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CONDITIONS AS REGARDS THE SHAPE AND DIMENSIONS OF THE MOTOR VEHICLE SEATS

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***Abstract:** The paper sets itself to present the main conditions to be fulfilled by the motor vehicle seats, in particular by the tractor seats. The issue of ensuring comfort through diminishing the driver's postural stress stands no longer for a technical problem, but also for a social-economic problem. By observing the standards with respect to the shape and dimensions of the seats, there are ensured the psycho-physiological conditions adequate for labour and there are diminished the professional accidents.*

1. INTRODUCTION

The designers and the builders of tractors throughout the world are preoccupied to an increasing extent of the accomplishment of functional seats, which should provide physiological conditions adequate for labour. There is aimed at the same time at the "humanization" of the work place so as work should not endanger his life and so as it should not wear him out above the recovery possibility of the organism during repose.
The creation of physiological labour conditions implies settling the tractorists pressures, their measurement and the answer of the organism to every one of them, their comparison to the normal physiological limits and the interventions upon the tractor seat with a view to toning its exigencies in with the tractorist`s physiological possibilities.
The tractorists` main pressures are the pressures due to the vibrations and to the postural stress.

2. POSTURAL STRESS

By postural stress we understand the negative effects in their entirety that the posture imposed at the work place may bring about the tractorist, with special reference to the blood flow and to the spine. The postural stress in the tractorist many a time exceeds the acceptable limits, due to the prolonged maintenance of a certain posture, to the compression of certain segments of the members, to the hindrance of the blood flow or to the constraint of certain postural attitudes in contradiction with the normal statics of the body, with torsions or leanings of the trunk. A tractorist`s incorrect position in his seat may lead to pains in breath, in thorax and in the abdomen.

The majority of the pressures that cause this stress may be diminished and brought under the limit of the physiological capacities of the organism through complying with the main requirements with respect to the shape and dimensions of the seat.

3. REQUIREMENTS WITH RESPECT TO THE SHAPE AND DIMENSIONS OF THE SEAT

The shape and dimensions of the seat play a significant importance in diminishing the physiological pressures the tractorist must undergo. Driving the tractor as comfortable as possible is also determined by the cushion and by the seat back, which must fit round the

shape of the human body as closely as possible. The concave form of the sitting surface and of the seat back may lead to the increase of comfort

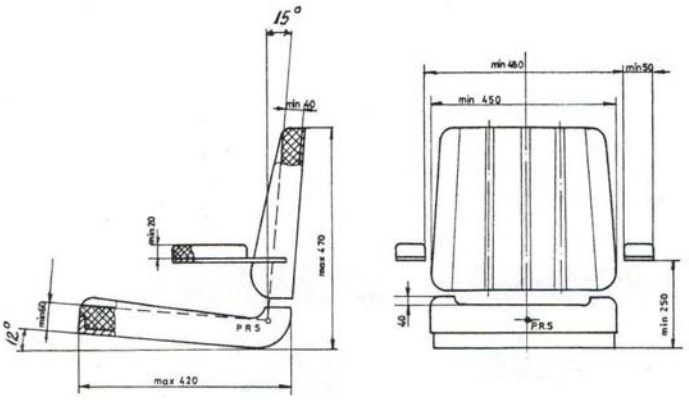


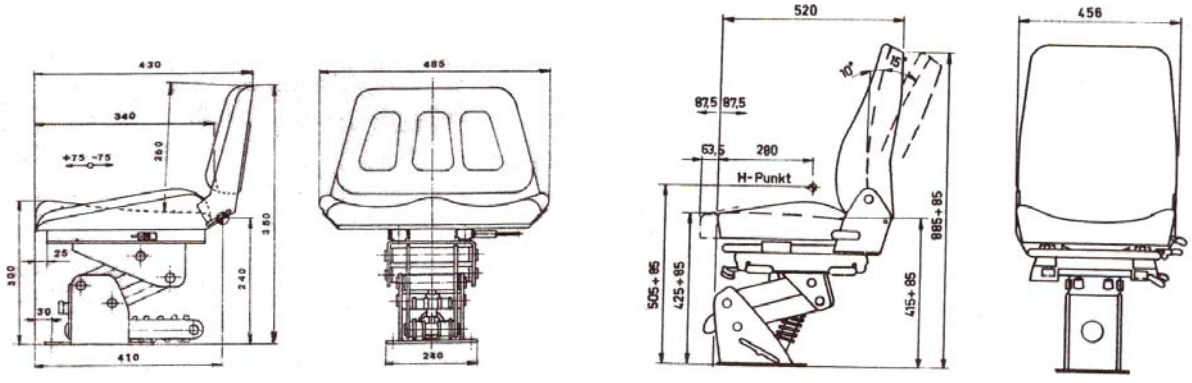
Fig.1 Cerințe privind forma şi dimensiunile scaunului

As regards the dimensions of the seat, they must be correlated with the tractorist`s anthropometric dimensions within our country, and the shape of the seat must ensure the repartition of the pressure upon the isobaric curves, as uniformly distributed upon the seat and its seat back as possible. With a view to obtaining a relaxing, comfortable position, the seat back must allow an inclination of 5° ... 12° to the vertical, characterized by the possibility of continuous control or stepped control of the position; the seat back must support at least the lumbar area of the tractorist`s back. The shape and the dimensions of the seat must allow the driver's natural movements: sitting and rising, as well as the cone of visibility of the target aimed at, through turning round and leaning out.

An ergonomic characteristic of the chair is that the sitting surface should have a backward leaning of 3°... 6° and a difference of 30...50 mm between the anterior and the posterior edge.

The main requirements with respect to the shape and the dimensions of the chair are presented in figure 1.

The chair must have lateral borders in upholstery which should impede the tractorist`s lateral shifts and the material which it is manufactured of should ensure an optimal air circulation, should be humidity and excessive heat proof, and should be easy to wash with water and detergent. The supports for elbows that the chairs are provided with should be reversible so as to allow the tractorist`s easier access to his working place. It is adequate for the sitting surface and the seat back to be fixed on a common support so that the range of chair vibration frequencies should be increased.

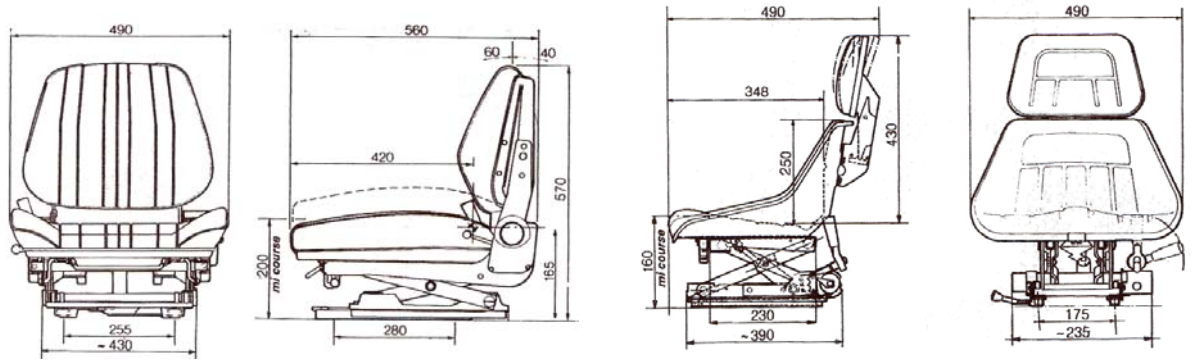


a) b)

Fig.2 Scaune cu mecanism parallelogram

Through mounting the chair on the tractor it is necessary to ensure a good visibility to the front wheels in order to track the ground the tractor moves upon, but also backwards in

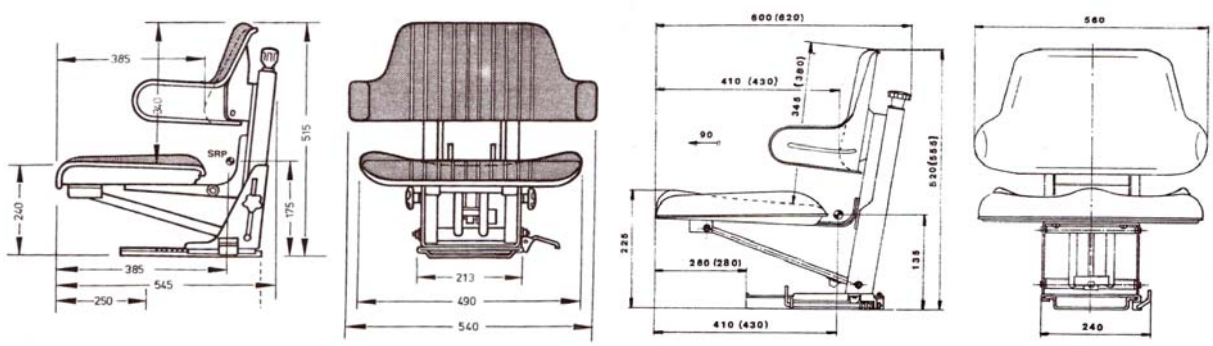
order to follow the working organs. The seated tractorist's visibility constitutes one of the major factors of the security in exploitation.



a) b)

Fig.3 Scaune cu bare în X

In the majority of the order standards, there is recommended that their placement should be carried out according to the point of reference of the chair, noted P.R.S. This point is defined as the intersection between the tangent line at the interior surface of the seat back and the horizontal line at the sitting surface, in the framework of the symmetry longitudinal-vertical plan of the chair.



a) b)

Fig.4 Scaune cu glisare pe suport vertical

The sitting surface must have a translation movement, should move in parallel plans on a vertical direction. This condition is ensured through the use in building the chairs of the mechanisms which realize this condition: parallelogram mechanism, X-bar mechanism, and slip on a vertical support mechanism. In figures 2, 3 and 4 there are presented the main dimensions of several chairs realized by the companies Sitra-France, Grammer-Germany and Sacchetti-Italy.

4. CONCLUSIONS

There currently asserts itself a new design conception, which should begin with the unitary dwelling on the tractorist`s working place, under all aspects, aiming mainly at the main objectives of creating adequate psycho-physiological conditions for work, of taking measures against professional sickness and against work accidents. The work should not endanger his life and should not exhaust him above the recovery possibilities of the organism during repose.

The design of functional chairs, the study of the possibilities of improvement of the quality and cosines of the chairs, as well as the accomplishment of the protection means against vibrations constitute not only a technical issue, but also a social-economic issue.

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