

LEAD INDUSTRIES ASSOCIATION

Graybar Building, 420 Lexington Avenue
New York, N. Y.

May 15, 1933.

TO MEMBERS OF THE LEAD INDUSTRIES ASSOCIATION:

The Lead Industries Association has been endeavoring to do what it can in promoting the use of white lead for painting highway structures. It began by making a survey of the painting practice of State Highway Departments which indicated that, although white lead had a preferred position as an exterior paint among the various State Highway Departments, room for improvement remained, and that paints of a metallic lustre were making serious inroads. Fortunately, from a safety standpoint the use of metallic lustered paints is dangerous because, in driving automobiles at night the structures painted with such a paint as aluminum do not loom up as brightly as structures painted with white lead, a fact which we pointed out in the July, 1932 issue of our publication LEAD.

Dr. John A. Schaeffer, Research Director of the Eagle-Picher Lead Co., has made many speeches and written numerous articles on the subject, looking to the correction of the situation in the Middle West and just recently, through his efforts and that of other members, the State of Missouri abandoned the use of aluminum in favor of white lead for its highway structures. In Idaho, changes in favor of white lead have also been introduced.

As you may be interested in reading one of Dr. Schaeffer's addresses, for a resumé of the situation, I am enclosing a copy of the speech he delivered before the Public Forum in Oklahoma City, on April 28, 1933. Moreover, if any opportunity arises for improving the situation in your own State you will have these data available.

Respectfully yours,

J. E. Williams
Secretary.



LEAD AND ZINC PAINTS VERSUS METALLIC-LUSTER PAINTS

Talk Before the Public Forum
Oklahoma City, Friday, April 25, 1933

By
John A. Schaeffer

We consider it a privilege to tell you some of the story of the zinc and lead industries as they pertain to the State of Oklahoma. It is particularly fitting that the situation as it exists in Oklahoma be brought to your attention at this time, in view of the depressed condition of the largest metal mineral resource you have in this state. It is fitting for two reasons, first because the State of Oklahoma has been the largest zinc producing State in the Union for many years, and second, because certain steps can be taken to greatly aid both the zinc and lead industries.

Few of you realize what the zinc and lead industries have meant to the State of Oklahoma. When I tell you, according to figures published by the Tulsa Chamber of Commerce, that in the year 1926, 342,000 tons of zinc and lead concentrates were produced in Oklahoma, as compared with an estimated production for the year 1932 of only 139,000 tons of zinc and lead concentrates, having a market value in the year 1926 of \$52,000,000 as compared with an estimated market value in 1932 of only \$2,700,000, you can readily realize what I mean when I speak of the depressed condition of that great industry within your borders. It is estimated that of the above monies eighty per cent of the total value of these concentrates went directly into labor, salaries, power, supplies, material and royalties, all of which represented income accruing directly to the residents of the State of Oklahoma, thus leaving only twenty per cent of the total monies produced by these industries as leaving the confines of the State. Approximately 1500 men are now employed directly in the zinc and lead mines within the State, which mines today are yielding no profit, as opposed to 6500 men directly employed in 1926. To this number of men directly employed in the mining operations must be added a large number of men who are employed in those industries related to the mining industry.

At the same time we find four large zinc smelters within the State, located at Bartlesville, Blackwell, Henryetta and Quinton. We find that for every ton of ore smelted at these smelters, approximately five dollars worth of gas is used, from six to eight dollars is paid out in labor, as well as an overhead of several dollars per ton. Is an industry of such proportions worth the consideration of the legislators and residents of this State?

You may ask what is our interest in this matter. The Eagle-Picher Lead Company has seen fit during the year 1932 to invest more than a half million dollars in the largest and most modern central concentrating plant ever constructed for the treatment of ores of the type found in the mines of the Tri-State District. This mill is located near Miami, Oklahoma, and handles a tonnage in excess of three thousand tons of mined rock daily. We have seen fit to start our smelter at Henryetta. We are consequently vitally

interested in every phase of the zinc and lead industry, and we rightly object to a condition such as exists today in the State of Oklahoma, wherein that State does not support to the fullest its largest metal mineral resource. We believe in that industry and we are willing to do our part to fight this present depression.

The American Zinc Institute and the Lead Industries Association of America have during the past three years actively studied their products through their Research Departments, in an effort to find new and varied uses for their products in industry. At the same time, they have made an earnest effort to see that zinc and lead products maintain their old place in industry, as they rightly deserve.

There is one phase of this activity on the part of these National Associations which I want to bring to your attention at this time, namely the question of zinc and lead paints as opposed to metallic-luster paints for use on highway work, a subject which is of vital importance to these industries, as well as to the State of Oklahoma. When I speak of zinc and lead paints, I speak of the pigments entering into those paints, namely zinc oxide, lithopone and white lead. These are white pigments used in paints which are being supplanted within your State through the use of paints of metallic luster.

So that you can better understand this story, I would ask that you confirm our scientific findings at any time any of you happen to be on your own State highways where we find paints of metallic luster used as finishing coats on highway structures. I want to draw your attention to the question of visibility particularly at night between white paints, such as zinc oxide and white lead, and metallic-luster paints on such highway structures, a matter which needs nothing other than your own confirmation during night driving. The question of proper visibility for highway structures and markers is one which has been attracting the attention of highway engineers more and more in the various states. During the past few years metallic-luster paints have found great favor as the finishing coat in the painting of such highway structures. When such paints are specified, the question of visibility and corresponding safety necessarily has to be considered of secondary importance. We believe such visibility and safety should be of prime importance. Our own research work has shown us that white paints, such as made from white lead and zinc oxide, give increased visibility from all angles, other than that of direct reflection, when compared with paints of metallic luster. This will be plainly evident to you, if you will realize that those latter paints are mirror-like in their reflectivity. You are all aware of the blinding flash which is thrown in your eyes from your rear vision mirror, while driving when the headlights of an automobile to your rear give the proper angle of reflection. When those headlights are directed away from a definite line of reflection to the eye of the driver, there is no such blinding light.

We have found that when an object is observed in the line of direct reflection from the incident ray, metallic-luster paints have great visibility. When, however, an object is observed off the line of direct reflection, we have found that such metallic paints suffer markedly in visibility, whereas flat white paint suffers not at all. Such white paint is visible at any angle as is found in direct reflection.

It is quite clear why such a phenomenon exists. Metallic-luster paints are mirror-like, due to their consisting of numerous shiny metallic scales, each of which is a perfect mirror. These are directioned in the paint so that for the most part they are parallel to the surface. Consequently a beam of light falling on such a paint film is reflected as from a mirror, and if the observer is in the line of direct reflection he receives much light. If off the line of direct reflection, he receives but little light. White paints reflect by diffusion, with approximately equal intensity in all directions. We can safely state that white paints offer greater visibility and consequently greater safety for highway work than metallic-luster paints. This we have demonstrated by superimposing panels which have been painted white, on highway structures which have been painted with a finish coat of metallic luster. The panels painted white are plainly visible from every direction, whereas the metallic painted structures at many angles suffer in visibility during the night driving.

Quite recently the New Jersey Zinc Company's Research Laboratory has published data showing the value of paint as light. This work was conducted by Mr. D. L. Gamble, who showed that with a given light intensity of twenty foot candle power in a room using indirect lighting, there would be reflected on a table in that room fifteen candle power, provided the room was painted white. If painted yellow, nine candle power would be reflected on that table. If the room was painted gray, eight candle power was reflected, whereas if the room was painted with a metallic-luster paint, but five to six candle power was reflected. As he states, a worker at a table in the white room would receive almost twice as much light as a worker at the table in the gray room. He has thus determined that the white room is sixty-seven per cent more efficient than the yellow, seventy-eight per cent more efficient than the green, and eighty-nine per cent more efficient than the gray, the room with a metallic-luster paint falling in efficiency even below that of the gray. This when translated means that if the worker needs less light a much lower candle power lamp can be used in a white room, and the resulting lower number of kilowatt hours becomes a saving in dollars and cents.

In the State of Oklahoma, the oil industry is confronted with the necessity of properly conserving its oil storage. The problem on such oil storage is the reduction of loss of gasoline on evaporation, due to the heat of the sun. Metallic-luster paints have been used for the protection of such oil storage tanks, in the belief that the heat-reflecting value of these paints will result in the least amount of evaporation. The New Jersey Zinc Company and American Zinc Institute have published data showing the fallacy of such a procedure. These data showed that the initial heat-reflecting efficiency for an oil tank newly painted with a white paint was 94.5%, as compared with only 63.4% for a paint of metallic luster. After weathering for a period of eleven months, there still remained an actual heat-reflecting efficiency of 84.6% for the storage tank painted with the white paint, as compared with only 30.8% heat-reflecting efficiency for the tank painted with the metallic paint. As would be expected, the tank covered with metallic-luster paint showed a considerably greater loss of gasoline by evaporation than the tank on which white paint was used.

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You may ask what condition we have confronting us in the State Highway Departments throughout the country. We find today twenty-two states in the Union either require or allow zinc-lead paints. We also find that certain states in the Union which have a large mineral production make an effort to protect those industries, though such is not universally found to be true. The State of Idaho, which is the second largest lead producing State in the Union, specifies a finishing coat of 100% white lead for its highway structures. The State of Utah, which is the third largest lead producing State in the Union, specifies a white lead and zinc paint for the finishing coat on its highways. We find that the State of Arizona this year has adopted the use of copper for the manufacture of its State automobile license plates, thus fostering that industry in that State. But what do we find in the Tri-State District? We find the State of Kansas specifies 100% metallic-luster paint for the finishing coat on its highway structures. We find the State of Missouri, the largest lead producing State in the Union, specifying finishing coats of 100% metallic-luster paint on its highway structures. We find the State of Oklahoma, which prior to the year 1932 was for many years the largest zinc producing State in the Union, specifying 100% metallic-luster paint as the finishing coat for its highway structures.

As one passes through the State of Oklahoma, one finds highway structures painted with metallic-luster paint, one finds railroad markers, water tanks, oil storage tanks, tank cars, and store fronts covered with a similar paint. We have even seen instances in the State of Oklahoma where mills which produce lead and zinc ore, hopefully at a profit, are painted with metallic-luster paint at the expense of the lead and zinc industries. We say that the Highway Department of the State of Oklahoma might as well erect sign posts along its highways, reading: "We endorse the use of metallic-luster paints as finishing coats on structures in the State of Oklahoma at the expense of our leading metal mineral resources, namely the zinc and lead industries". We feel that the effect of such a practice on the part of the State Highway Department has great influence in molding public opinion as to the use of such paint for domestic consumption. We feel that the attitude adopted by the State Highway Department in penalizing the zinc and lead industries is more far reaching than one would believe, since the policy adopted is not only an advertisement for every inhabitant of the State of Oklahoma, but likewise for every transient who passes through the State of Oklahoma and necessarily uses the highways in that State.

We find being used throughout the State on its highways creosoted posts and markers covered with metallic-luster paint. While we admit that white paint cannot be successfully used over creosoted posts and markers, we also question the value of using a metallic paint as a protective coating for such creosoted wood work. We suggest that the preservation of such posts and markers be effected through the use of zinc chloride, followed with a finishing coat of white zinc and lead paint, so as to obtain the maximum visibility on the highways. The C. B. & Q. railroad has studied this matter of the preservation of railroad ties over a period of years. Their findings have recently been published. The engineers of that railroad have estimated a life of 15.5 years for railroad ties preserved with zinc chloride. It is true the life of a railroad tie preserved with zinc chloride is not as long as that of a tie preserved with creosote. But when

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such preservation is translated to highway posts and markers, I believe every one will agree that owing to the changing conditions which we find on our highways today, that a highway post or marker which will remain in an excellent state of preservation for a period of fifteen years has an ample service life, particularly when the added factor of visibility can be obtained. Research work conducted by the Forest Products Laboratory at Madison, Wisconsin, has shown that white paints can be successfully applied over timber preserved with zinc chloride.

The use of white zinc and lead paints on such highway posts and markers would increase the visibility during the life of those posts and markers and thus add the needed safety to the highways of the State of Oklahoma, at the same time promoting those products within its own confines.

The zinc and lead industries ask no favors in this matter from the standpoint of protection and visibility. Those industries ask that the highways of the State of Oklahoma be made the most visible and the safest highways possible. The use of zinc and lead paint as finishing coats on State Highway structures is not new. One need only look at the beautiful highways in the State of Illinois to see how perfectly visible its white painted highway structures are at all times.

It is not your fault nor our fault that metallic-luster paints are used in the State of Oklahoma, not only for highway structures, but also for domestic work, at the expense of the largest metal mineral resource of this State. It is, however, your fault and our fault if such a condition continues to exist. It is your business and it is my business—it is the business of the American Zinc Institute to see that the zinc industry is properly recognized by the State of Oklahoma. We must rightly approach our legislators, our State Highway Department, and we must bring pressure to bear through publicity to see that the highways of the State of Oklahoma are properly maintained so that maximum visibility and safety will be present at all times, and we should rightly, in the State of Oklahoma, for domestic consumption promote the use of zinc products in every way possible. If such a condition can be brought about, our meeting with you today will not have been in vain.