Designing honeycomb shells for rocket fuel tanks accounting for plastic deformations

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We suggest a method and a program for designing a honeycomb type rocket tank in the case of the shell losing its stability under plastic deformations. The computations involve designing the fuel tank, accounting for general and local stability losses for the shell on the whole and a specific cell at once. We assume that the minimum mass of the tank shell corresponds to the moment when general and local critical forces in the shell are equal to the assumed analytically determined failure load. We provide computation examples and a look at the user-friendly software interface. Stiffened shell design that takes the plasticity zone into account makes it possible to noticeably widen the range of loads affecting the fuel tank and to use the capabilities of its material more fully.

Keywords: *stiffened shell, honeycomb type, rocket, tank, elastic and plastic strain, general and local stability losses, critical forces, analytically determined failure load*

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