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# AN INTEGRATED ARCHAOMETALLURGICAL TYPOLOGY OF ARCHITECTURAL CRAMPONS AS A METHOD FOR RECONSTRUCTING THE IRON ECONOMY OF ANGKOR, CAMBODIA (10TH TO 13TH C.).

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Iron economy, archaeometallurgical typology, Khmer empire, architectural crampons

## Abstract

The Khmer Empire, based at the UNESCO World Heritage site of Angkor in Cambodia, rapidly extended their political influence across mainland Southeast Asia between the 11th and 13th c. AD. Traditionally, Angkor's power base is attributed to an elaborate bureaucratic system, regional centres, and road system. Lack of key resources around the capital suggests this network provided materials necessary to enhance a broad range of activities (e.g. construction efficiency, military capability,...). Iron with its technological characteristics and universal utility is known as being one of the most dynamic materials for facilitating social transformation. Reconstructing how iron was managed in the Khmer empire is therefore a critical perspective for drawing a socioeconomic context in terms of development of states and polities. The international IRANGKOR project was established to investigate the diachronic organization of iron consumption and distribution practices. In combination with the INDAP project, which focuses on the evidence of iron production, our broader aim is to address the overall impact that iron played in the processes of Angkorian state-building during this time period.

In this paper, we propose to discuss the results of a comprehensive archaeometallurgical typology of iron architectural supports, or *crampons* that represent the most frequent evidence of iron consumption in Angkor (9th to 15th c. CE). We have examined a statistically significant number of crampons (100) recovered from 5 temples (Royal Palace, Baphuon, Preah Khan of Kompong Svay, Angkor Wat, Preah Khan). Technological, chronological and sourcing analyses of this class of iron objects were combined to generate evidences of form, process of secondary manufacture, association with reduction systems, and date of production. The large sample size and range of construction dates for each building allow us to assess diachronic patterns of metal procurement and manufacture during the period of Khmer expansion between the 11th and 13th c. This investigation was paired with extensive analyses of the vast iron production landscape of two known production zones (central Cambodia, northeast Thailand) (200 sites) in the Khmer empire. It was therefore possible to investigate the origin of the ore resources and the smelting practices and to shed new light on the broader exchange system. Gathering all evidences permits to identify changes in the production and consumption strategies of the Khmer state that seem to be linked to key historical developments of the empire. Overall, it is possible to move towards reconstructing premodern iron economies and the interrelationship between the sociotechnical system and historic trajectory of the Khmer Empire.

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