

Apollo “Moon Boxes” made at Y-12

Because of the 40th anniversary of the landing of a man on the moon, we will take a brief diversion in our Y-12 history series to jump forward in time to 1969. Here is the story of the Moon Box at Y-12.

Y-12 had a role in man’s first landing on the moon. The historic record-setting landing was 40 years ago on July 20, 1969. Apollo 11 landed in the Sea of Tranquility and nearly 50 pounds of moon rocks and soil was returned to earth for study.

Y-12’s role in support of the National Aeronautics and Space Administration (NASA) Apollo Program was to supply the “moon boxes” officially named the *Apollo Lunar Sample Return Container*. The box was machined from a solid piece of aluminum. It was an exceptionally well made box that was seamless except for the lid opening which had a metalized gasket that firmly sealed when the lid was closed. Four metal straps secured the lid.

Six Apollo missions, flown between 1969 and 1972, brought back a total of 842 pounds of lunar material including 2,200 separate samples of lunar rocks, core samples, pebbles, sand and dust. Most of the samples remain stored in the Apollo Lunar Sample Processing Lab and Storage Vaults at Johnson Space Flight Center in Huston, Texas.



Fig. 1. Apollo Lunar Sample Return Container (Moon Box) open showing plastic bags to segregate lunar material.

A small amount of the material is also located at the White Sands Space Harbor in New Mexico. The samples have been studied by scientists in the United States and continue to be studied by various scientific groups around the world.

The result of this tremendous opportunity for studying the actual material from the moon has provided invaluable knowledge. Even now as NASA prepares to return to the moon, the materials are continuing to provide exceptional details and much needed information.

In a report, compiled by F. D. Mundt, J. M. Schreyer and W. E. Wampler issued February 16, 1973, containing details of the design, development and fabrication of the moon box is found the following rationale for its existence. While it was a wonderful conception in its heyday of actual use and proved to be a most practical tool, it is still a marvel of design and machining even today.



Fig. 2. Machining the inside dimension and creating the rib construction for added strength on a milling machine at Y-12.

The report states, “In the late 1950’s and early 1960’s, plans were formulated to achieve the goal of a manned lunar exploration. The chosen program designation was Apollo, and it had as its prime objective the landing of American astronauts on the lunar surface and their safe return to earth with samples of lunar materials.”

“These samples were to be carefully chosen from each landing site so that earth-based scientists would be able to characterize the moon and hopefully answer some questions regarding the genesis of the universe.”

“A Lunar Surface Experiments Program was established to fulfill these exploration experiments. This program consisted of two parts; (1) the Apollo Lunar Surface Experiments Package which was a self-contained group of experimental instruments and supporting subsystems that allowed lunar geophysical data to be returned to earth by radio frequency transmission, and (2) the Lunar Geological Equipment which included those tools used by the astronauts in gathering lunar surface materials for return to earth in the spacecraft.”

“Since only a small volume of samples could be returned to earth by each mission, the samples not only had to be carefully selected but also carefully protected from anything which might affect their scientific content. Such detrimental agents as the earth’s atmosphere, contamination from the collection hardware, and breakage due to vibration of the spacecraft were of prime concern to the scientists awaiting the samples.”

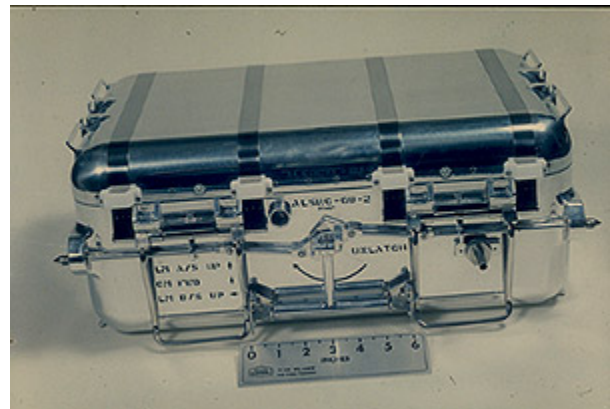


Fig. 3. Apollo Lunar Sample Return Container (Moon Box) packed up and straps closed.

“These reasons, along with the fear of the unknown (namely biological contamination of the earth), led to the requirement for Apollo Lunar Sample Return Containers that would maintain structural and vacuum integrity throughout an Apollo mission.” And that’s where Y-12 came into the picture.

The moon box was not the first project Y-12 did for NASA. That was the “BIG” project or the “Blood in Gravity” sample container that was approximately two inches by four inches by one inch thick with a three inch handle on it. The container served to hold blood samples that were examined immediately upon the return of the Gemini spacecraft.

The project was used to determine if the flights beyond the earth's atmosphere would adversely affect human blood. Y-12 built the blood sample containers, took the units to the spacecraft, inserted the container of blood samples as the last item on the flight and then took the samples off as the first item to be retrieved from the spacecraft.

The experiment proved that blood was not altered when taken into space. But for Y-12 it proved to be the lead in project that led first to the moon box project but has continued to provide a beneficial partnership between Y-12 and NASA over the years and even continues today.

Next week, we will continue to examine the moon box project at Y-12.