The Significance of Water Projects in Ancient Cretan Civilizations

Minoan technological developments in water management principles and practices are not known as well as other achievements of the Minoan civilization, such as poetry, philosophy, sciences, politics, and visual arts. To put in perspective the ancient water aqueducts discussed in this paper, it is important to examine their relevance to modern times and to harvest some lessons learned. The relevance of ancient works will be examined in terms of the evolution of technology, the technological advances, homeland security, and management principles. With a few exceptions, the basis for present day progress in water transfer is clearly not a recent development, but an extension and refinement of the past.

Archaeological and other evidence indicate that, in the Bronze Age in Crete, advanced water management and sanitary techniques were practiced in several settlements. This period was called by the excavator of the “palace” at Knossos sir A. Evans as Minoan after the legendary king Minos. Thus, Crete became the cradle of one of the most important civilization of mankind and the first major civilization in Europe. One of the major achievements of the Minoans was the advanced water management techniques practiced in Crete at that time. The advanced water distribution and sewerage systems in various Minoan palaces and settlements is remarkable, because there are evidences that several water techniques were unknown before the Minoan era. These techniques include the construction and use of aqueducts, cisterns, wells, and fountains, the water supply systems, the construction and use of bathrooms and other sanitary and purgatory facilities, as well as wastewater and storm sewer systems. The hydraulic and architectural function of the water supply and sewer systems in palaces and cities are regarded as one of the salient characteristics of the Minoan civilization. These systems were so advanced that can be compared with the modern systems, which were established only in the second half of the 19th century in European and American cities (Lyrintzis and Angelakis, 2006).

Achievements of water and wastewater technologies in ancient Crete, since the Minoan civilization are considered in this Gallery. Emphasis is given to the water resources development such as aqueducts, cisterns, wells, distribution systems, wastewater and stormwater sewerage systems construction, operation and management beginning in the Minoan times (2nd millennium B.C.). The achievements of this period in order to support the hygienic and the functional requirements of palaces and cities were so advanced that could be paralleled only to modern urban water systems that were developed in Europe and North America only in the second half of the 19th century (Angelakis and Spyridakis, 1996). It should be noted that hydraulic technologies in ancient Greece are not limited to urban water and wastewater systems. The progress in urban water supply was even more admirable, as witnessed by several aqueducts, cisterns, wells, and other water facilities discovered, including the famous Minoan aqueducts of Knossos and Tylissos, the cisterns of Zakros, Archanes, Pyrgos and Tylissos, the wells of Paleokastro, Zakros, and Itanos (e.g., Koutsoyiannis et al., 2008). These advanced Minoan technologies were expanded to the Greek mainland in later periods of the Greek civilization, i.e. in Mycenaean, Archaic, Classical, Hellenistic and Roman periods.

These technologies, although do not give a complete picture of potable water, wastewater and stormwater technologies in ancient Greece, illustrate that such technologies have been used in prehistoric Greece since about 4,500 years ago. These advanced technologies began in the Minoan Crete and subsequently were expanded to
Mycenaean and then the Archaic and Classical Greece. In light of these historical and archaeological evidences, it turns out that the progress of present day in urban water and wastewater technologies as well as in comfortable and hygienic living is not as significant as we tend to believe (Angelakis and Koutsoyiannis, 2003 and Koutsoyiannis and Angelakis, 2004).

This technological progress was accompanied with good understanding of the water and wastewater related phenomena. Thus, ca. 600 B.C., Greek philosophers developed the first scientific views on natural hydrological and meteorological phenomena. Later, during the Hellenistic and Roman periods, significant developments were done by Cretans in hydraulics, such as in the construction and operation of aqueducts, cisterns, wells, harbours, water supply systems, baths, toilets, and sewerage and drainage systems. Several of such projects are presented in this Gallery. Some examples are the aqueducts of Gortys, Chersonisos, Arkadia, Lyttos, and Polyrhrenia, the cisterns in Minoa, Eleftherna, Aptera, Dreros, Kissamos, Polyrhrenia, and Lato, the harbour in Phalasarna, the water supply systems in Kissamos, and the baths and sewerage and drainage systems in Aptera, Eleftherna, and Kisamos. Further improvements were achieved by Cretans during the Byzantine and Venetian periods, when a further development of hydrotechnologies, such as aqueducts, cisterns, and water supply and sewerage systems was achieved. Several sophisticated defense structures, including famous water supply systems were also constructed at those periods.

In the photographs included reflect existing remains of water projects in ancient Cretan Civilizations. Those are thousands years old. However, most of those water projects are characterized from their adequacy, wholeness, and compliance. In some of those, the achievements of the periods referred in order to support the hygienic and the functional requirements were so advanced that could be paralleled only to modern urban water systems that were developed in the developed world only in the second half of the 19th century.

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References


