program selection parameter ($R_x = 0$ or R_x 0) in the general case.

b) Determining the horizontal component R_x requires calculating the vertical component R_y, which is typically defined as a function of R_x.

c) The determination of R_x and R_y is performed only for aggregates with force or positional control of tillage depth. For all other aggregates, these values are specified in a generalized form.

d) The calculation formulas for the above-mentioned aggregates are valid under the digging effect of soil resistance. The digging action of soil reaction on the working tools is accounted for by assigning a negative sign to R_y in the input data.

e) The horizontal coordinate of the mounted implement's center of gravity is specified only during verification calculations of the aggregate.

Therefore, the proposed computer-based calculation method for a tractor-implement unit based on the self-propelled chassis is a universal algorithm for optimizing the "TSH – mounted implement" system, taking into account variable parameters. It allows modeling and analyzing various combinations of units by varying weight distribution and traction class. Particular attention is paid to the accurate input of initial data, which determines the precision and reliability of calculations. The method considers typical dynamic schemes and ensures the ability to account for different operating modes of soil-cultivation equipment depending on tillage depth and soil reactions. This approach enhances the efficiency of using the self-propelled chassis in agrotechnical operations.