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Qualitative analyses of copper alloy objects and scrap from Site S, Chelmsford

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The objects and scrap metal were analysed by energy dispersive x-ray fluorescence. By comparing the spectra obtained with those of known alloys, approximate compositions could be suggested for the objects. These figures should only be taken as a guide as the variable degree of corrosion and object size and shape all affect the readings recorded. I should like to thank Neil Pratt for carrying out all the analyses.

All the tag ends (AM 817397-414) were of brass (copper with around 10% zinc) containing up to a few percent of lead too. No tin was detected.

The scrap sheet (AM 817415-21) was all quaternary alloys containing copper, zinc, lead and tin, though in varying proportions. Most of the samples were of similar composition to the tag ends but with the addition of a few percent of tin. One example (AM 817416) contained significantly more tin while another (AM 817418) contained only a few percent of zinc. The lead levels were, on average, somewhat lower than for the tag ends.

The other objects (AM 817422-39) were more variable in composition. Of the buckles (AM 817422-30) only one (AM 817423) contained no tin and all except AM 817429 contained about 5-10% zinc (this object contained only a few percent zinc). Lead levels were generally low, comparable with those of the scrap sheet.

The object made of sheet included three of composition comparable with that of the tag ends (AM 817431, 817436 and 817438), three comparable with the scrap sheet (AM 817434-5 and 817439) and two (AM 817432-3) of quaternary alloys containing only a little zinc.

The composite object (AM 817437) was originally tinned all over but in some areas this coating has worn off. Analyses of both white and non-white areas gave similar spectra; the object is probably a brass containing about 10 percent zinc but also a few percent of both tin and lead.