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.

1. Introduction

The iron pillar currently situated in the Qutb Minar complex (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 classified into two categories: the