The Qualimetry

Ergonomics of Labour

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The principles of the International Labour Organization (ILO) are the most important:

1. Declaration concerning the aims and purposes of the International Labour Organisation.
The fundamental principles: *labour is not a commodity*.
2. C100 - Equal Remuneration Convention, 1951 (No. 100).
3. The Occupational Safety and Health Convention, 1981.

Among the scientific directions of labour economics essential value is gained by ergonomics.

- The term "ergonomics" was accepted in England in 1949.

- In Russia in the first part of the XX century it was offered (Bogdanov A.A.) the term "*ergologiya*" and now it is accepted now the English term.

Taylor and Gilbret's method according to the microelement analysis of labor movements of a body of the person in the processes of work called by system of MTM.

The MTM and BSM method (the Russian option of MTM), dismembering the labor process on "microelements". It fixes only duration of time of each element. And the method doesn't fix ergonomic parameters of:

- the made work;
- the static moments;
- the logical action.

"Qualimetry ergonomics of a workplace".

Every concrete labor process has its qualitative definition. It is expressed by the totality of properties, symptoms and parameters defining the labor process as such.

A qualitative definition of labor is expressed in concrete individual labor processes, the totality of which, on scale of an enterprise, determines the quality of production.

If movement can be expressed quantitatively in hours, then working time – in work-hours. In this light the undernoted functional dependence is fully warranted:

$$W_t = W_e = f(Ph, P_a, t)$$

where W_t - working time, work-hours;
W_e - labor expended, work-hours;
Ph - working force expended in the physiological sense;
P_a - concrete form of purposeful activity;
t – duration of living existence of labor, hours.

Labor expenditure

$$W_e = C_{phs} \cdot C_{is} \cdot t$$

Coefficient of physical strain

$$C_{phs} = \frac{1}{e_b} \cdot \left(E_b + a \cdot \frac{A}{500} \right) \cdot C_m \cdot C_c$$

Coefficient of intellectual stain

$$C_{is} = \frac{lnN}{e^{1-p}} \cdot \Delta$$

The product of $C_m \cdot C_c$ marks the intensity of labor process, i.e. intensity of "living existence of labor".

Every product of labor comes out as capacity of:
a. substance of nature;
b. consumer properties for people;
c. labor expenditure.

For a certain assemblage of operations we will have the production labor input:

$$W = \sum_{i=1}^{C} W_{p_i} = \sum_{i=1}^{c} C_{ps_i} \cdot C_{is_i} \cdot t_i$$

In production practice technological labor input is determined by formula:

$$W = \sum_{i=1}^{c} t_i$$

Duration of labor process

The crux of determining duration of labor process lies in bringing out the following functional dependence:

$$t = f(x_1, x_2, \ldots, x_n)$$

t – duration of labor process;
$x_1, x_2, \ldots, x_n$ – material factors of labor process forming its duration.

Time is determined by micro-element rate fixing.

- Each variety of movement of labor is a labor microelement.
- With the help of microelements it is possible to split any operation, complex of techniques and actions into their component elements – micro-movements.
- Microelements can be applied in manual procedures and actions only.

Logical diagram of labor process algorithm

The process is performed in the following order:
1. Observation is carried out for the purpose of taking in and handle basic procedures and transitions.
2. All initial data are filled in the analytical chart.
3. Then the workplace planning is filled.
4. Analytical results of operations are entered on the reverse side of the chart with the description and left-hand movement singly.
5. After entering each microelement, the researcher must ask: Is not transition to next movement, a problem to performer of the work?
6. All actions of the whole cycle of work connected with machining labor object in given workplace are entered in the logical diagram of algorithm.

Thank you for attention