

7.1 Assessment of Roman Metalworking Waste

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Introduction

7.1.1 Just over 1kg of metalworking waste, initially identified as ‘slag’, was recovered from Saltwood Tunnel, exclusively in the vicinity of the Late Iron Age/ Romano-British settlement C15. Most was recovered by hand although a small amount (in particular the micro-slags) was retrieved from soil samples.

7.1.2 The study of metalworking waste assists with the following Fieldwork Event Aim:

to recover dated environmental and economic indicators.

Quantification

7.1.3 A total of 1.121kg of material was recovered from three separate features (grave C24, ditch C246 and pit C260). The slag types present in each context are listed in **Table 26**. All three features were of Late Roman date (Phase 6b).

Table 26: Metalworking Waste by context

Context	Provenience	Slag identification	Wt. (kg)	Comment
C23	grave C24	Vitrified hearth lining	0.048	
C23	grave C24	Undiagnostic	0.032	
C23	grave C24	Fuel ash slag	0.008	
C23	grave C24	Crucible/ mould frag	0.004	
C23	grave C24	Undiagnostic	0.004	
C23	grave C24	Vitrified hearth lining	0.108	
C23	grave C24	Undiagnostic	0.036	?smithing hearth bottom
C23	grave C24	Smithing hearth bottom	0.102	80 x 55 x 20mm
C23	grave C24	Undiagnostic	0.002	
C23	grave C24	Hammerscale - flake	0	
C23	grave C24	Hammerscale, flake & sphere	0	
C23	grave C24	Undiagnostic	0.001	
C247	Ditch C246	Vitrified hearth lining	0.082	
C247	Ditch C246	Undiagnostic	0.170	?smithing hearth bottom
C247	Ditch C246	Undiagnostic	0.062	
C247	Ditch C246	Smithing hearth bottom	0.174	65 x 60 x 35mm
C247	Ditch C246	Crucible frags	0.014	
C261	Pit C260	Vitrified hearth lining	0.050	
C261	Pit C260	Burnt daub	0.050	
C261	Pit C260	Smithing hearth bottom	0.106	75 x 50 x 25mm
C261	Pit C260	Hammerscale, mainly flake, one sphere	0.000	
C261	Pit C260	Vitrified hearth lining	0.068	
		Total	1.121kg	

7.1.4 Some iron slags are diagnostic of the process being carried out (smelting, primary smithing or secondary smithing), others are not. Undiagnostic slags may derive from either iron smelting or smithing and the process can only be determined in the light of any diagnostic evidence from the site. Other types of debris may be the result of various kinds of high temperature activities - including domestic fires - and do not by themselves indicate ironworking was taking place.

7.1.5 Much of the slag assigned to the undiagnostic category for this site is there because it was broken and generally so small in size it could not be assigned to either iron smelting or iron smithing. Dimensions for pieces unbroken during recovery are provided where appropriate (length x breadth x depth).

- 7.1.6 No slags diagnostic of iron smelting were present in the assemblage.
- 7.1.7 Slags diagnostic of iron smithing take two main forms: bulk slags and micro slags. Of these the smithing hearth bottom is the one least likely to be confused with slags produced by smelting. Its characteristic plano-convex-shape was formed as a result of high temperature reactions between the iron, iron-scale and silica from either a clay furnace lining or the silica flux used by the smith. The predominantly fayalitic (iron silicate) material produced by this reaction dripped down into the hearth base forming smithing slag which, if not cleared out, developed into the smithing hearth bottom. Three smithing hearth bottoms were present amongst the slag - one in each of the three features represented.
- 7.1.8 Iron smithing also produces micro-slugs (hammerscale) of two types: flake and spheroidal. Flake resembles silvery fish scales and is the product of the ordinary hot working and hammering of a piece of iron where fragments of the oxide/ silicate skin flake off from the iron and fall to the ground. Spheroidal are small solid droplets of liquid slag expelled from within the iron during the primary smithing of a bloom or the fire welding of two pieces of iron. Grave C24 and pit C260 produced mainly flake hammerscale and a little spheroidal.
- 7.1.9 grave C24 and ditch C246 contained copper alloy working crucible fragments which implies this may have been taking place in the same area as the ironworking, before the waste was dumped.

Provenance

- 7.1.10 The largest group of slag came from the fill of an isolated inhumation burial (grave C24). It appears the grave may have cut through a pit containing metalworking debris. The other two contexts containing metalworking waste were Late Roman deposits, both of which may have derived from the remnants of road metalling associated with trackway C1 (ditch C246).
- 7.1.11 It was common for iron slag to be dumped on Roman roads to help form a compact and resilient surface. Slag produced as a result of the smelting industry in the Weald was used on the Roman roads there and was a useful way of disposing of quantities of this waste. If this was the case at Saltwood, then any disturbance to the road after the deposition of the slag could have resulted in its redistribution into the adjacent features as residual finds.

Conservation

- 7.1.12 Iron slag, being fayalitic (an iron silicate), does not deteriorate and needs no special storage. Any decision on disposal of the material should be based on the likelihood of further work but otherwise there seems no other reason to retain the material after publication.

Comparative material

- 7.1.13 Small amounts of iron smithing slag, thrown into cut features after being cleared out of the forge, or further redeposited should the initial dumping area be disturbed, are ubiquitous all over Britain. They form the most common assemblages of iron slag.

Potential for further work

- 7.1.14 The study of the slag assists with the following Fieldwork Event Aim:

to recover dated environmental and economic indicators;

- 7.1.15 The fragments of crucible may demonstrate that both iron- and copper alloy-working were taking place together within or just outside the Roman settlement. The crucible fragments of crucible (one may be part of a mould) should be examined by the relevant specialist and could be test to determine the alloy involved.
- 7.1.16 There is no recommendation for further work on the iron slag since such small amounts discarded in pits and disturbed by burials and later cutting merit no further attention. It if appears that slag was being deliberately dumped on roads as metalling, this should be mentioned in any publication, as should the fact that the dump also contained non-ferrous waste.