

LEAD INDUSTRIES ASSOCIATION

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SUBJECT: REPRINT FROM
"MASS TRANSPORTATION"

To Members of the Lead Industries Association:

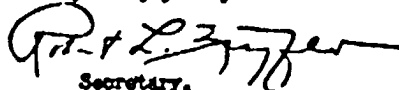
We are pleased to attach a reprint of an article on the use of red lead paints by the New York City Transit Authority that appeared in the March, 1959, issue of "Mass Transportation."

We are planning to send this reprint to our mailing list of over 9,500 individuals and companies interested in paints and painting practices.

The article was prepared by W. L. Schlager, Jr. Assistant General Superintendent in Charge of Maintenance of Way, New York City Transit Authority, at the suggestion and with the assistance of the Lead Industries Association and its publicity agency, which was responsible for securing its publication. This is a part of our over-all advertising and publicity program.

Additional copies are available on request.

Very truly yours,


Secretary.



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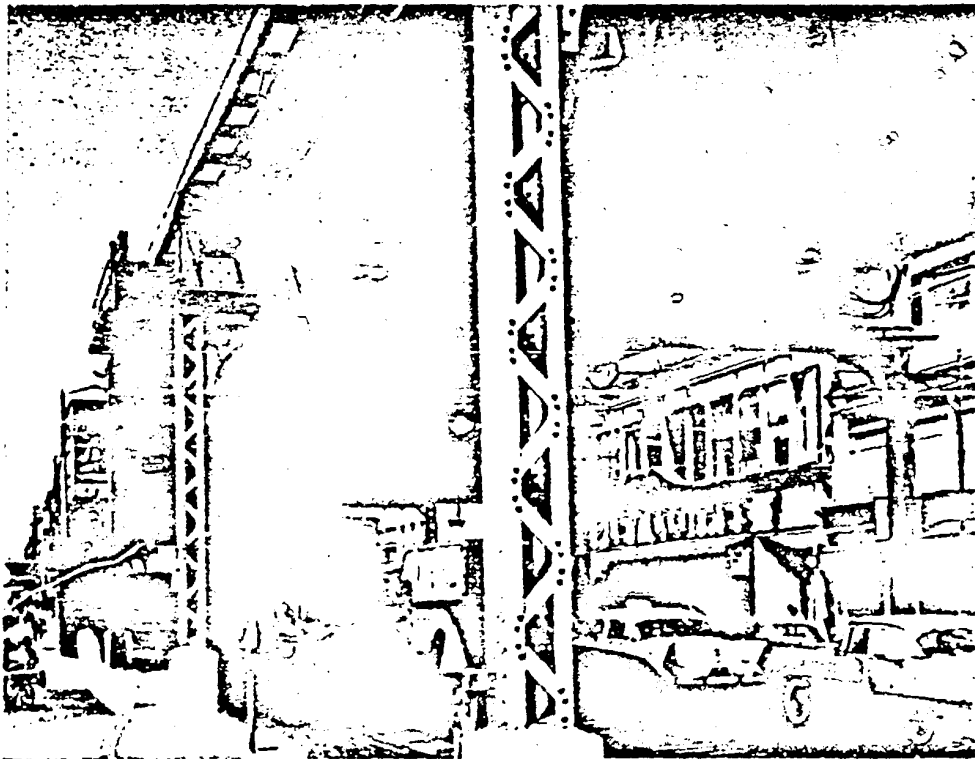
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MAINTENANCE

Department

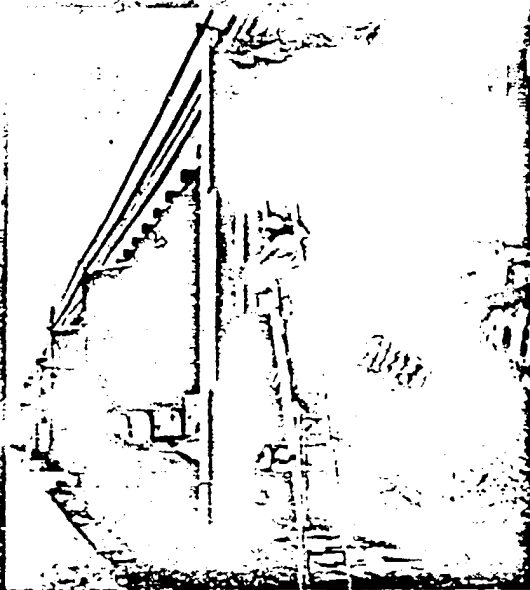
Helpful articles for the busy bus shop superintendent



THE NEW YORK City Transit Authority has the responsibility of operating a municipal railway system that annually transports 1.4 billion passengers, three times as many as all the rest of the railroads in the U.S. It is forbidden by law to operate at a loss. Obviously, good housekeeping is essential to the TA's success. And in this, nothing has paid off better than the judicious use of highly protective, long-lasting, economical lead based paints. For the complete story on their structural painting, turn the page.

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They Maintain A Road Forbidden to Lose Money

New York City Transit Authority depends on the protection of lead based paints for structures of the gigantic elevated system

By W. L. Schlager, Jr.

Assistant General Superintendent
in Charge of Maintenance of Way
New York City Transit Authority

THE PEOPLE of the City of New York own the 725 miles of running track that carry them underground and overhead in their community. They leased the entire system to the New York City Transit Authority in 1953 for a period of 10 years. And they made a law: the TA must operate the transit facilities within its operating income.

It is no exaggeration to say that the job is a challenging one. The running track is more than enough to link New York and Chicago, 713 miles apart. The city's transit properties cost almost \$2 billion to construct, purchase, and equip. But by conservative estimate replacement value at today's prices would be at least twice that much. The railway system annually carries 1.4 billion passengers, three times as many as all the rest of the railroads in the U.S. carry.

The physical organization of this sprawling plant doesn't help matters. Like Topsy, New York's transportation arteries "just grew," branching out frantically to meet exigencies of the times, designed in harmony with the technology of the times.

First "E" Ran in 1868

The metropolis was concentrated at the southern tip of Manhattan at the end of the Civil war. The first elevated train, steam motivated, was put into operation in 1868, and within two years was extended to mid-town Manhattan, spreading the metropolis along beneath it.

After that, competing interests built steam locomotive lines on elevated structures on pasture land and timber stands in northern Manhattan and Brooklyn, confident that the population would grow rapidly wherever transportation was available. And they were proven right.

The first electric-powered subway train made its maiden run in 1904. Thereafter, city-built subways

leased to private operators burrowed a maze of tunnels beneath Manhattan, The Bronx, Brooklyn, and Queens. As predicted, the population to support them developed swiftly. But so did costs. By the end of World War I, it was becoming apparent that no private operator could run rapid transit lines in New York at a profit. A lengthy history of political and legislative maneuver culminated in city ownership of the elevated and underground rapid transit system and the creation of the TA.

That history hardly makes a community-planned transit system. Most of the elevated structure, which carries 207.90 miles of running track, was built to support the belching coal burners operated by independent businessmen 50 and more years ago. Most of this structure has been subjected for many years to the hot, dirty, acid abuse of ancient steam locomotives.

But commercial and residential building has proliferated below, above, and on all sides of the transit arteries, which are interwoven among a tangle of electric, communication, gas, water, sewage, and other utility conduits. Real estate values have climbed into the blue sky. Costs have soared. To rebuild the transit system according to a master plan is not to be thought of.

Paints Preserve Old Structures

Our job, then, is to preserve the structure as it stands. Outdoor structures are exposed to weather, salt spray, railway and industrial smoke containing the gamut of acids and alkalis, road dust and dirt, tar, grease, and oil. The only economical way to preserve the steel in this hostile environment is to paint. Lead-based paints have been our defense since a time previous to our earliest maintenance records, at least 50 years ago. They are our defense today.

Take a good example. The IRT Corona line that

runs out to the 1940 World's Fair site was last painted in 1932. At that time it was given a single prime coat of red lead paint. When we repainted the line this summer, 28 years later, we found the steel surface in excellent condition. For the most part, it was just dirty, with only occasional, small patches of light rust. There was an exception. Where the line passes high above the tracks of the Long Island Railroad, corrosion was more severe, though by no means critical. This has been attributed to smoke from steam engines, probably high in acid content.

Take a horrible example, the old BMT Myrtle Avenue line in Brooklyn. Our records don't go back far enough to show when it was last painted, but it must have been all of 50 years ago. That's long enough for the oils to dry out of the paint. And it's long enough ago to include years of service with steam locomotives.

Structure Remained Sound

When we repainted this summer, we found extensive corrosion, heavy rust on bearing plates. We replaced damaged rivets and angles. But the structure, protected by red lead primer, was still sound. Evaluation: the primer gave all the protection you could have expected from any, other than exotic, material in view of the length and type of exposure.

Salt spray attacks structures situated near sea water, as some of our lines are. This is perhaps the most damaging of all the abuse we encounter. Red lead primer stands up under it as well as anything that has been available at reasonable cost.

In recent years, we've been applying red lead primer at the rate of about 14,500 gallons per year. Total surface requiring the primer is about three million square feet. Our experience has taught us that red lead exhibits superior resistance to rusting under the finish coat, that it is the best wetting primer available, and that it is highly effective over surfaces that are difficult to clean properly.

TA Specifies Red Lead

Following are our specifications for red lead paint (Formula M-1):

Pigment	Percentage
Dry red lead (85% grade)	78.14
Vehicle	
Raw linseed oil	13.37
Boiled linseed oil	6.74
Drier M-2	0.62
Turpentine	1.13

100.00%

(Standard weight is 25 pounds, 12 ounces per gallon.)

We further require that pigment, linseed oils, and turpentine meet current ASTM requirements and that the paint shall dry hard within 24 hours.

The drier (Formula M-2) is a mixture in the proportions of 20 pounds of dry red lead, 15 pounds of 85 per cent grade manganese dioxide, 50 gallons of raw linseed oil, and 50 gallons of turpentine. Red lead and linseed oil must be varnish makers grade. Red lead and manganese dioxide are dissolved in linseed oil by boiling. The mixture is then thinned with turpentine.



PAINT must be worked in to cover all surfaces thoroughly and evenly. TA engineers constantly spot check the job to see that private contractors meet tight specifications.

We further specify that the drier be clear and free of sediment or suspended matter and that it mix in the volume proportion of one part of drier with 19 parts oil without curdling. It is further required that this mixture, when flowed on glass, shall dry within 18 hours.

New Formula Looks Even Better

Our engineers are actively searching for better ways to do things. This search directed us to an improved red lead formulation which we began using in 1959, red lead-red oxide primer (Formula M-20). Our specifications for this material follow:

Pigment	Minimum Percentage	Maximum Percentage
Red Lead (ASTM D83-41, 95% grade)	74%	74.0



SURFACE traffic must be allowed to pass through while the job is in progress. New York's transit lines run over crowded structures that cannot be closed to traffic without causing great inconvenience to thousands.



HAND cleaning of metal is specified by the TA, since special problems rule out sandblasting and other methods of power cleaning. Severe jobs like Brooklyn's Myrtle Avenue Box call for preliminary work with heavy scrapers like this one.

Red Oxide (ASTM D84-51, Class II)	21.0	
Aluminum stearate		1.0
Vehicle		26%
*Synthetic resin solids	22.0	
Linseed Oil (TT-0-369)	51.0	
Volatile (TT-T-291a, Grade 1)		26.7
Driers (TT-D-847a, Types I, II, III)		0.3

*Glycerol phthalate, 41 plus or minus 2 per cent, linseed type (TT-R-266a, Type III).

Standard weight is 22.0 pounds per gallon. The primer must dry hard within 24 hours.

Advantages of this material are:

- (1) It dries very quickly, a fact which we expect to see reflected in lower bids.
- (2) It is more durable, offers superior protection against salt spray and weathering.
- (3) It is easily applied, another fact which we expect to see reflected in lower bids.
- (4) It is economical. We expect to get an even higher ratio of effectiveness to cost with this material than we got using the M-1 formulation.

This is followed by a finish coat of tinted aluminum paint made to our formula M-21-1.

Paint Samples Analyzed by TA

The TA neither makes nor stores its own paint materials. Jobs are specified on a piecemeal basis and bids invited. The low bidder, provided he can demonstrate experience and financial responsibility, is awarded the bid. He selects his source of supply among paint manufacturers, subject to TA approval of his choice.

TA engineers take samples of the paint as it is manufactured and have it analyzed at the TA's laboratories at 900 Carroll Street, Brooklyn. If it fails to meet TA specifications, it is rejected. More than 100 people are employed for source materials inspection alone.

Our gray-green finish coat (Formula M-11) is specified as follows:

Pigment	Percentage
Carbonate white lead	24.0
Basic sulfate white lead	12.0
Zinc oxide	18.0

Tinting colors	1.2
Silica	2.4
Magnesium silicate	2.4
Vehicle	
Raw linseed oil	36.8
Drier M-2	3.2
	100.0%

Standard weight is 15 pounds, 6 ounces per gallon.

Tinting pigments (extra light yellow oxide of iron, raw umber, french ochre, and lampblack) must be shaded to standard color with chrome oxide (green) or phthalocyanine green. And the paint must dry hard within 18 hours.

Rust Removed to Bright Metal

Surface preparation of the metal is important. All loose paint, scale, calcination, rust, dirt, and corroded material must be removed with wire brushes and scrapers. Where rust appears, surface must be chanced down to bare metal. All this work must be done by hand, since sandblasting in the crowded areas in which we must operate might lead to expensive damage suits.

At the discretion of the TA, if surfaces are wet, the contractor may be required to treat some surfaces prior to painting by wiping with a cloth that has been dipped in a 1:1 mixture of benzene and turpentine. In this case, the primer must be applied when the cleaning mixture is almost but not altogether dry.

In addition to the special problems already enumerated, the painting of the elevated structures presents several other difficulties not encountered on most other jobs:

Surge demand for rapid transit in New York makes it necessary for us to paint while tight transportation schedules are met without interruption or delay. This points up the value of paint materials that are easily and quickly applied.

Inclement weather must be taken into consideration. We prohibit structural painting between December 15 and March 15, when weather is wet or damp or when the temperature is below 40° F. Finish coat must not be applied until primer is dried hard. The value of quick-drying paint is apparent in this connection.

Painting Cycle Worked Out

From the foregoing, it must be evident that some lengths of line are subjected to much more abuse than others and would require more vigilant maintenance, particularly those passing near sea water. But, due to public ownership of the transit system, it is impossible to work out an equitable maintenance schedule that permits preferential treatment for particular neighborhoods. We must be content with the compromise of identical maintenance schedules in all neighborhoods.

We are spending money that is not our own and that must be used for the public good. Our budgets must be made up very carefully. We must be sure that no money is wasted and that all money is spent where it will do the most good. For this reason, we cannot provide superfluous maintenance in one neighborhood just because maintenance requirements are heavy in another neighborhood.