



Geophysics
International

CASE HISTORY

DELINEATION OF SUBSURFACE TOMB (WAN LI TOMB) AT THE SHI SAN LING AREA, HOPEH PROVINCE, PEOPLES REPUBLIC OF CHINA

Petro-Sonde Survey - Archaeology Division

LOCATION. Wan Li Tomb, Hopeh Province, Peoples Republic of China.

TOPOGRAPHIC CONTROL. Brunton compass and tape.

OBJECTIVE OF THE PETRO-SONDE SURVEY. Rapid detection of subsurface voids, without a drill hole, would be a great aid to archaeologists in the search for and excavation of, ancient tombs. This study will demonstrate the Petro-Sonde's ability to detect specific changes in the character of the electrotelluric signal which can be directly correlated with changes in the subsurface medium.

GEOLOGY. Unconsolidated soil overlying Limestone tomb.

PETRO-SONDE SURVEY STRATEGY. Two points directly above the tomb and one 33 meters away from the tomb were chosen as survey sites. The surface configuration and tomb floor plan made this a simple task. See Figures #1 and #2. The depth to the floor of the tomb was estimated by counting the steps down into the structure. The height of the ceiling was estimated by measuring and counting bricks in the wall. In this manner, the depth and height of the tomb were established and could then be compared with the electrotelluric signal response.

CONCLUSIONS AND COMMENTS. At each survey station an electrotelluric log was constructed from the surface down to 50 meters. The tomb caused a distinct and recognizable distortion of the electrotelluric signal in the projected depth interval. Figure 3 shows the depth and height of the tomb at each survey station. Figure 4 shows the electrotelluric logs superimposed on the tomb configuration. The slight deflections in the log at station #3 are most likely caused by minor changes in lithology.

The primary value of the electrotelluric survey is that it can eliminate drillsites where there are no apparent voids. Where a void is detected, at least one hole should be drilled to corroborate. Once that is established, a detailed grid pattern can be surveyed to establish the exact size and shape of the void.

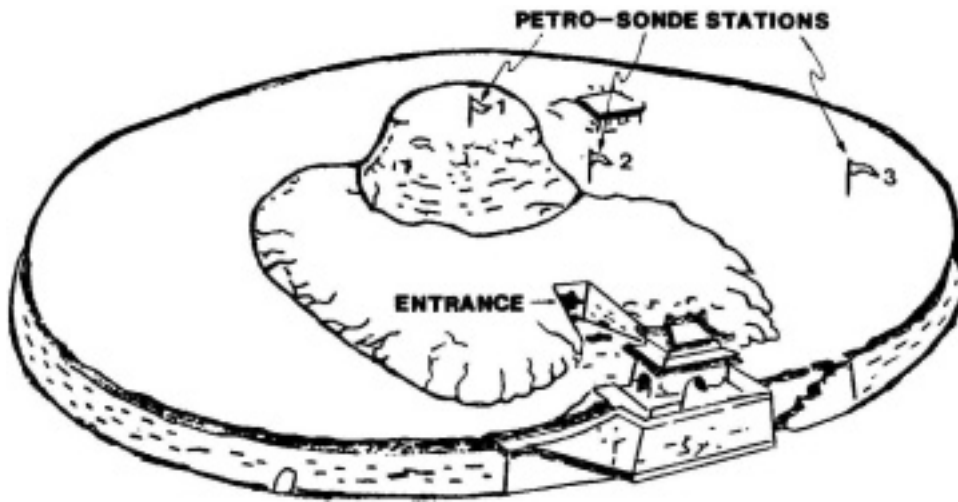


FIGURE 1. SURFACE TOPOGRAPHY OF WAN LI TOMB, SHI SAN LING, HOPEH PROVINCE, PEOPLES REPUBLIC OF CHINA.

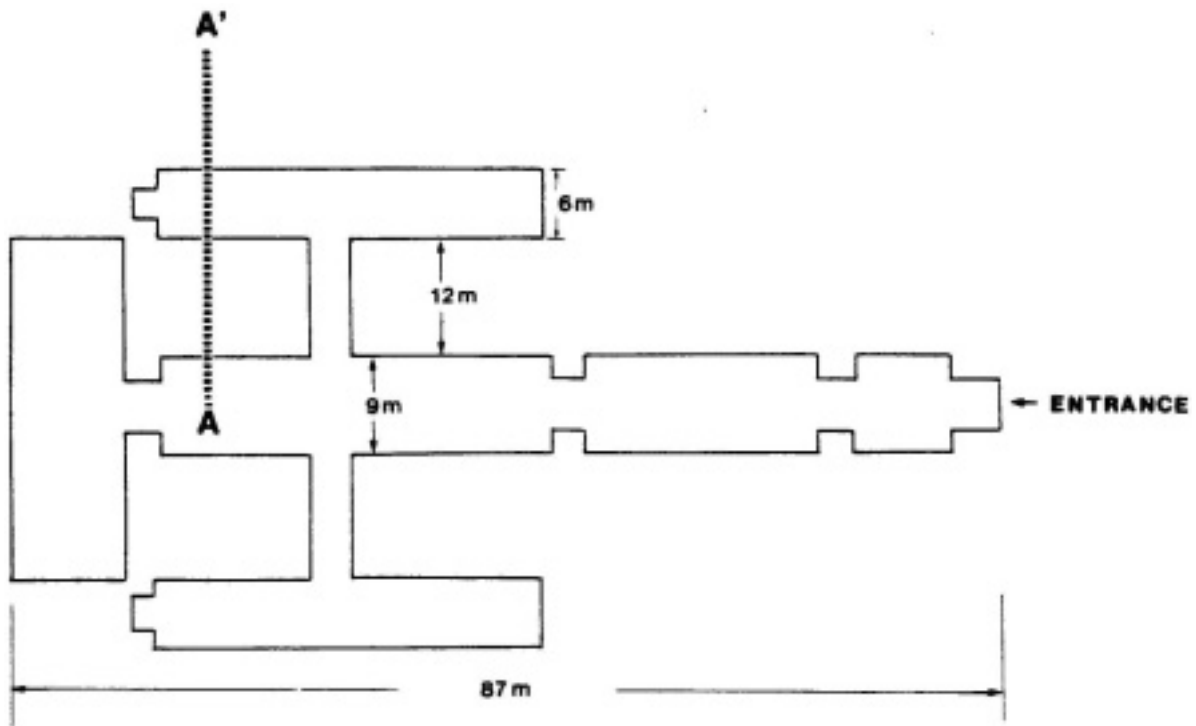


FIGURE 2. PLAN VIEW OF WAN LI TOMB.

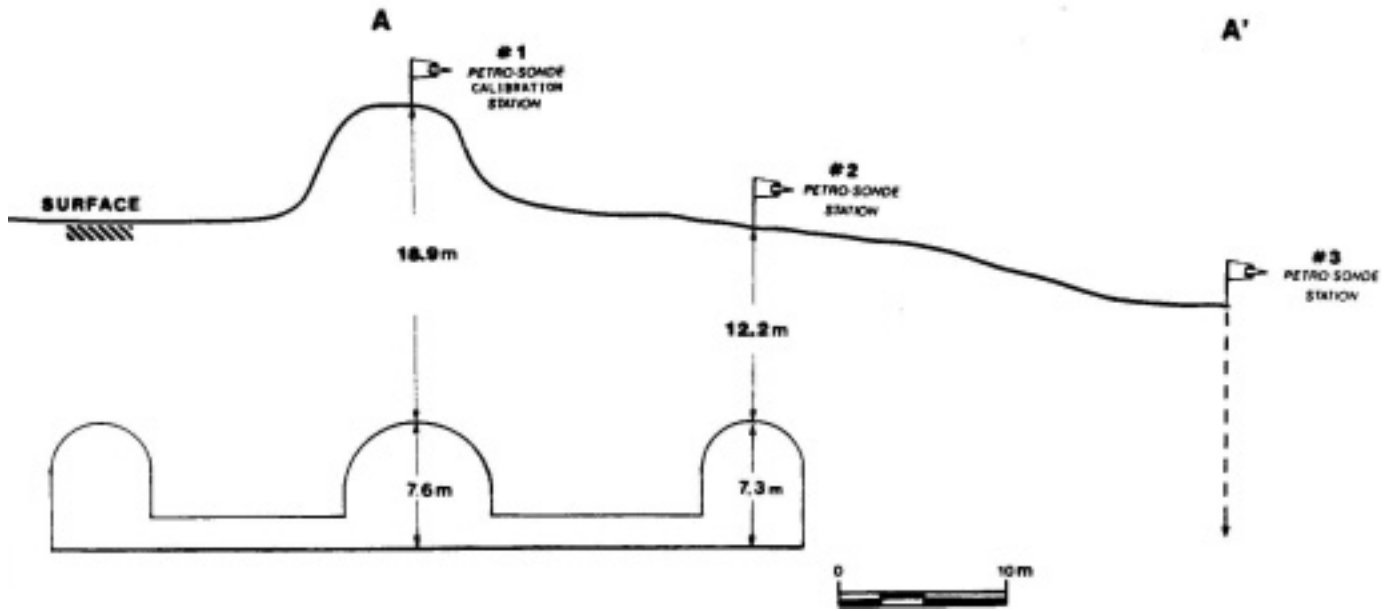


FIGURE 3. DEPTH AND THICKNESS OF TOMB AS DETECTED BY ELECTROTELLURIC SURVEY.

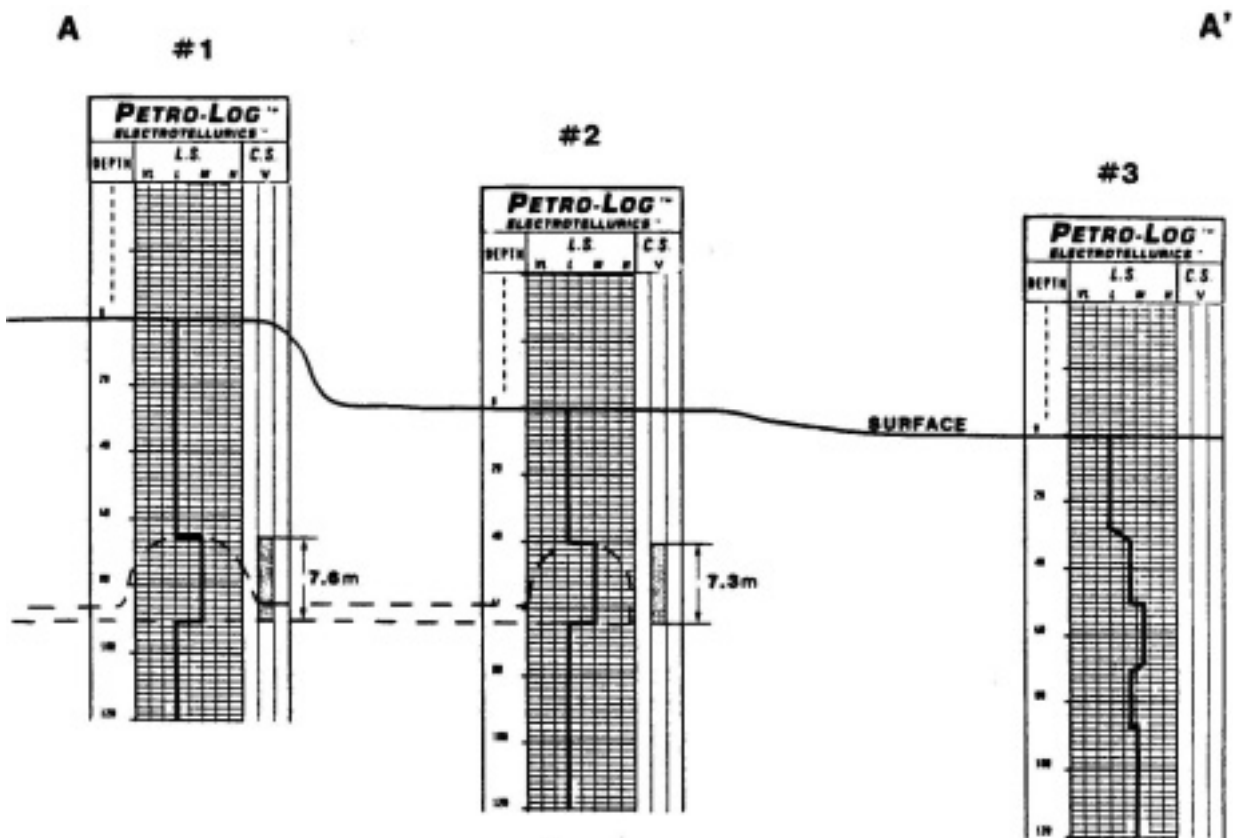


FIGURE 4. DATA PRESENTATION. PRESENCE OF VOID CAUSES DISTINCT AND RECOGNIZABLE DISTORTION IN THE CHARACTER OF THE ELECTROTELLURIC SIGNAL.