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CENTRIFUGAL SPACE STATION

Abstract

The negligible amount of gravitational force/microgravity in space is only beneficial for unmanned space missions. But when it comes to manned spaceflight in orbiter missions or manned deep space exploration, it becomes difficult for humans to face the effects of microgravity when we land back on Earth because of our biological limitations. In microgravity, there is no load acting on our bones and muscles hence, our bones lose minerals as well as our muscles begin to weaken and shrink. Thus, there is a need of gravity which is similar to that on Earth when manned space operations are concerned and the ideal solution of centrifugal space station is suitable for this problem. We can make the space station to rotate about its axis which will create a centrifugal/outward force, this will keep us humans constantly being pulled towards the outside walls of the circumference of space station. To produce enough gravity which is similar to Earth's gravity, there are two possible conditions, the first is we either make the structure similar to the size of the International Space Station(ISS) and rotate it incredibly fast or we increase the size of the structure and rotate it at considerable amount of speed. The problem for the first condition is that if we spin it at a very high speed, the blood in our body won't reach our brain and we will pass-out. The problem for the second condition is that we do not have enough amount of material here on Earth as well as the finances required to build the huge structure. Hence, we have to compensate with a larger structure and the fact that we do not have enough materials and enormous amount of money to procure and build such large space stations is limited only on Earth. We can implement Space mining and manufacture individual components in space itself, this will reduce the cost of bringing materials in vast quantities on Earth by considerable amounts. There are huge quantities of metals and non-metals readily available on asteroids, moons and other planets and we just need to procure them. In this paper, size and strength calculations, material selection, ways of procuring materials, cost, method of transport of parts and assembly for a rotating space station are discussed.