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LEAD INDUSTRIES ASSOCIATION
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Speaking to 150 executives of the lead mining, smelting, refining and manufacturing industries at the annual meeting of the Lead Industries Association at the Drake Hotel, Chicago, B. B. Steiner, president of the Association of American Battery Manufacturers, Inc., predicted that 387,000 tons of lead would be used in storage batteries in 1957. This is an increase over the 366,000 tons used last year. It is based on an estimated production of 34,983,000 automotive type batteries, with 35,000 tons of lead used for industrial type batteries. The estimate for automotive type batteries is an increase of a little more than 2 million over 1956.

He stated that data gathered by his Association indicate that the average life of automobile batteries has been as low as 16.3 months and as high as 27.6 months since 1940 with the longest life prevailing in 1956. He placed the average automobile battery weight at 20.11 lb. In discussing the trend toward 12-volt rather than 6-volt batteries in automobiles he stated that all new passenger cars, with the exception of the Willys Jeep, are now equipped with 12-volt batteries. On the basis of total registrations 12-volt batteries have increased from 0.7 per cent in 1953 to 9.2 per cent in 1956, and he predicted that the weight of lead per battery would increase as the 12-volt battery becomes more predominant.

Combating atomic radiation was the subject of a talk by Dr. C. E. Crompton, associate technical director, National Lead Co. of Ohio, formerly connected with the Atomic Engery Commission, which covered design criteria and market possibilities for lead and other materials of shield construction.

He stated that lead's attenuation of gamma rays from reactor produced radioisotopes and radiation from reactors themselves accounts for its major use as protection for both personnel and equipment. Other uses ranged from housing of

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radiation sources in cameras for industrial radiography and medical therapy, to mobile high intensity fission product sources for food preservation.

Peacetime distribution and use of radioactive isotopes which continues to increase at a rapid rate will account for 1,000 tons of lead per year by 1964, although this may be overshadowed by shipments of used reactor fuel elements for reprocessing slated to require 2,000 tons per year by 1964 and 4,000 tons per year by 1975.

For reactor shielding, particularly mobile propulsion and "package" power reactors where a premium is placed on minimum weight and space, requirements for lead may be between 5,000 and 10,000 tons per year by 1965.

Operating research reactors are expected to reach 54 in number by 1960. Shield requirements for 1964 would appear to be approximately 1,000 tons of lead per year. It is interesting to note that a research reactor complex carrying out testing work in its hot cells requires some six tons of lead per year to shield gamma emitting waste materials destined for disposal in the ocean.

In summation Dr. Crompton stated that "we can look to the entire nuclear industry as a growing market for high density materials and aggregates. In 1964 lead consumption may reach 10,000 to 15,000 tons per year..... With nuclear power contributions more than doubling every 10 years we may expect this consumption of shielding materials to increase accordingly." He further estimated that some 26,000 to 26,000 tons of lead are currently in use in the atomic energy industry.

Dr. Alex Stewart, director of research and Hugo J. Ratti, head of new products development, National Lead Co., described new applications that are being made of old lead compounds and new lead compounds that are being used in increasing amounts. Six examples were given. 1. New lead pigments supplementing white lead, red lead, the chromates, and basic sulphate in paints. 2. Lead compounds to stabilize chlorine-containing thermoplastic resins such as polyvinyl chloride and vinylidene chloride plastics. 3. Lead curing agents for thermo-setting plastics such as Hypalon. 4. Heat-sensitive lead compounds for telegraphic and radio

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communications which enable a receiving instrument to reproduce words, pictures and maps at some distant point accurately and instantaneously. 5. Shielding materials for protection against X-ray and all other types of destructive radiation, using both organic and inorganic lead compounds where a fluid protective barrier is desirable, and 6. Ballistic modifiers, an important use but one which can not be discussed because of security reasons.

Discounting the last three classifications which could be large but difficult to estimate in volume at present, it appears that new lead pigments in paints can reach a total of 30,000 tons per year within the next few years.

By 1965 stabilizers for chlorine containing plastic materials will approximate 15,000 tons, whereas depending on volume growth of rigid plastic pipe and sheathing, another 10,000 tons of these lead compounds should come into use by 1970 to 1975.

It was also stated that new products will continue to be derived from over 700 lead compounds available today.

Charles C. Shackford, chief engineer, Electrical Wire Division, John A. Roebling's Sons Corp. reviewed the newer materials such as aluminum, steel and plastics which are offering competition to lead in cable sheathing. He described some of the advantages of these newer sheath materials but pointed out that they are offset by several major technical problems as yet to be solved in both manufacture and installation. He emphasized that the newer fatigue-resistant lead alloys commonly referred to as "arsenical alloys" and modifications of them with tellurium offer five to six-fold improvement in fatigue life and creep resistance. These alloys are in use today and appear to be holding their own, but cannot as yet be extruded continuously.

Regardless of new developments and as a result of the continual wide growth of power utility systems, he predicted that during the next ten years lead sheathed power cable will continue to be used in the same ratio as it has for the past five years.

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In tracing the history of tetraethyl lead fluid used in modern gasoline, Dr. D. P. Barnard, research coordinator, Standard Oil Co. (Indiana), and former Deputy Assistant Secretary of Defense, Research and Development, said that it had made two major contributions over the years. First, by lessening the tendency of fuels to knock it had improved the fuels, and second, by inspiring the engine designer to get the most performance from the fuel, it had paved the way to advances in engine design. Feeling that lead in gasoline makes an important and economically rational contribution to a necessary sales characteristic of gasoline, Dr. Barnard predicted that the use of tetraethyl lead as an anti-knock will continue along established lines for the foreseeable future.

In reporting on current research and development on the use of lead in ceramics such as porcelain enamels, glass, glazes, and electronic and other ceramic bodies, Dr. John Koenig, director of the School of Ceramics, Rutgers University, "concluded without question that in addition to the many established uses for lead in ceramics, by far the greater part of all new ceramic developments in the low temperature field will involve the use of lead compounds." He emphasized the increasing interest of the ceramic industries in low temperature ceramics.

Other speakers included Roger H. Cutting, vice president, The Bunker Hill Co., who described the wide use of lead in building and chemical construction; Professor R. L. Cook of the Department of Ceramic Engineering, University of Illinois, who covered the broad field of lead compounds as used in ceramics; and Dr. William E. George of Australia, who discussed industry health problems.

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