

PRELIMINARY REPORT ON DRILL STEM 70007

SAMPLE HISTORY

Drill stem 70007 is the third section from the top of the Apollo 17 drill string and contains approximately 30.5 cm of core. The top of this section of core is from 62.7 cm below the lunar surface. The drill string sampling location was about 40 meters north of the ALSEP central station. The entire drill string, with a total length of about 294.5 cm of core, has three major stratigraphic units of core: an upper, coarse-grained interval 107 cm thick; a middle, fine-grained anorthositic interval 56 cm thick; and a lower interval 131.5 cm thick, which consists of fine-grained breccia-rich regolith with thin strata of coarser material.

Drill stem 70007 was only partly filled. A void of about 10 cm at the top allowed slumping to disturb natural stratification down another 8 cm according to the x-radiograph interpretation. The exact cause of the void cannot be determined, but it is thought to be related to a partly uncoupled joint between 70007 and 70008. The lower 2 cm of 70008 was also void. The poor sorting and coarseness of 70008 may have provided plug resistance during extraction on the moon, while the finer soil of 70007 allowed movement.

Before the drill stem was opened by milling, the soil was confined by inserting a hollow teflon plug and aluminum foil stay at the upper end. For this operation, the drill stem was oriented vertically. The plug was pushed in until moderate resistance was felt at 9.5 cm below the tube opening.

The lower end of the tube was capped by a hollow teflon flight cap. It was necessary to replace this cap by an internal-fitting teflon tube plug. Although the soil in the flight cap was loosely packed, the solid tube plug penetrated the tube only about 5 or 6 mm of the required 26 mm. The 20 mm or so of soil obstructing the proper placement of the plug was pushed into the tube by screw compression during mounting of the drill stem in the milling machine. It was felt that the soil was very loosely packed by the upper plug emplacement, and that more compaction was desirable for the rigors of milling. The soil in the lower end was also loosely packed due to the 26 mm void created when the male end of 70006 was uncoupled from the lower end of 70007. The flight cap, being hollow, did not fill this void.

Steve Waltz ~ 1975

.On August 1, 1975, drill stem 70007 was longitudinally split on a mulling machine. After being affixed in a troughed dissection table, the upper half of the tube was lifted off and set aside. Soil remained in the upper split half along the lower 4 cm and tapering up another 2.5 cm. This soil was tightly compacted by insertion of a tube plug. Reference scales were mounted so that the lower plug/soil interface was aligned with the 40 cm mark and that the upper end of the tube was aligned with the zero cm mark. The upper plug/soil interface then became established at 9.5 cm.

PRE-DISSECTION DESCRIPTION

From x-radiographs of drill stem 70007, four units were interpreted on the basis of size distributions and inferred compositions. (See the attached chart.)

Examination of the exposed surface of the core revealed no apparent color or tonal differences. Consequently, no layering could be inferred based on that parameter. The overall color was between 10yr 3/1 and 5y 3/1 on Munsell's color chart.

Variations in the gross surface texture (development of a rind of compacted soil) give some indication of changes in physical properties of the soil. Between 9.5 and 21.5 cm, the surface is a nearly unfissured, continuous rind with pockets of relatively coarse shiny particles. The overall appearance is speckled. At 21.5 cm a transverse crack in the rind marks the beginning of a less continuous rind with many longitudinal fissures. The overall appearance is sheen-like. It may be that slumping began at 21.5 cm and that the transverse crack is the overlap formed by reconfinement.

Only minor compositional changes could be seen in the coarse particles, none of which were larger than 2 mm in mean diameter. No orange glass was noted as was in 70008 and 70009. The matrix material is in the silt size range with a mean grain diameter estimated to be 5.5 phi units or about .02 mm.

DISSECTION PLAN

Since no stratigraphic units are apparent at the surface, it is suggested that standard dissection procedure be followed. Effort should be made to determine the extent of disturbance from slumping. The soil in the upper split half should be dissected simultaneously with that in the corresponding lower split half, in order to provide comparative statistics between intervals. Dissection should begin at the lower end so that the upper split half of the drill stem may be removed.