

LEAD

the facts

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CHAPTER 1

INTRODUCTION

Lead is one of man's most valuable commodities. Occurring naturally in the environment, the metal is mined and processed in some 60 countries. The usage continues to increase and has risen from 4 million tonnes per year worldwide in the 1960s to 6 million tonnes in the 1990s. Of this, nearly 2 million tonnes per year is produced in Europe. Secondary production or recycling is now widely practised and currently accounts for some 70 per cent of usage worldwide.

Lead has some important properties, in particular malleability (i.e. it can be hammered into shape), ease of production, ease of melting and joining, and good corrosion resistance in most common environments. As a result, it has been used for purposes such as roofing, window frames, piping, kitchen/tableware and ornamental uses for many centuries. Its high density has proved effective for weights and anchors for fishing lines, boats, and later for munitions. This property is now utilised in lead radiation screening and soundproofing. The electrochemical properties of lead enable it to be used in storage batteries in all motor vehicles, and for some back-up power supplies. Certain compounds of lead, particularly brightly coloured lead oxides, and leaded glasses and leaded glazes on ceramics, have been used for millennia. The use of most leaded paints has recently been phased out, but lead is still an important addition to some glasses and glazes.

However, it has been known since ancient times that exposure to lead can have serious consequences for health. Accounts of symptoms consistent with chronic lead (and other metal) poisoning dating from the Roman period have been found, and there is evidence that many, in particular the nobility at the time, suffered from high exposure to lead. Up until recent decades, many workers suffered lead poisoning from exposure in the workplace.

Today, it is known that exposure to lead can cause adverse effects on many parts of the body. The organs potentially most affected are the brain and nervous system, kidneys, blood, and the reproductive system of both sexes. Lead in certain forms is also considered a possible carcinogen. Of particular concern is that relatively low levels can affect the developing foetus and young children, impairing their mental development and causing a small but measurable decrease in IQ. However, clinical symptoms are only found in very highly exposed

individuals (who are usually exposed at work) and this is now extremely rare in the Western World.

Although mining, processing, manufacturing and the use of lead-containing products, together with recycling and waste disposal will continue to give rise to small emissions and losses to the environment, responsible action by industry coupled with the development and implementation of appropriate environmental regulations, designed to protect both human health and the ecosystem, keep these losses to a minimum. In a world driven by high technology, the continuing uses of lead which now avoid significant sources of human exposure, present little or no risk.

Nevertheless, the very word lead has, since the 1970s, evoked an emotive reaction in many of the general population and to a degree in the minds of politicians and regulators. They are not necessarily aware of the full scientific facts but are easily swayed by the more biased and articulate lobbyists, some of whom hold extremist views.

This book aims to:

- explain what lead is and to describe its properties;
- detail the present applications, and compare its suitability with other alternative materials and substances (this includes lead metal, alloys containing lead, compounds of lead, and other substances containing lead);
- describe the EU (and, in less detail, worldwide) lead industry as it is today, including the amount of production, consumption, re-use and recycling, and market trends;
- describe the risks of exposure to lead - to the health of the general public, to occupationally exposed workers, and to ecosystems - arising from manufacture, use and disposal of lead and lead-containing substances (and also from natural sources of lead);
- describe the lead emissions from industries which produce and use lead, and detail measures undertaken by the industries to minimise emissions;
- present trends in the use/production of lead, and in levels of exposure to humans;
- critically assess:
 - whether lead is a suitable material for its current uses;
 - whether these products or their manufacture present significant cause for concern;
 - and in the light of these points, whether lead is likely to remain in use in the future.

In summary, this book presents an unbiased account of the present day activities of the lead industry, the production, uses and disposal of lead – and the

potential risks to human health and the ecosystem that still remain. It is prepared on the basis of factual evidence, incorporating the use of state-of-the-art science, using the specialist advice of a team of experts from Imperial College of Science, Technology and Medicine, London. It has been written independently of the lead industry. It aims to provide a source of factual information for policy makers, regulators and scientific advisers in local and national government, the European Community and international organisations, together with non-governmental organisations and industry. In short, its primary objective is to set the record straight and pave the way for the future of lead as a sustainable and safe commodity.

