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**USE OF INFORMATION TECHNOLOGY BASED ON SOLIDWORKS SIMULATION FOR
CALCULATIONS OF AUTOMOBILE REPAIR EQUIPMENT**

Today, information technology (IT) is the most important factor that influences the quality of the education system. The main prerogative is the quality and level of training of students in universities, which is the key to the successful functioning of the education system. The use of IT in

the educational process reveals the creative abilities of students in the learning process, since IT today is the basis and one of the most important factors that have a strong impact on the quality of the education system.

In addition, when the requirements for the quality of graduate training increase, global informatization and the development of the latest IT occur, which will also improve the training of the future specialist. For the modern educational system, learning is, first of all, a cognitive activity that is focused not only on acquiring knowledge and skills. There is also a change in the student's personality: first of all, intelligence increases and the main focus is on self-development. And professional competence, scientific qualifications, and personnel training lead to the formation of a new type of specialist who enthusiastically finds a creative approach to solving a problem.

The authors of [1] based on information technology have looked at the applications of solid-state design and the ongoing verification of the static strength of the attachment for pressing the silent block of the upper part of VAZ cars, and the nut itself. It has been established that the minimum reserve of value is $k = 6.315$, which is much more than permissible $[k] = 3$. Therefore, the meta of this research is the possibility of replacing steel 45, from which the nut is made, with cheaper availability repair tanks have steel 15 (DIN analogue: C15E – fig. 1).

Имя:	Сталь 45 ГОСТ 535-88	Имя:	1.1141 (C15E)
Тип модели:	Линейный Упругий Изотропный	Тип модели:	Линейный Упругий Изотропный
Критерий прочности по умолчанию:	Максимальное напряжение von Mises	Критерий прочности по умолчанию:	Максимальное напряжение von Mises
Предел текучести:	8,3e+08 N/m ²	Предел текучести:	4,5e+08 N/m ²
Предел прочности при растяжении:	9,8e+08 N/m ²	Предел прочности при растяжении:	5,5e+08 N/m ²
Модуль упругости:	2,04e+11 N/m ²	Модуль упругости:	2,1e+11 N/m ²
Коэффициент Пуассона:	0,3	Коэффициент Пуассона:	0,28
Массовая плотность:	7 826 kg/m ³	Массовая плотность:	7 800 kg/m ³
Модуль сдвига:	7,8e+10 N/m ²	Модуль сдвига:	7,9e+10 N/m ²
Коэффициент теплового расширения:	1,19e-05 /Kelvin	Коэффициент теплового расширения:	1,1e-05 /Kelvin

a b
 Fig. 1. Properties of steels 45 (a) and 15 (b)

formed by the authors

Through repeated calculations in SolidWorks Simulation, the nut model was divided into finite elements (FE), its stiffness matrix was built; carried out the synthesis of SE of its model; solved the resulting system of algebraic equations and determined the components of the stress-strain state (table 1, fig. 2).

Table 1. The results of the nut research

Steel	TensionVon Mises (max.), σ , MPa	As a result moving URES (max.), h , mm	Еквівалентна деформація ESTRN (max.), δ , mm	Запас міцності FOS (min.), n
45	131,4 Node 23183	0,004 Node 491	0,0004493 Element 6064	6,315 Node 23183
15	132,2 Node 23183	0,004 Node 491	0,0004312 Element 6064	3,405 Node 23183

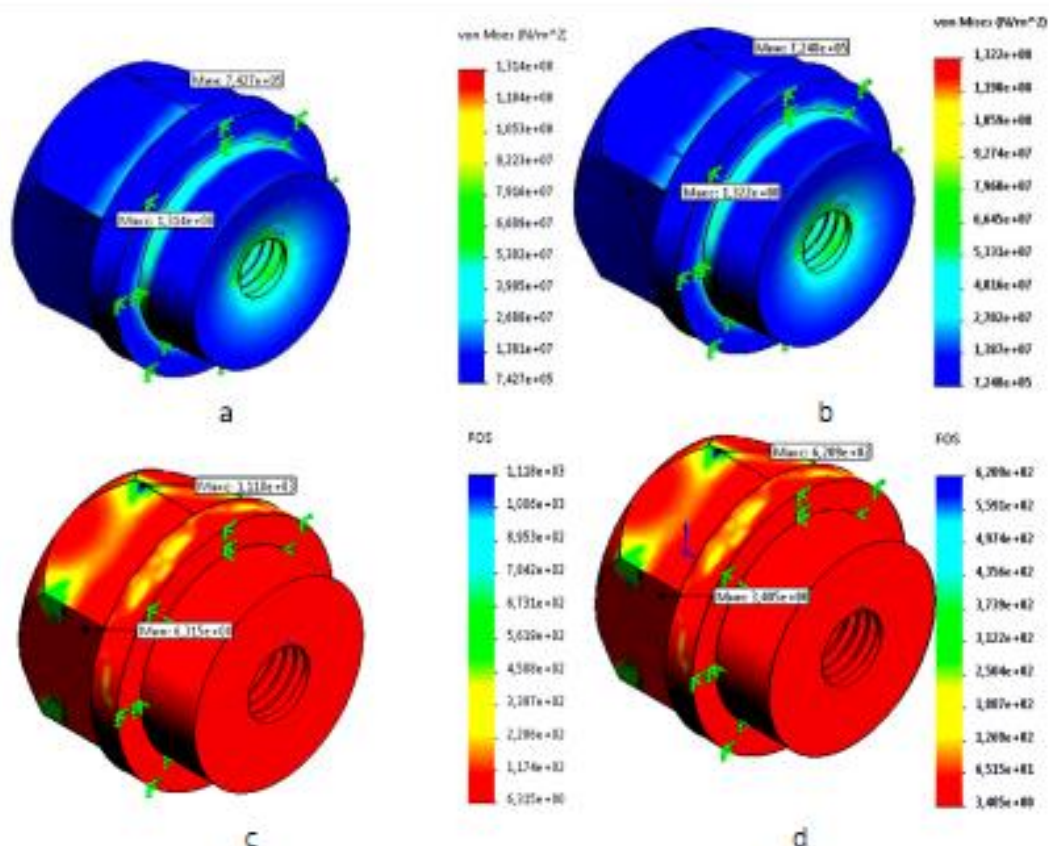


Fig. 2. Plots of the maximum stresses VON (a – steel 45, b – steel 15) and the minimum margin of strength FOS (c – steel 45, d – steel 15) of nut formed by the authors

Since the minimum margin of safety factor for a nut made of steel 15 is $k = 3.405$, which is more than permissible, the margin of safety is sufficient.

List of references

1. Вовк В. Ю., Собко Е. Р., Рудик О. Ю. Розрахунок пристосування для заміни сайлентблоків із застосуванням методу скінченних елементів. *Класичні та прикладні аспекти спадкоємної математичної підготовки у ЗВО : історичний та сучасний погляд молодих вчених і здобувачів вищої освіти : матеріали Всеукраїнської науково-практичної конференції здобувачів вищої освіти та молодих вчених (Харків, 08-09 квітня 2021 р.)*. Харків: ХНАДУ, 2021. С. 123-126.

