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On the Presence of Lead in the Delhi Iron Pillar

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Abstract

The Delhi iron pillar has attracted the attention of metallurgists and archaeometallurgists for several years due to its excellent resistance to corrosion. The material of construction of the pillar is almost pure iron with entrapped slag inclusions which result due to the process of manufacture of the pillar. In the present paper, evidence for the presence of lead/lead-alloy in different regions of the Delhi iron pillar is presented for the first time. The presence of a lead sheet at the bottom of the pillar, a lead coating in some of the buried sections of the pillar, lead in between some iron lumps at waist level and in the joints of the decorative bell capital of the Delhi iron pillar are described. The possible reasons for the presence of lead in these locations are discussed. Lead present in the decorative capital comes from the time of manufacture of the pillar and evidence suggests its use for the purpose of joining. Lead noticed in the lower regions of the pillar (lead in between some individual iron lumps and lead coating on the pillar just below the ground level) is due to intentional application by the Archaeological Survey of India in recent time. The lead sheet on which the pillar rests is present from the time of its erection. The status of lead metallurgy in ancient India is also briefly reviewed. The possible effects of lead in modifying the corrosion behavior of the Delhi pillar iron is finally addressed.

デリーの鉄柱に使われている鉛について

インド、デリーの鉄柱はその錆びにくい性質によって金属学者、金属考古学者の注目を集めている。鉄柱の材料は製造工程に起因するスラグをかみ込んだほとんど純粋な鉄である。本稿ではこの鉄柱の一部に用いられた鉛と鉛合金について初めて紹介する。

柱の基礎に鉛板が使用され柱の鉄塊の接合部、腰節および柱頭の装飾の取付部分にも鉛が使用されている。柱頭の取付は創建当初からのようであるが、柱の下部（鉄塊のすき間と襦を覆っている）の鉛はインド考古調査局による意図的なものである。柱の基礎の鉛板は創建当初のものである。古代インドの鉛製錬と鉄柱の防蝕に鉛の果たした役割についても考察する。

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1. Introduction

The iron pillar currently situated in the Quwat-ul-Islam mosque (Fig. 1) near the Qutub Minar at New Delhi has attracted the attention

of metallurgists and archaeologists for its excellent resistance to corrosion. The theories which have been proposed to explain its superior corrosion resistance can be broadly be classified into two categories: the