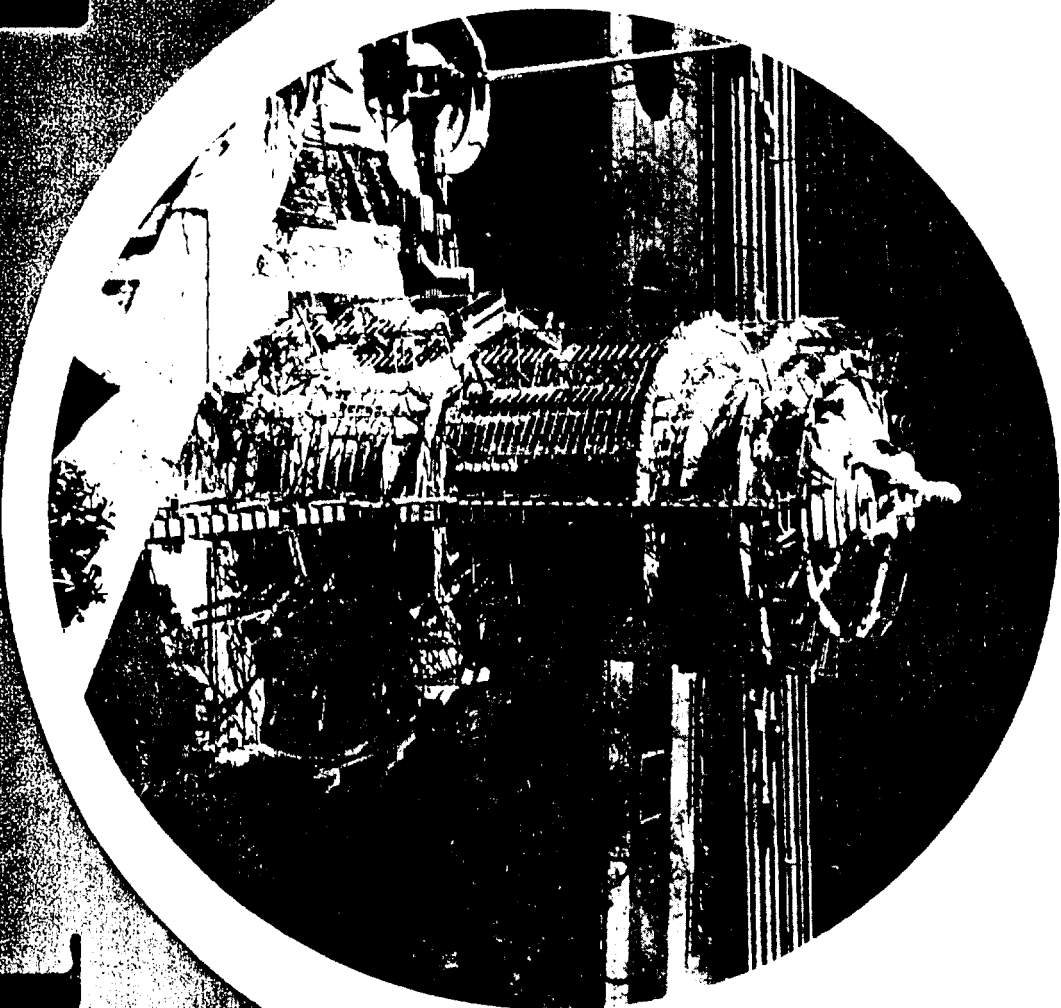




old museum
with lead
• 2

Lead

LEAD INDUSTRIES ASSOCIATION, INC.

432 MADISON AVENUE, NEW YORK 17, N.Y.



Lead Restores A Monument

Lead to the rescue of New York's famed Soldiers and Sailors Monument. More than eight tons of lead were used for roofing, calking, and waterproofing the 1902 edifice in its recent rehabilitation. Sequence of operations in reroofing with lead is shown at right. 1—Grooves were cut in the deteriorating marble roof to receive wood sleepers. 2—Four-pound hard lead was fastened to these with cleats. 3—The lead was formed into a radial lapping pattern with a locked cap-and-base treatment at each change in roof level. 4—Nearing completion, the roof is seen to be a weather-proof, water-proof sheath over the stone.



Built in 1902, New York's Soldiers and Sailors Monument on Riverside Drive has been subjected to the rigors of seacoast winters and the corrosive attacks of the industrial atmosphere surrounding the city ever since. Progressive deterioration of the marble used in the monument became an increasingly urgent problem.

A number of conferences of City Fathers with various experts associated with the Monuments Division of the Department of Parks finally resulted in necessarily drastic action. It was decided to refinish the entire structure. The work was begun in August, 1960, by a small group of skilled craftsmen under the direction of Mr. Walter Beretta, chief of the Monuments Division.

By shaving or chipping down the entire exterior surface of the stonework with pneumatic chisels for a depth of as much as $\frac{1}{4}$ in., they reached solid stone. This gave an entirely new surface and restored the appearance of the original. No detail was neglected. Joints between blocks, sculptured pieces, cornice mouldings and belt courses were repointed and, in some cases, replaced entirely.

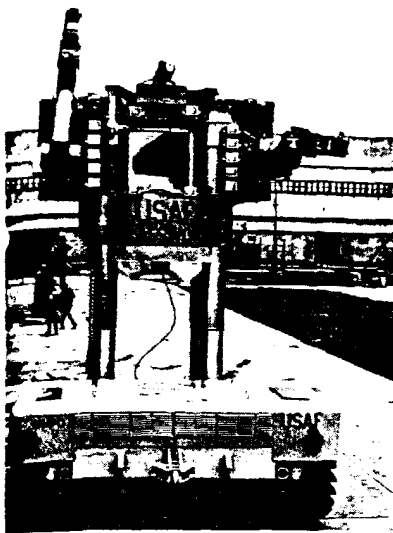
Though no guarantee can be given that future onslaughts of freezing and thawing will not bring the stonework into a similar state of disrepair, neither these nor the ravages of air borne industrial wastes over any pe-

riod of time can seriously impair the effectiveness of a complete roof of lead.

Originally stone panels, the roof was stripped down and refinished with four pound sheet lead. Grooves were cut with a Skilsaw and wood sleepers let into them to provide positive fastening for the copper cleats holding the flat loose-locked seams in place.

Since the plan of the roof is circular, joints in the lead were laid out on a radial pattern. In the other direction the roofing stones were lapped like shingles. In this case the lead was treated with a kind of cap and base technique at each change in levels. Photographs will illustrate these methods.

In all, a total of 17,000 lb. of lead was used, about two thirds of it being four pound antimonial lead for the roof, the remainder being six pound material for use in foundations, under columns, etc. Another ton of lead wool for calking and about twenty-five pounds of wire for burning were also consumed. It is well worth noting that back in 1902 when the monument was built, it ran over its budget. The total cost at the time, including an extra for all the approaches, all the landscaping and all the paving of terraces was \$275,000. The cost to the City of New York for the recent repair and refinishing alone was \$1,073,661—almost four times its original cost.



Head-on view of Beetle shows the heavy lead-shielded cab in the extended position of its four stanchions. For scale, the lead glass front window measures 30 x 36 in.

Project *Rover* envisions a whole new generation of rockets and spacecraft powered by nuclear engines. The advantages of range and power for such rockets are obvious. The problem of maintenance for such huge intricate assemblies where radiation is a hazard are equally striking. Technical specialists may be given free access to chemical rockets, but the men who work on nuclear rockets will have to be heavily shielded.

To make the work possible at all, General Electric Company, working with the Air Force Special Weapons Center, has built a prototype 85-ton mobile robot. One man rides and guides the monster. He can make it lift a ton — or pick up a nut and thread it on a bolt with the massive powered



MEET THE BEETLE

arms of the device. Its name: Beetle.

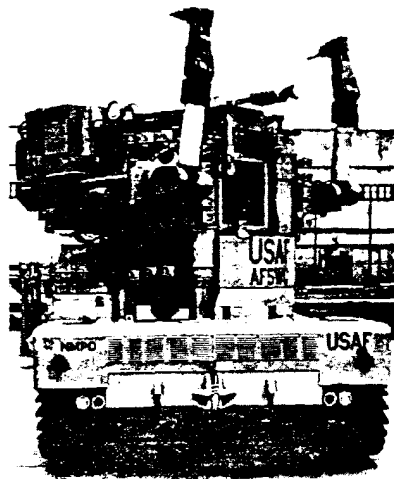
To protect him from radiation, the operator is encased in a 100,000 pound cab. With walls of lead a foot thick, this cab has five leaded glass windows, each two feet thick. The 6.2 density lead glass gives radiation protection equal to that of the lead. These windows can be seen, one, 30 x 36 in., facing front and two, 24 x 30 in., on each side.

Inside the cab are controls for driving the Beetle, raising, lowering, and turning the cab, and for manipulating the arms. These, together with accessory controls for the two motors, generator and hydraulic systems, air conditioners, radiation and communications equipment take up most of the room. Instead of windows to the rear, the Beetle is equipped with TV cameras and a screen inside to aid in backing up.

Despite periscopes, with which the Beetle is also equipped, there will be jobs that call for looking around impossible corners. Beetle can do this, too. Confronted with the need to look at the back of an assembly, say, it reaches into a special "breast pocket" and takes out a small TV camera with one hand, and simply holds it where it gives the best view.

Another interesting aspect of the heavy lead shielding of the cab is that sound does not reach the operator. He has two microphones outside the cab and an amplifier and speaker inside (plus a warning horn for accidents) so that he can hear whether the motors are performing normally.

Beetle has two other leaded glass windows on each side for wide field viewing by the operator. The periscopes (top center) and three TV cameras augment his optical gear.



Silent caddy has electric muscles



Designed to effortlessly cart a bag of clubs around 18 holes, the battery-powered Caddy Master lets golfers enjoy a stroll around the links without burden. Its 12-volt lead-acid battery has its own built-in charger and timing clock. The single handle responds to fingertip pressure: it steers the carrier and controls its speed to exactly match the pace of the golfer. Caddy Master is made by Toro Manufacturing Co., of Minneapolis.

Lead chemicals

and rubber

team up

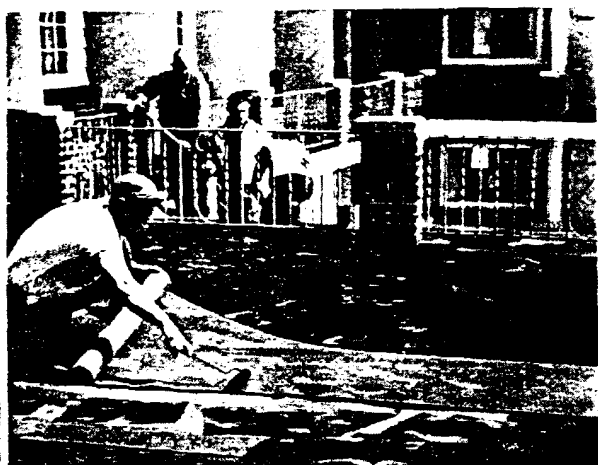
to put . . .



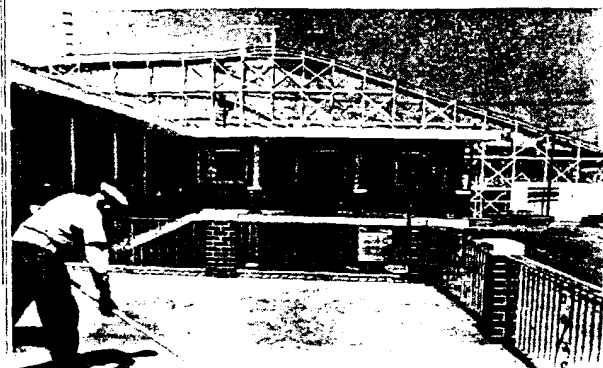
Lead-cured rubber solved the roofing problem at Wildwood.



A deteriorated roof was stripped to the concrete slab, primed and calked . . .



Glass mesh cloth was then bedded in a heavy coating of rubber, sealed in, and finished with a pastel Hypalon top coat. Lead chemicals are used to cure both the neoprene and Hypalon rubbers used.



SOMETHING NEW on

If you want to give a roofing expert the horrors, specify a large flat roof with no pitch, no drains, and no expansion joints, tell him that people — especially women in sharp spike heels — are going to walk on it, then point out that it absolutely must not leak or require any maintenance for at least ten years or so. As an afterthought you might add that you would like it in a fade-proof pastel and that maintenance is to be an absolute minimum.

If that set of specifications doesn't frighten the roofer, you can be sure that he has heard about the new families of lead-cured rubber chemicals now being used in such difficult situations.

The two chemical families are the neoprene and Hypalon rubbers. Both of these chemical rubbers are cured by lead chemicals. Usually *tribasic lead maleate* (82 per cent lead) is used. Where requirements are really tough, litharge or red lead can be substituted for improved performance. As a general rule about 40 parts of any of these cures 100 parts of Hypalon. Twenty to 25 parts will cure 100 parts of neoprene.

All of the complications noted above had badly deteriorated a concrete roof deck over the office of the White Star Motel at Wildwood, New Jersey. Of course, this roof was subjected to salt spray at its beachfront location, heated

by intense summer sun, and treated a boisterous hurricane now and again. As a result, not only the roof surface but the concrete slab beneath it had cracked. Maintenance bills mounted. And worse, potential guests at the motel noted evidence of the leaks in the office and sometimes suspected their rooms might leak too.

A local building contractor, M. Trusiak of Cam-Den Glass of Vill., N. J., suggested that a combination neoprene and Hypalon would solve the problem. The three photos show what he did. First the roof was stripped down to the bare slab and primed with neoprene coating. All cracks were calked with Hypalon calking. Next, a heavy layer of neoprene was applied and a 1/2-inch glass mesh cloth was bedded in this. The glass mesh was sealed in with another heavy layer of neoprene. Finally, two top coats of Hypalon, a pearly gray in this case, were applied and dusted with reflective glitters, while curing, for a decorative finish.

With a 300 per cent elongation in both neoprene and Hypalon, the absence of expansion joints in the 30 by 40 ft. roof poses no problem. The high tensile strength of the glass distributes the load of people walking on the deck roof so that the resilient plastic does not suffer even under the trans-

W... Motel.

he ROOF

...000 psi loading of a woman wearing
...the heels.

Stripping away the old surface ap-
...approximately doubled the usual cost in
...this case. Still, the cost was modest,
...based on about 40c/sq. ft. for new
...construction.

Since the job was completed this
...ing it offers no data about the dura-
...ity of lead-cured rubber roofing.
...Experience with other roofs indicates
...chalking rate of about 0.25 mil per
...year...equivalent to a 20 year life.
...u that time the only maintenance
...trip...necessary is an additional topcoat, ac-
...ording to the manufacturer.

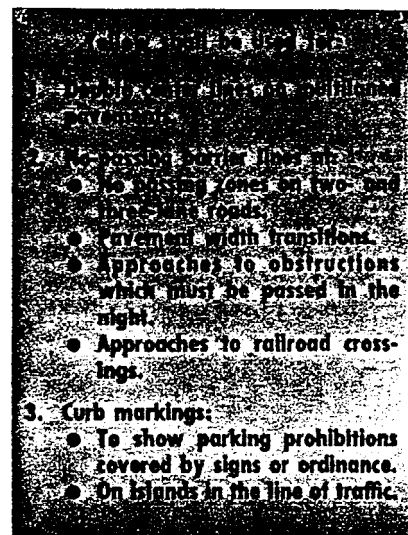
Other Possibilities

One of the attractions of the rubber
...ool is the decorative possibility of
...st tint to the basic white Hypalon
...ating. A limited range of shades is
...also available when the material is
...flectured with litharge or red lead, accord-
...ing to the supplier. Chemical Coatings
...d Engineering Co., of Media, Pa.
...Industrial jobs where color is not
...important, neoprene cured with red
...ad or litharge and no Hypalon top
...coat is frequently a better performer.
...This black coating has unusually good
...istance to standing water or im-
...ersion and is inert to most of the
...common corrosives.



THE toughest test of all — the test of time — is proving that yellow traffic marking paint offers the ultimate in visibility, caution and safety. Rapidly, yellow is forging to the front for all kinds of traffic marking and control points, from highway no-passing lines to parking lot markings.

The following requirements are established by the June, 1961 issue of "Manual on Uniform Traffic Control Devices for Streets and Highways" published by the Bureau of Public Roads, U. S. Department of Commerce:



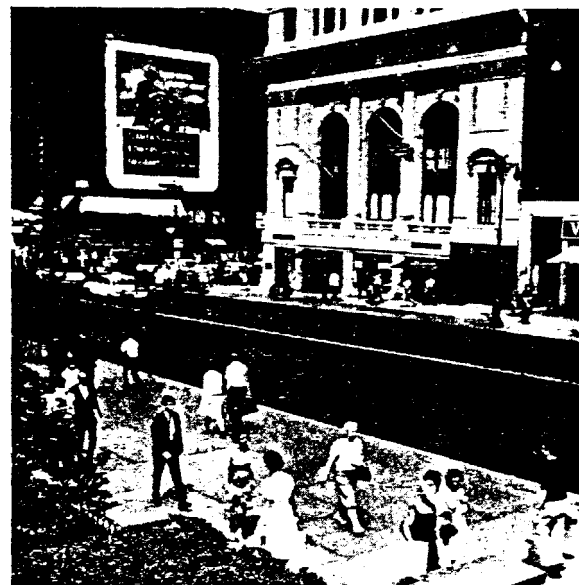
All fifty states are rapidly converting to this method of marking, as are many cities. New York's two-way avenues are being given the "double yellow center line" treatment. Westchester County is applying it to its parkways and other four lane highways. It is also being used in many of New York's suburbs.

But aside from the Public Roads system, yellow finds many other useful pavement marking applications. Most guide lines for taxiing airplanes at



Busy Madison Avenue in New York City uses a double yellow divider line and yellow to mark No Parking at bus stops.

Fifth Avenue in front of the famous New York Library.



major airports are yellow. Parking spaces both on streets and in parking lots are more and more being delineated in yellow. It seems to make the driver more cautious about straddling lines and using too much space. Yellow traffic marking in factories to guide in-plant vehicles like lift trucks and personnel carriers are becoming more popular as precautionary and safety measures.

As the Public Roads Manual states: "Yellow has been accepted as a symbolic warning color in signs and signals." And it is no happenstance that basic lead chromate, known as chrome yellow, is the pigment in these paints on which reliance is placed for the proper color and high visibility.



Porcelain Enamel Rides Herd on Rust.

Workmen secure bolts on another section of porcelainized steel guard rail near Pleasant Corners, Pa. Attractive and maintenance-free, this rail offers the protective strength of steel and the reflection of white porcelain. (Courtesy Bethlehem Steel Co.)

Lead enamels are on 24-hour guard duty at a narrow bridge on a twisting country road near Pleasant Corners, Pennsylvania. For nearly a year now this test section of porcelain enameled steel guard rail has been warning motorists approaching the narrow overpass by the brilliant reflective qualities of its permanent white coat.

Until recently, this rail could not have been protected with such a lifetime glass coating because the usual high firing temperatures reduce the strength of the steel.

The advent of extra-low temperature lead-bearing enamels has opened

entirely new fields of application for porcelain on steel. It was because of the superior qualities possessed by this enamel, e.g., good adherence, weather resistance and flexibility, that it was chosen for this job. The Erie Enameling Company, Erie, Pennsylvania did the enameling.

The steel rails were fabricated by Bethlehem Steel Company's Lackawanna, N. Y. plant, and were of regular guard rail analysis steel — not a special enameling grade! Special steels were not required because the enamel used "fires" or matures several hundred degrees below the annealing tem-

perature of ordinary steels. As an additional bonus, these enamels exhibit an ability to cover sharp corners and radii.

The enamel was fired on the steel at about 1000°F with total thickness of the finished coating from 4 to 9-mils. No problems were experienced in either the fabrication or the installation of this unique guard rail, and it is expected to retain its glossy finish and never peel or darken.

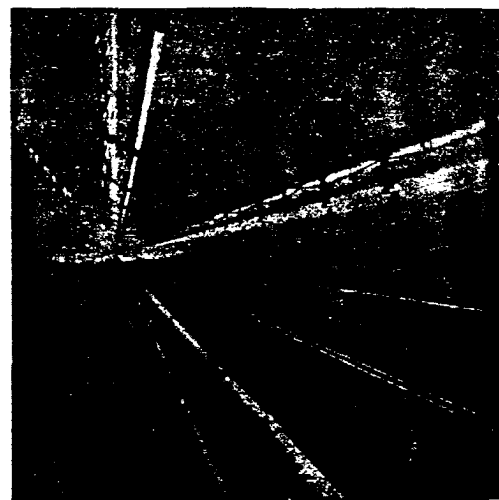
At the present time, only a few enameling firms throughout the country are equipped to enamel steel at these low temperatures. It is on the merits of this guard rail application and other tests now in progress that predictions of a big future for this enamel are being made.

...and Makes a Colorful Entrance at Boston

If you fly to Boston and then taxi downtown, you're sure to see and travel through the new Lt. William F. Callahan, Jr. vehicular tunnel under Boston Harbor. You may also notice the 5500 ft. of bright yellow police railing that accompanies you through the tunnel. Made of porcelain enameled steel, these railings were coated with a lead-bearing enamel in order to achieve the precise shade of yellow specified by the Massachusetts Turnpike Authority to match the yellow

tile walls.

Regular 1600°F leaded enamels were used on this railing because of their "long firing" range and excellent coverage on radii. These enamels are highly acid-resistant, and will withstand the salt, water, grease and dirt hurled by the spinning wheels of nearly 10 million vehicles which use the tunnel yearly. The tunnel was built by the Marine Division of Perini Corp., Framingham, Mass., and was completed in November, 1961.



Canary yellow police railing in newly completed Callahan Tunnel is protected from rust and corrosion by leaded porcelain enamel. (Courtesy Perini Corp.)



Advantages of shop prefabrication show up as this plumber uses a pneumatic tool to calk oakum into a cast iron pipe joint.



Here, the joint has been installed in the "plumbing wall" and is receiving molten lead prior to final calking.

PREFABRICATED PLUMBING SYSTEMS

How much easier is it to do a good job in a well equipped shop than it is to do a good job at a building site? If you are talking about plumbing systems, the answer is about 20 per cent — at least that is the dollar savings available to builders who elect to buy whole prefabricated plumbing systems from Kingsberry Homes Corp., of Fort Payne, Alabama, as a part of Kingsberry's complete manufactured home package.

It works this way. Builders within a thirteen state Southeastern area select the Kingsberry plans best suited to their development from Kingsberry's line of more than 80 plans, ranging in size from 884 to 2400 sq. ft. On receiving a plumbing package order, Kingsberry details the job in accordance with local building practice and code requirements. From this detailed plan, Kingsberry completely fabricates the whole plumbing wall, tests it, and ships it ready for fast installation and connection.

The cost of these assemblies is \$400 to \$600, a savings of about \$100 on most jobs. Prices depend, of course, on the number of baths the house plan calls for. Experience with the prefabricated units has shown that installation time on the job is cut from three to two days for the plumbing crew. And, of course, the plumbing contractor hired by the local builder for the installation, saves warehousing, sales expense, material costs and call backs.

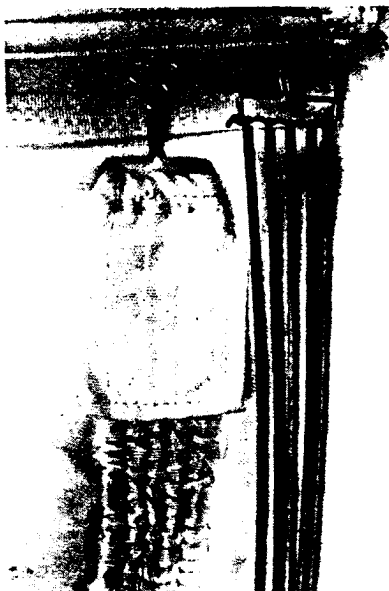
Lead's flexibility lends itself so readily to prefabrication that it is widely used in these plumbing installations. Kingsberry uses about 200 tons of lead a year in the form of calking lead for cast iron pipes, lead bends and stubs as water closet connections, P-traps for bath tubs, sheet lead for shower pans, and roof vent flashings. Specific uses of the lead vary from job to job, depending on local practice and code requirements.

While Kingsberry is best known for its manufactured houses, which are

shipped as components ready to be erected, the availability of its plumbing system has played a large part in the rapid growth of the company's sales. In 1961 Kingsberry Homes showed a sales increase of 62%, and in 1962, sales are running more than 50% ahead of 1961. Plumbing package sales are more than keeping pace with Kingsberry's rapid expansion.



Lead in the Parachute Pack



Close up of the five-spring opening band. The springs next to it are identical to those covered by the cloth.

Understandably, parachutes and the hardware associated with them are manufactured to the tightest sort of specifications. Imagine the difficulty, for example, of turning out perfect springs only $\frac{1}{8}$ of an inch wide from tough, springy 302 stainless steel wire 0.015 in. in diameter. J. W. Bernston & Company, a manufacturer of these special parachute springs found that springback of the wire caused poor coil alignment. Variations of tensile strength made differences in the coil diameter vary noticeably, too.

By changing to identical wire with a lead coating supplied by The Carpenter Steel Company, Bernston has eliminated coil variations and achieved a production rate 25 per cent higher than was formerly possible. As an added bonus the lubricating lead coating aids in slipping the springs into place in the nylon pack.



Alignment of the lead-coated stainless wire springs counts in this assembly operation where the springs are inserted.

lead



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