BUILDINGS OF GREAT INNER SPACE CREATED WITH LOW ASSET REQUIREMENT AND HIGH EFFICIENCY FOR THE MOON. ***B. Boldoghy[1], J. Kummert[1], T. P. Varga[2], I. Szilágyi[2], I. Darányi[2], Sz. Bérczi[3], T. N. Varga[4], G. Hudoba Jr.[5],*** [1] Ferroelektric Engineering Pan Konceptum Ltd., H-1116 Budapest, Vasvirág sor 72., Hungary, (konceptum@vipmail.hu), [2] VTPatent Agency, H-1111 Budapest, Bertalan L. u. 20., Hungary (info@vtpatent.hu), [3]Eötvös Loránd University, Institute of Physics, H-1117 Budapest, Pázmány P. s. 1/a., Hungary (bercziszani@ludens.elte.hu). [4]Eötvös József High School, H-2890 Tata, Tanoda tér 5. (mirene@freemail.hu), Hungary, [5]Hudoba Design, 6611 Oakland str. Pennsylvania, 19149 PA, USA. (ghudoba@aol.com)

Introduction: The essence of our proposal is a plan, architectural concept, a building technology for constructing lunar base buildings of great inner space and made of local materials. The local materials are partly transformed by various technologies: by baking (to brick units), bagging (to unit sacs) and simple moving of the regolith to cover building.

The emplacement of the building has two different positions: on the surface or below the surface with 5-10 meters. The constructions and their cross sections are shown in Fig. 1-2., and the thermal conditions of the buildings are shown for these two situations in Fig 3.

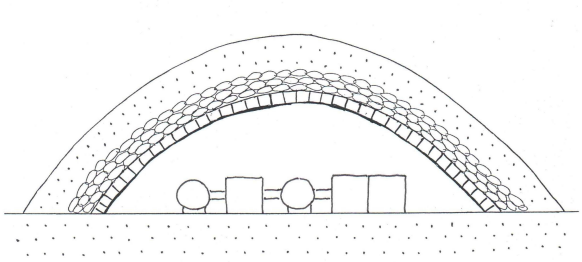


Fig. 1 *Cross section of building of great inner space with arched structure on the Lunar surface*

Even if it is built on the surface and the inner temperature is as changing as the surface temperature, the structure still keeps its protective characteristics against radiation and impacts (Fig. 1.).

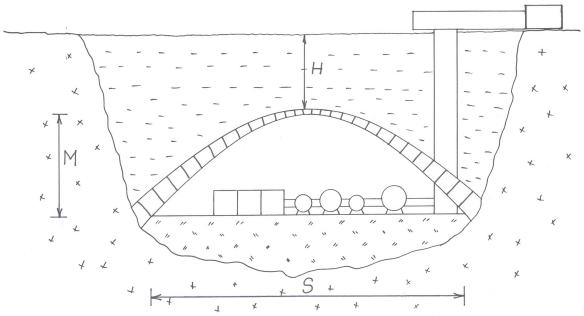


Fig. 2. *Cross section of a building of great inner space formed in a Lunar valley or ditch.*

When the building is deep under the surface (Fig.2.) then the temperature amplitude is more balanced then in the surface building (Fig. 3.).

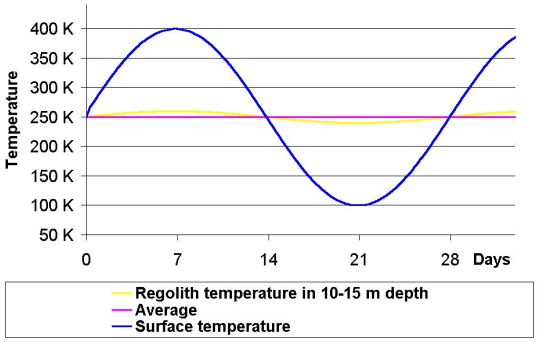


Fig. 3 *The run of the temperature during the Lunar day and night on the Lunar surface and in 10-15 m depth*

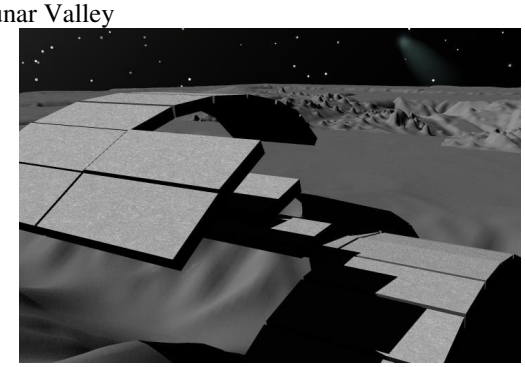
The coating of the building consist of 3 layers:
I - Inner Building Shell
II - Bagged Covering Layer -III - Outer Covering Layer Their production has 3 different technical level:
I – Inner Building Shell - made of Bricks - it requires high technical level II – Bagged middle Covering Layer - it requires medium technical levelIII – Outer Covering Layer, made of Lunar regolith - it requires low technical level
Only the bricks of the inner building shell should be created „in situ" with high technical preparedness (forming, heating or binding)**Structural relations**

Inner Building Shell	1 unit	e.g.	0.3… 0.5 m
Bagged middle Covering Layer	3 unit	e.g.	0.9 1.5 m
Outer Covering Layer	3-5 unit	e.g.	0.9… 2.5 m
Whole skin of the building	7-9 unit	e.g.	2.1… 4.5 m

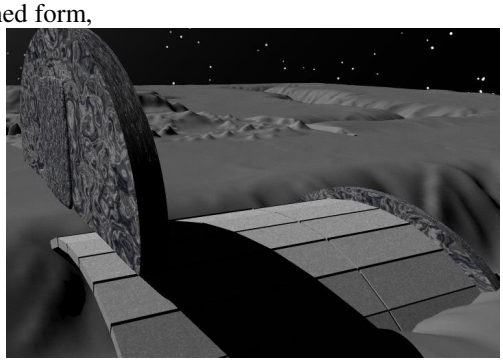
Only the 1/7 – 1/9 of the whole skin is the inner building shell made of „bricks", which requires high level technology. It is the only the 11-15% of the total thickness.

It means, that almost half of the building's technological and material requirements can be ensured mostly with the moving of the Lunar regolith, by low technological requirements. The 33-42% of the constructing material is the bagged and moved of the regolith. The remaining near 50% is of the coating material is only moved.

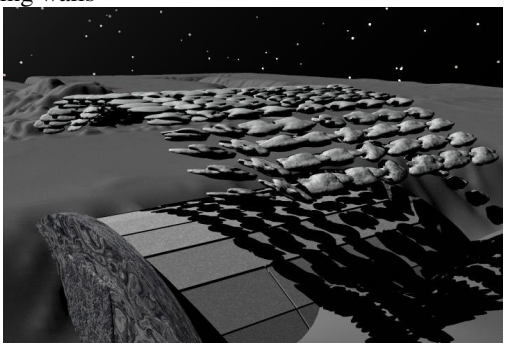
- The main steps of the building of great inner space construction in a Lunar valley: Choosing a proper Lunar Valley



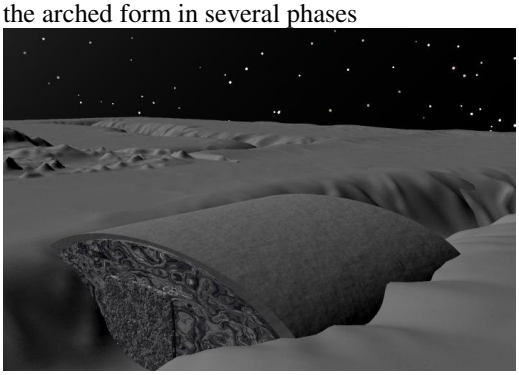
- Placement of the building elements and shaping the arched form,



- Placement the necessary additional parts, e.g. vertical closing walls



- Placement of the bagged regolith for the outer side of the arched form in several phases



- Covering the whole structure with Lunar regolith

Considerations of the efficiency

The same machinery is usable in several technological processes. E.g. Lunar regolith and dust collecting and transporting devices are necessary for all phases,
- for collecting the raw material of the „brick"
- for collecting and filling the lunar dust to the bags-
for the final outer covering of the building
It results the devices and apparatus are significant minimalized to be transported to the Moon.

The advantages of our proposal: The technology proposed by us enables the creation of buildings (depending on the brick size) from a span of 8-10 m to 20-30 m or even 60 80 m with an arbitrary length. It has got a low technology requirement, and few components should be transported from Earth. All of the required components can be found under lunar circumstances, and the building can be easily created. Protects from cosmic radiation, meteor impacts, and from the heavy radiations of the Sun.

When placed in lunar valleys or ditches, and the upper part is covered by regolith, it provides an inner space with a balanced temperature. The technology of our proposal enables the building of hangars and storages in a massive scale, for long time periods. These can be used both for human or industrial purposes. **References:** [1] Kummert et al., Organizational Concept of Buildings of Levelled Temperature Interior Space on the Moon, SRR VII conf. 2005 (*#2007*), [2] Boldoghy, et. al., Construction of a Lunar Architectural Environment…, 37 LPSC 2006 (#1152), [3] Boldoghy et. al.: Feasibility Concept Of Creating Protected Spaces, SRR VIII conf. 2006, [4] G. A. Smithers et. al., A One-Piece Lunar Regolith-Bag Garage Prototype, SRR VIII conf. 2006, [5] Boldoghy, et. al., Practical Realization of Covering Lunar Buildings for Ensure Leveled Temperature Environment 38 LPSC 2007 (#1380).