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# Making protective clothes for auto-operators from the point of view of scientific labor organization

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**Abstract:** *The analysis results of auto-operators of typical working motions with the aim of making comfortable protective clothes have been given in the article.*

**Key words:** working clothes, labor organization, auto-operators, and protective clothes.

Working clothes is one of main means for not dangerous work conditions.

Working clothes provides a worker's protection from unfavorable factors of production medium and influences upon him specifically. Designing working clothes is rather difficult process taking into account many factors. Many factors dependence in designing working clothes and work conditions requires more attention as we make clothes with protective and hygienic properties set beforehand.

For example ergonomic nonconformity of working clothes to its usage decreases its quality level. In connection with this fact it is necessary to make preliminary researching in order to value the degree of


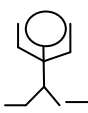


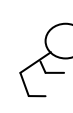



ergonomic perfection of future working clothes.

In the article the analysis of working clothes (a jacket and overrule set) in Tashkent auto-enterprises was made. Working clothes of iron-workers during one shift was tested. The time of continuous using working clothes during one shift was tested. The time of continuous using working clothes during one shift is 12 hours. Iron-workers of technical service (TS) do different operations in technological process on assembling all kinds of buses produced by «Mercedes-Bens». The character of their work is similar not only on energy loss but also on working poses, list and influence of dangerous and harmful production on means of individual protection (MIP).

For 8 the most typical poses and motions in working cycle (average production of buses during one shift due to the plan is 25 units) a diagram of labour content was made. Average labour content of time (t) calculated for every motion during 1 shift on 8 poses is shown in Table 1.

Table 1.

Duration of main working motions of iron-workers during a shift.

Workers post	Total working time, min.	Poses (in minutes)							
									
		1	2	3	4	5	6	7	8
Iron-worker-electrician	600	101	-	55	145	155	64	57	23
Iron-worker- motorist	480	102	64	45	73	77	35	47	37
Iron-worker-universal	600	125	80	27	87	111	72	45	53
Iron-worker-welder	600	160	37	27	97	124	47	76	32
Iron-worker-carburetorist	600	149	-	32	97	167	45	53	57
Iron-worker-electrician	600	173	126	43	87	110	21	-	40
Iron-worker-ballooner	600	53	47	28	97	112	96	23	144

According to the classification of working motions (1) and on the basis of diagram data on time loss for making every pose all the motions of iron-workers at «Mercedes-Bens» SC can be divided into 2 large groups - in position ‘standing’ at continuous motion of lower extremities (constant walking after a moving object of work with the speed of a conveyer motion);

-in position ‘sitting’ inside a bus.

In its turn, each of these groups includes motions that can be joined into 3 subgroups (2);

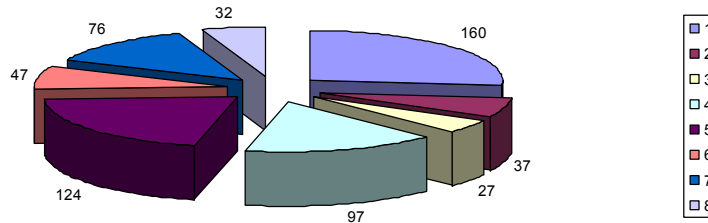
-motions of upper extremities;

-motions of lower extremities;

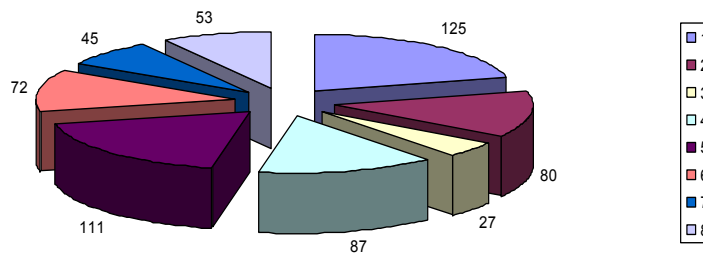
-motions of a body.

Motions of upper extremities are different, but main ones are: flexing and straightening in elbow ankylosis, moving in shoulder ankylosis (onward, back, upward, aside). Main motions of lower extremities: flexing and straightening in knee ankylosis motions connected with support point function; motions with the help of which lower extremities accomplish spring function. Motions of a body are flexing and straightening (bending onward and back, aside). Such detailed information is necessary for concretization of making basic construction of working clothes model and technical modeling taking into account ergonomic peculiarities. In the result of the research it was defined that for this category of workers trousers instead of overalls set are preferable in working clothes set. Schematic comparative analysis of ergonomic motions during a shift for various specialties of

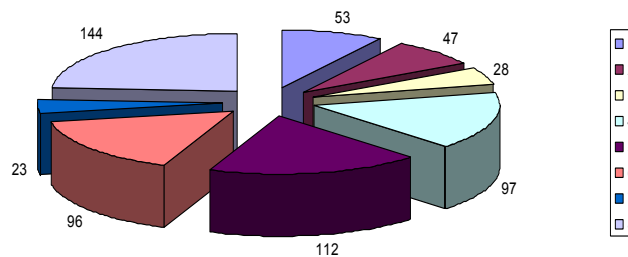
auto-enterprises workers is shown in fig 1,2,3,4 (consequently A,B,C,D). Fig.1. Diagram of time loss correlation (in minutes during a shift) at accomplishing main working motions by iron-workers: A-by welders; B-universal; C-ballooners; D-motorists.



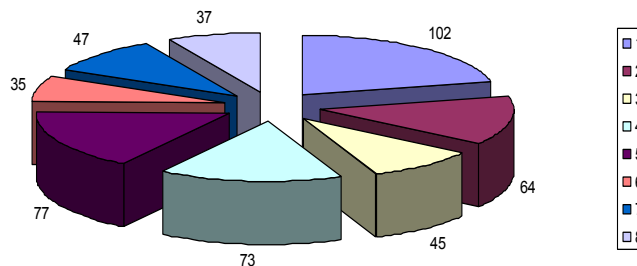
A)



B)



C)



D)

Therefore, main working poses are: “standing”, “bending”, “squatting” or “sitting on a stand”. According to the results of a working day photograph an iron-worker

spends a larger period of his working time in standing-bending position and only 1/3-in sitting position. This is typical for iron-workers (welding, universal and motorists). Poses with inclining worker's body, flexing extremities, bending his head are characteristic for motorists. For removing these defects universal working clothes set that included a jacket and trousers for all previously mentioned categories of workers was embedded. A jacket of straight silhouette with protective things lay on and made of fabric with special impregnation on stomach and on sleeves (on elbows); straight trousers also with

protective things lay on knees. Working clothes was successfully tested at «Mercedes-Bens» and also got a diploma on 5-th international exhibition in Tashkent.

#### **Source of information**

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