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Characteristics PU Foams at Alternate Static and Dynamic Loading

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Abstract. Characteristics cushions from PU foam together with coat determine comfort automobile seats. Frame construction, at what is cushion with seat cover loaded, serves like body-rest. Also perform safety rules, that are demanded on automobile seat. Cushion in automobile seats are predominately manufactured from PU foams. Testing procedure theirs property investigate with correlation between their characteristic and comfort. Cushion are exhibited alternate static and dynamic loading. According to that changes their characteristics in medium term time interval. Subject research and content hereof article is recognition transmission characteristics and contact pressures cushions from PU foams in time interval two o'clock in turns static and dynamically weight constant loading.

Introduction

Long-term sitting drivers and passengers in automobile seats presents next from series phenomenon present-day. Activities that the human earlier practise rarely or at all, happen part of common life. Are all activities safety, undamaged health human being? Sitting isn't for human natural position. Main factors, which affect quality sitting are: quality seat squab and back-rest, presence static and dynamic load. At static sitting are main factors discomfort possible saddle gall (decubital ulcer). Pressure applied on human back is always higher than acceptable, because weight accrues on smaller area than needed. In combination with dynamic loading (mechanical vibration seat squab, hand rest) happens yet in addition to mechanical loading of the human bodies, to vibrations single organs, to absorption energy human body. It already are actualities, which be harmful to human organism [1].

Description of the Studied Problem

This article describes ascertained characteristics cushions from polyurethane foams at combined static and dynamic loading. Recognition correlation between static and dynamic loading and property PU cushions makes it possible to predicate their influence over quality sitting. All the measurement are compile - time in medium term time interval of several hours. Average motorist will spend sitting in car as far as 1 an hour every day.

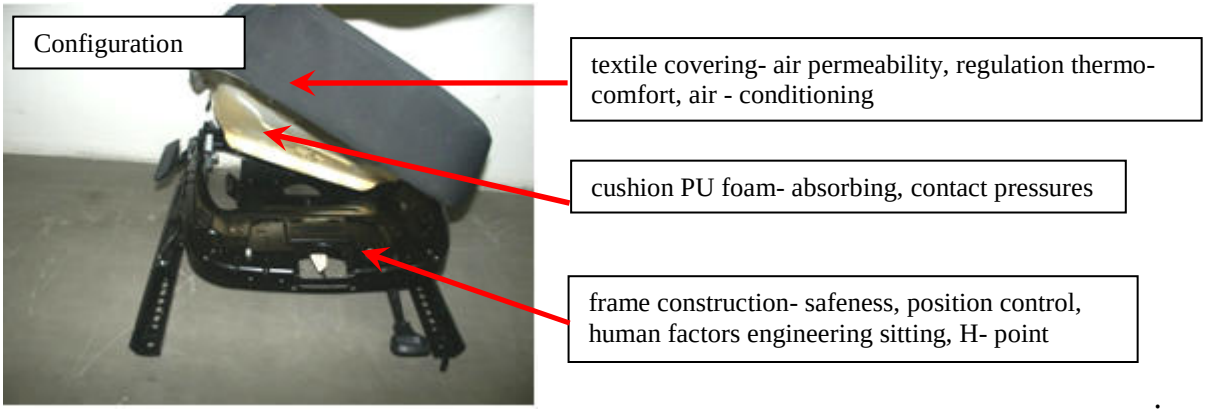

Fig.1. Arrangement automobile seat.

Normalized Laboratory Measurements

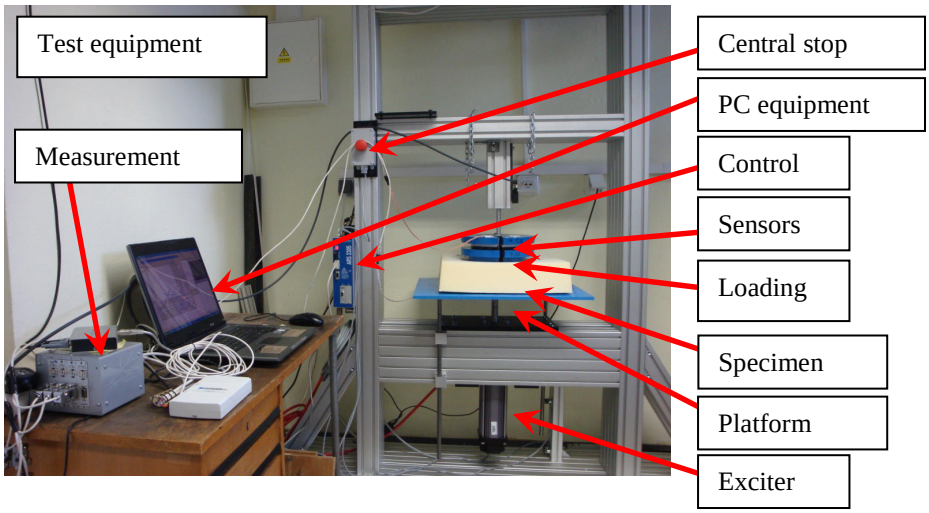

Fig. 2. Laboratory standard measuring.

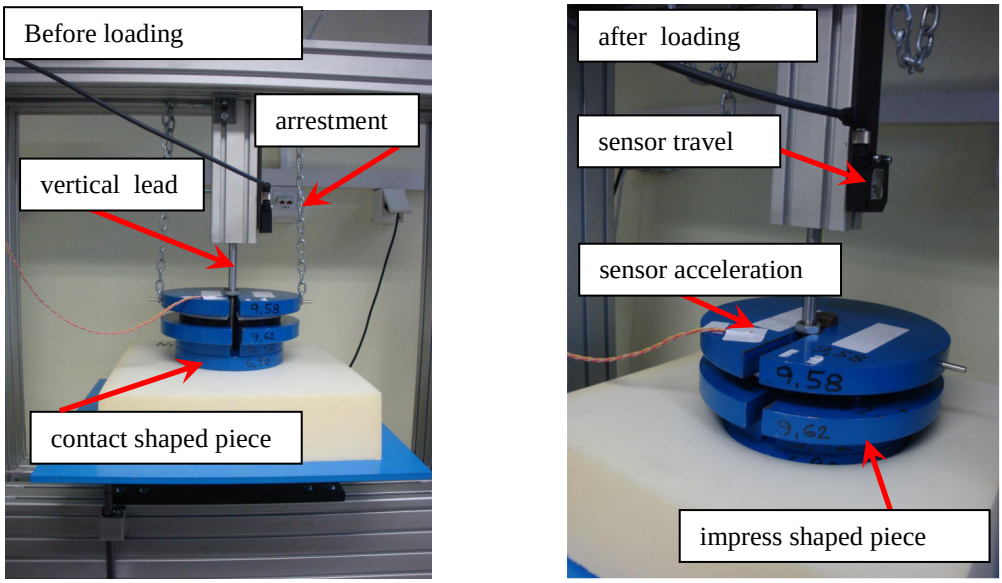

Fig. 3. Laboratory standard measuring transmissibility.

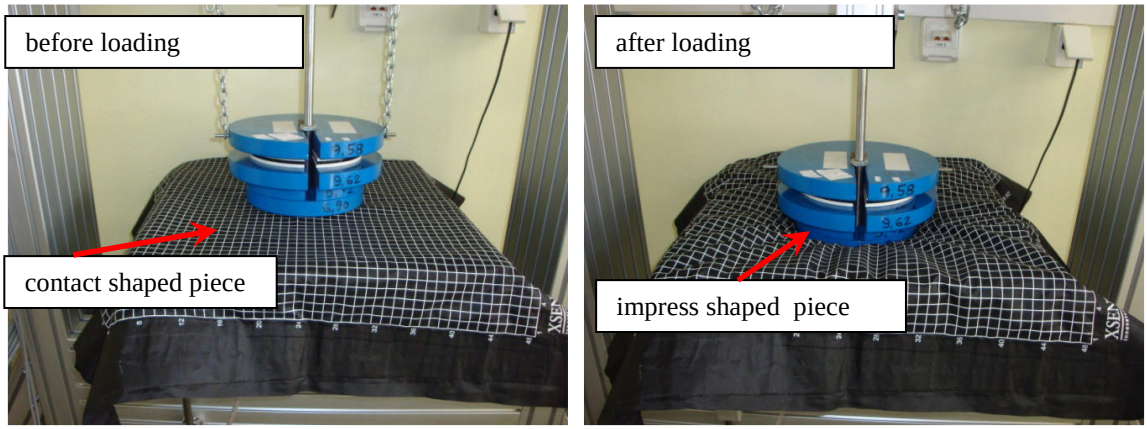

Fig. 4. Laboratory standard measuring contact pressure.

Measured Parameters

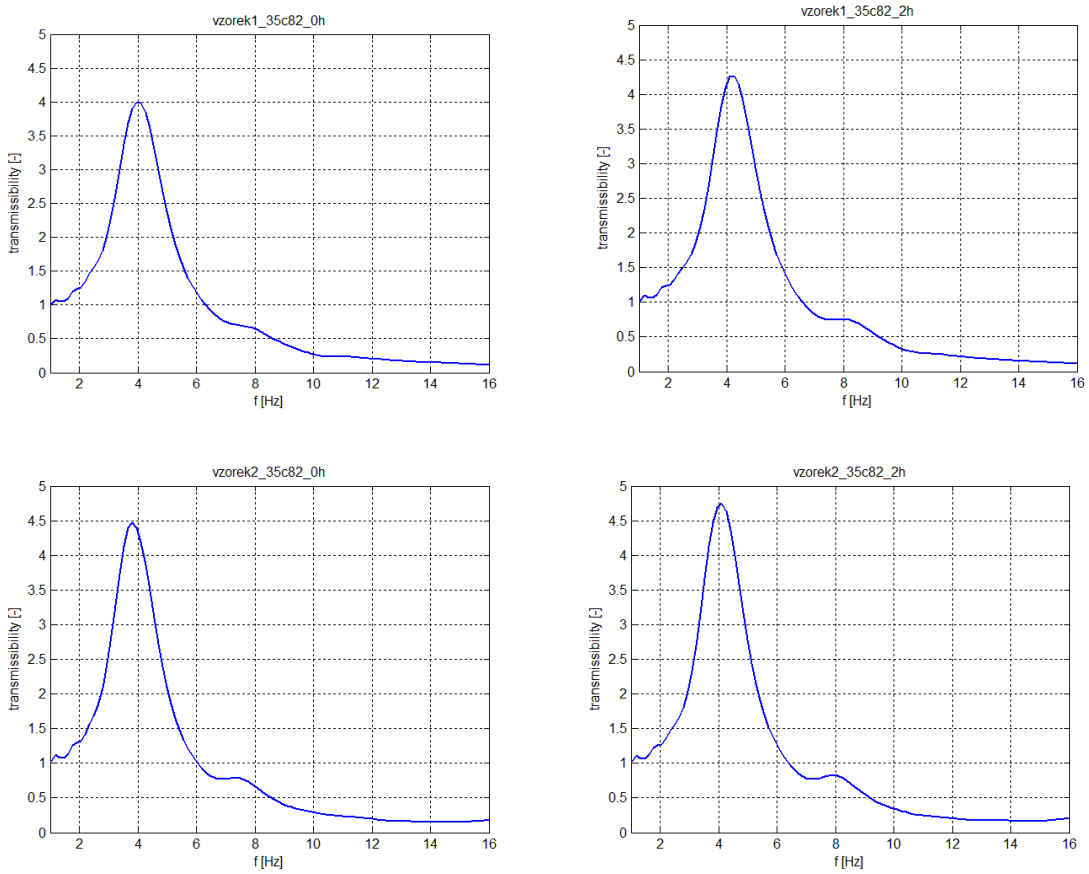

Fig. 5. Measured parameters-transmissibility.

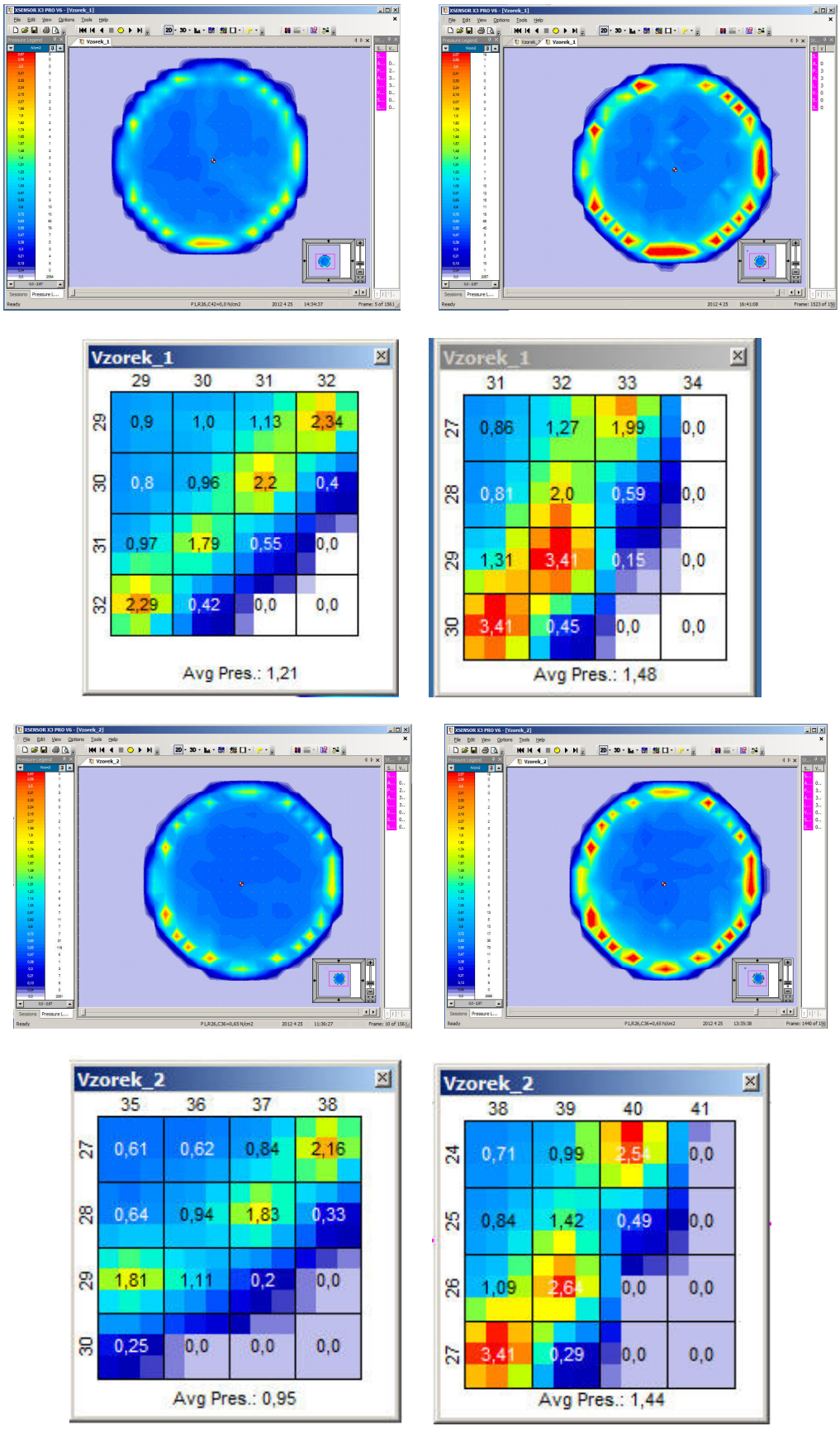

Fig. 6. Measured parameters-contact pressure.

Table 1. Measured parameters-travel.

	t = 0h		t = 2h	
	Before signal	After signal	Before signal	After signal
Specimen 1	39.5 mm	34.9 mm	34.3 mm	32.4 mm
Specimen 2	37.2 mm	34.55 mm	32.8 mm	32.6 mm

There were measured variable PU blocks 500x500x100 with different hardness depending on chemical composition. Measured variable parameters were stroke (laser sensor), acceleration (acceleration sensor), contact force (x sensor). For this article were chosen results measurement two blocks TDAS01-35c82, TDAS02-35c82. On these two figures we can demonstrate, how turns characteristic PU foam depending on type her load. For experiment we have chosen combination static and dynamic straining with measuring piece T3.20 [2] about weight 35,820 kg. Experiment proceeded double phases. In first phase was adapting piece first loaded on tested sample and followed dynamic test. In second - phase were specimens static weighting 120 minutes and again followed dynamic test. How is evident from graph results go beyond to change transmission characteristics. For an explanation changes, unto whereby happens in PU foams during loading was effected examination on contact pressures. Results are in graph Fig. 5, Fig. 6 and Table 1.

Analysis of Measured Parameters

According measured values follows that the specimen 1 in first phase is characterized transmission 4,0 at frequency 4,00 Hz, specimen 2 transmission 4,5 at frequency 3,85 Hz. Thence it follows that the specimen 1 has in first phase higher stiffness foam than specimen 2 (reached chemical composition). Further was ascertained that the in second - phase is specimen 1 characterized transmission 4,25 at frequency 4,25 Hz, specimen 2 transmission 4,75 at frequency 4,15 Hz. Expressive switched also distribution contact pressures in the area from 0,96 to the 3,41 N/cm^2. We can state that the in both specimens got with dynamic and subsequently static straining to increasing transmission about 0,25 regardless of chemist foam, practically inflexibility resonance frequency. From correlation Fig. 5, Fig. 6 and Table 1 it stands to reason that the happens static loading to pressing foam below adapting piece and spontaneous sinking adapting piece to the foam. From measured values follows impress near specimen 1 was 7,4 mm and at specimen 2 was 4,6 mm, which acknowledges higher hardness at sample 2, increasing impress at sample 1 however disrespectful on increasing transmission after 120 minutes. Average contact force were measured at sample 1 in first phase 1,21 N/cm^2 in border areas and near specimen 2 0,95 N/cm^2. It is due to by that the second - specimen better bears loading. In second - phase average values contact pressures align about values 1,46 N/cm^2. Evidently happens to stabilization mechanical property PU foam below loading. Come to conclusion that the for lower empty weight is more suitable use PU foam corresponding specimen 2. for higher comfort we recommend use PU foam accordant with specimen 1.

Conclusions

Mentioned measurements are partition global research property PU foams depending on their chemical composition, high, loaded area, distribution contact pressure, loading weight and time. By PU foams it is possible reach various sensibilities on alternate static and dynamic load in time [3]. By testing PU foams we can find correlation between measured variable

characteristics as well as them optimize. From measured results we create as early as many years knowledge database that the makes it possible lead innovative process correct direction.

References

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