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The Modern Day Space Elevator as a Permanent Transportation Infrastructure (3)

Author: Ms. Ayla Malikova
Azerbaijan State University of Economics, Azerbaijan

Ms. Zahida Mirzayeva
Azerbaijan State University of Economics, Azerbaijan

LIFTING THE FUTURE: UNDERSTANDING THE IMPACT OF MATERIALS AND ENERGY ON SPACE ELEVATOR

Abstract

A space elevator has the potential to make the space exploration as simple as taking an elevator.Currently, the transportation of cargo into space and the accomplishment of research are implemented by means of rockets.However, the cheapest way to get to orbit may not be a rocket, but an elevator.The space elevator could make the space travel more widely and economically accessible by reducing the cost and technical complexity.Moreover, it would be much cleaner than rockets from an environmental perspective; no fuel would be burned and no harmful greenhouse gas emissions would make it environmentally superior.Firstly, the main problem here is what material the cable is made of and the energy that drives it.According to NASA, the technology needed to build the space elevator exists, however, the material needed to make the cable is lightweight, flexible, and at the same time strong enough to endure excessive forces.The results show that nanotubes are 100 times stronger than steel and have the ability to be as flexible as plastic.Although these nanotubes are theoretically strong, they are difficult to manufacture into long, durable cables.Carbon nanotubes might be the first binding material that comes to mind for the space elevators, but graphene, a form of carbon that is essentially two-dimensional, can be scaled up more easily than nanotubes ,and could be a better option.Another critical challenge is the energy supply required for the movement of the elevator.Using lasers, the energy can be used to move the space elevator's cabins by wirelessly transmitting energy.In this case, the position of the elevator on the surface of the Earth plays a critical role, because it can be blocked in bad meteorological conditions (rain, storms).However, many questions remain unanswered, and there is still no global consensus on its underlying technology, feasibility, or even definition of the space elevator.The aim of this study is to find solutions to these questions with our own approach.The results confirm previous studies that if this project is implemented ,a revolution in the space industry could occur.