

**LUNAR LAVA TUBES AND ARTIFICIAL TUNNELS: HABITATIONS FOR THE NEAR TERM FUTURE.** A. A. Mardon. Suite # 16, 10324- 119 Street, Edmonton, Alberta, T5K-1Z6. CANADA.

**Introduction:** The primary idea and principle for this article is about human habitation inside the tunnels in the moon. The tunnels can be either formed by the lunar lava tubes or excavated by robotic devices.

**Lunar Lava Tubes used as Lunar Base:** Lunar lava tubes are elongated depressions formed by channels of molten lava. Such channels are usually created by high extrusion rates of low thickness magma. The benefits of living in the caverns are avoiding radiation, micro-meteorites impacts and the dust. The chance of micro-meteorites hitting the Moon is of a stochastic process which cannot be predicted. The roof of the lava tubes cannot be measured by humans on Earth and it is more than 10 m. The thickness of the roof and floor has to be carefully measured before the establishment of a lunar base. Another advantage is that the space fabrics can be lined in the elongated caverns as a protection for the instruments and a protection from the radiation with an airtight seal. Finally, the temperature in the lava tubes is about -20C which is an ideal temperature for human habitation. The lava tubes is a ready-made structure for a lunar base because the air can be sealed tightly within the inflatable balloons. However, the distribution of the lava tubes is still unclear. This problem can be overcome by more remote sensing analysis and inventory of the surface. The power for the residents inside the lava tubes balloon can be generated by the solar cells installed outside the lunar base. In conclusion, the lava tubes can protect human activities of a lunar base from radiation, micro-meteorites impact and dust in an economic way.

**Robotic excavation of tunnels for a moon base:** The proposed idea is that, firstly, a robot will be sent from the Earth to the Moon. Secondly, a robotic excavator landing on the Moon will make the preliminary tunnel. It will look like the shape of a bottle at a lateral view. Thirdly, the robot digs a hollow tunnel with a bottleneck which enables the lander to seal the tunnel. Finally, the robot will blow up a durable balloon which would be suitable for human beings. The cross section of the tunnel will look like a semi-circle. The conglomerate of several bottle shaped tunnels will become the sustainable environment for humans. Thus, it is possible to generate power through solar cells outside the tunnel for the residents in the tunnel. The oxygen will be generated from plants in another branch tunnel so that sufficient level of oxygen can be maintained. Furthermore, the plants can be used for human consumptions. The advantages of excavating in moon are that:-  
A. It is relatively close to Earth as far as distance is concerned, therefore, it is less costly. B. The robotic excavator will be an efficient machine to use due to the lower gravity condition and the long hours to dig a large enough tunnel. Also, it is cheaper for the machine to do this dangerous and dirty job. C. A base can be set up before humans arrive on the Moon with relative ease.

**Conclusion:** The idea of living in a tunnel maybe extended from the stone age practise, but it is a possible as well as a plausible idea. Since the lunar environment and the geographical aspects support this concept perfectly, we can maximize the benefits of the endowment of the nature for near future human habitation in the moon.