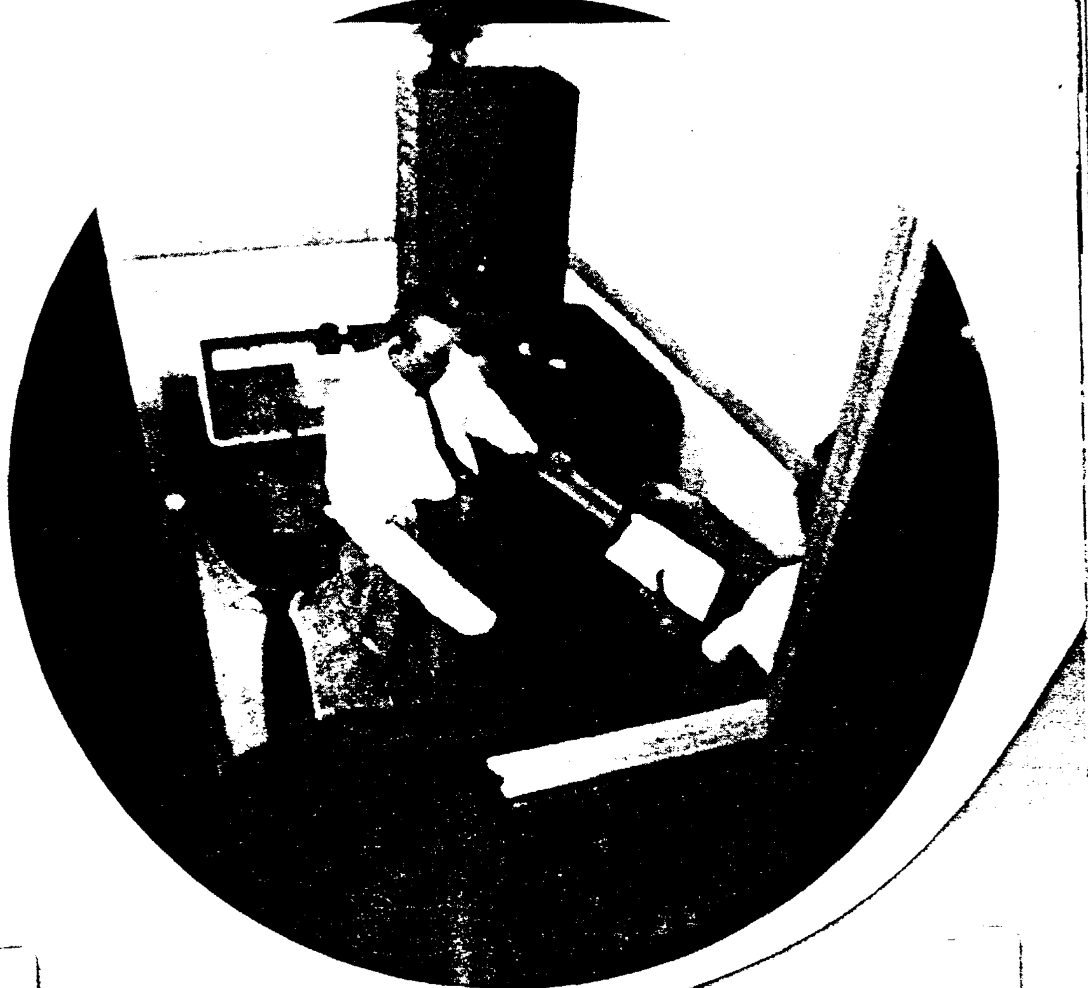
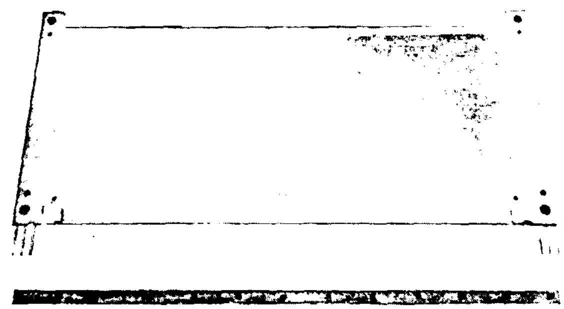


oking through a one-way rror at a lie detector st. See page 6

# lead

LEAD INDUSTRIES ASSOCIATION, INC.
292 MADISON AVENUE, NEW YORK 17, N. Y.



Glass bonded mica carrier board that is a basic element in the Bell System's revolutionary solid-state switching system. Tolerances are critical; flatness is maintained at 0.006 in. over an area of 6 in. by 12 in.

## *New Telephone Development . . .*

# A SOLID-STATE SWITCHING SYSTEM

The Bell System has made many important changes and improvements in telephone equipment and service through the years and is constantly directing large-scale efforts toward future improvements. As a result of these continuing efforts, a basic change of major significance is now in the making. Manual switchboards and electromechanical systems are on the way out. In their place will be a complex electronic switching system and memory unit that is expected to introduce new words to the language of telephony. Such terms as "variable call transfer," "add-on conference," and "abbreviated dialing" will be commonplace.

Heart of this revolutionary new telephone switching system is a lead-glass bonded mica electrical insulating carrier board. High dimensional stability—even under extremes of temperature and humidity—made the choice of glass bonded mica for this job a natural.

Attesting to the critical nature of this choice are the exacting requirements of the Bell Telephone Laboratories for flatness in the part. No point on its (approximately 6 in. x 12 in.) surface may vary from any other measured point by more than 0.006 in.! (six thousandths of an inch). Reason for this is that Bell depends on the exact spacing to keep memory card magnets in the switching gear a precise distance from one another.

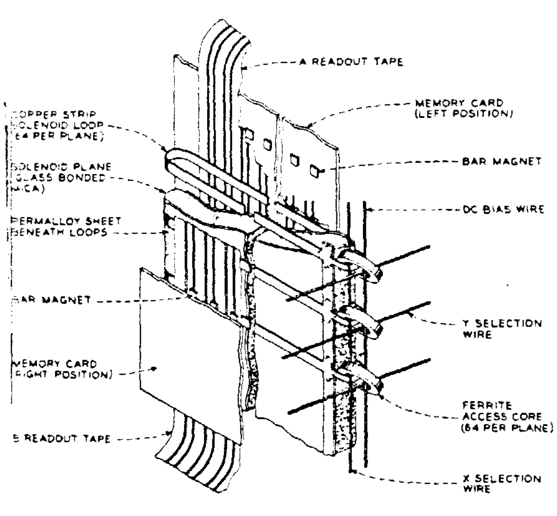
Jack Liker, Sales Manager for Molecular Dielectrics, Inc., of Clifton, N.J., principal supplier of the glass bonded mica carrier boards states: "No other material—either ceramic or plastic—could provide the dimensional stability, non-leaching and non-magnetic properties necessary to do this job *reliably* for an expected life of more than 25 years."

Mr. Liker points out that the use of lead bearing glass to bond the muscovite (mica) particles in this board makes it impervious to moisture — a vital consideration where electrical breakdown is concerned. In addition, lead in the glass makes the boards more machinable—an important plus since Bell Telephone Laboratories also set rigid requirements on machined surfaces.

Called a ceramoplastic, lead glass bonded mica is made at Molecular Dielectrics by mixing leaded glass and mica, subjecting the mixture to high temperatures and pressures, and then transfer or compression molding the parts to precise custom specification. Upon cooling, the material can be polished or machined to exact tolerances.

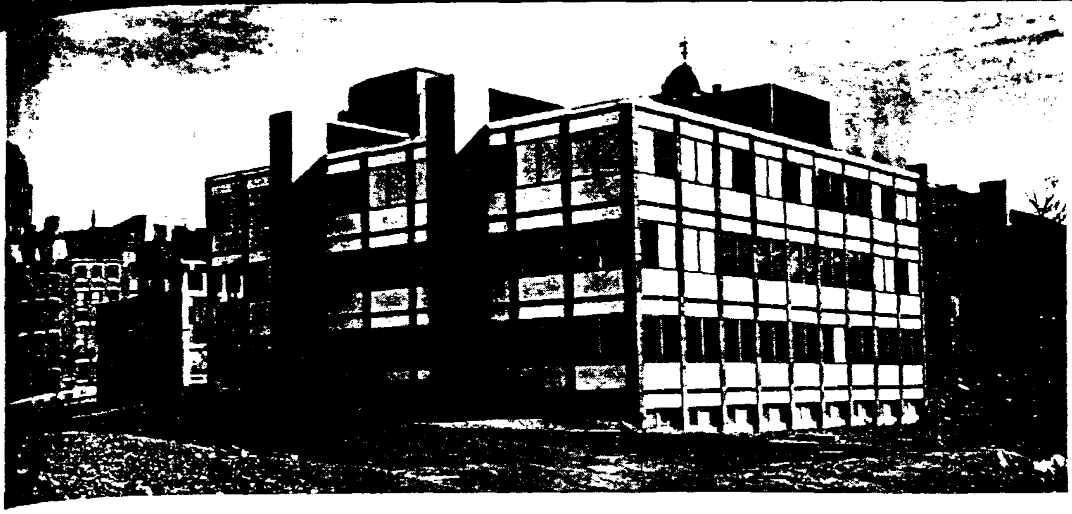
Several hundred thousand of these glass bonded mica carrier boards will be needed per year by 1975. By the year 2000, it is expected that the entire telephone switching system will be using these boards.

Extreme accuracy is essential in the switching circuit assembly of the system. If the circuit board is not flat spurious signals will be transmitted.






LIA26401



The modern Research Building of the Retina Foundation in Boston.

**Owner:** Retina Foundation, Institute of Biological and Medical Studies

**Architect:** H. Peter Klein, Bedford, Massachusetts

**Structural Engineers:** Sepp Firnkas, Boston, Mass.

**General Contractors:** Vappi Constr. Co., Cambridge, Mass.

Lead-Asbestos Vibration Pads by Rayproof, Stamford, Conn.

# FOUNDATION for PRECISION

## Lead asbestos anti-vibration pads aid a medical research laboratory

Space probes flung hundreds of millions of miles from earth to gather information have become a news story commonplace. Just as the mind boggles at these sallies into the enormousness of space it must also boggle at the infinitesimal smallness of the particles now intensively studied in medical laboratories.

The Research Building of the Retina Foundation in Boston is one of these. Studies there require microscopes so delicate that the vibration caused by a subway 400 ft. distant from the building threatens the precision of measurements being made.

When the Research Building was erected, this disturbing vibration was quelled almost at the source with lead-asbestos anti-vibration pads. This building, an advanced model of science building flexibility, owes the success of its operation to the fact that its 175 ft. x 100 ft. floor areas have been boldly set forth as completely open and adaptable spaces.

All utilities, which rise near one side of the building, are distributed overhead to any point, thereby leaving the large floor area free of utility walls customarily used in research buildings. Smaller spaces may then be created at will and as easily changed through the use of 2-in. thick movable metal partitions.

The finished project is a witness to the close cooperation between architect, engineer and research staff down to the last detail. The new building is an extension of the original 3-story laboratory which is also built on lead-asbestos anti-vibration pads.

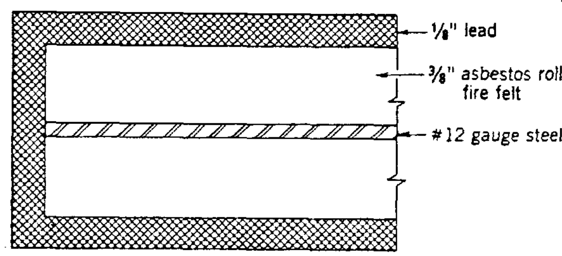
About 50 pads were installed in the original laboratory and results were so successful the owners decided to use them again in the new building—a total of 36 additional pads. There is a subway about 400 ft. from the site and pads are intended to protect against that source of vibration. However, their main function is to isolate delicate laboratory instruments of various kinds from disturbances created by motor traffic on two busy flanking streets.

Pads are from 30 in. to 48 in. square and are loaded to 500 psi. The structure is a concrete frame. One problem was the code requirement for dowels tying the columns to the footings and thereby passing through the pads to prevent lateral movement. These dowels are potential "flanking paths" for vibration to pass through from footing into the building frame.

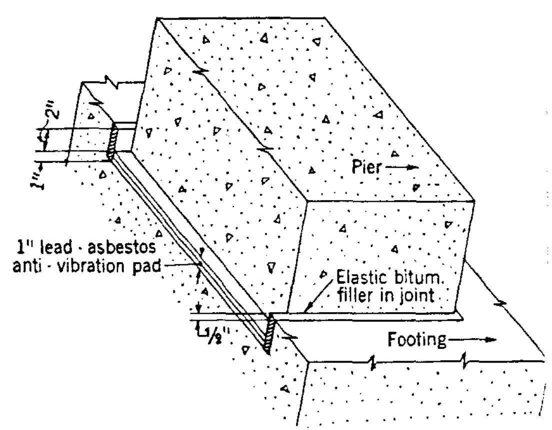
The difficulty was solved by simply setting the column piers into a 3 in. deep depression in the footing created to receive them.

Details show how this was done as well as a section of a typical 1 in. thick pad as used on this project. Photos show installation of a pad and an elevation of the original laboratory which will be matched by the new addition to the south.

Installing two of the pads that isolate the laboratory from ground-borne vibration.




Cross section of a typical pad.




How the pier floats on the pad and footing.

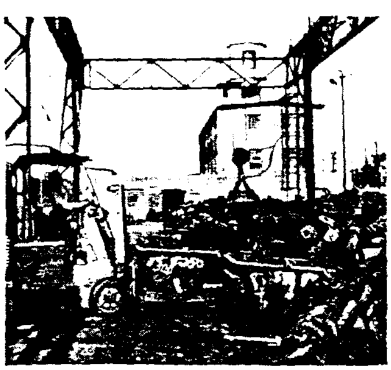
LIA26402

# THE TRUCK THAT FEEDS THE FURNAC

It's ten o'clock in the morning at the gray iron foundry of Combustion Engineering's Monongahela plant near Pittsburgh. As the crew arrives to load and fire the cupola for the day's 34 ton heat of closely controlled gray iron for castings, men on the floor below are scurrying back and forth laying out flasks, and there is an intermittent burping from deep inside the cupola itself as the goggled, masked pneumatic hammer operator knocks down the lumpy slag left by yesterday's melt.

An overhead crane whirs up softly and there is a solid thump as the first grab of engine blocks jumps four inches up from the pile to dangle from the electromagnet. Another soft whir and a battery powered truck zips through a short turn to lay down a dump bucket to catch the half ton of scrap as it falls from the magnet. By the time the clatter has stopped, the truck—having long since backed out—is doing a ballet turn with two more buckets, doubledecked, to lay them out precisely with the others in the line in front of the scrap pile.

By ten thirty the air hammer in the cupola has been hauled out and its burping replaced by the hiss and mist of wet refractory being gunned onto the raw, broken lining. The ballet of the crane and truck has changed too. Now it has settled down to a smooth routine—one load of remelt scrap, one of pig, one of regular scrap, one of coke and limestone. The sequence of visits by the truck to the 300 yard long line of piles is broken only by a side trip now and then to bring up more empty buckets to keep ahead of the crane operator.



On each trip the truck runs into the cupola floor, stops long enough for the scale to steady and for the hand signal that means OK, or "pull out

Weights are carefully checked.

two pigs", or, perhaps, "toss in that broken flywheel—no, not that gear housing, *that* flywheel, right." And the truck backs off, making a 180 degree turn in little more than its own length to gently lay down another half ton of feed in the "bank" of loaded dump buckets now growing in neat ranks in front of the open cupola.

By noon, all the staging has been removed from the cupola and a layer of kindling and coke in the bottom is ready to light. Loads of iron, coke and limestone may still be coming in from the stock piles but now they are being dumped right into the cupola after weighing.

By two-thirty nobody goes onto the loading floor unless he has to. Temperatures are well over 100° and there is a hot blast every time a dumping bucket momentarily deflects gasses and heat out through the cupola mouth against the glass heat guard of the truck. The cycle of remelt, pig, scrap, and coke repeats every six minutes—1000 po metal, 500 pounds of coke a each trip, 3500 pounds every c

This is the sort of puni taken every day, from 10 A PM by the single battery-p 3000-pound life truck that fe cupola. Until October of 196 4000-pound gas trucks were u this job. Normally, only one o was used, the other was a stan that the operation would n halted by truck breakdown. newer of the two, a 1950 mod mains in standby today. But for an odd job or two like cl snow, it is rarely used. Total time for the battery truck in two years of operation amount about four hours.

Downtime and maintenance lems were the principal reaso the change to battery power. flyash and foundry sand raised with the gas trucks. Entering the engine air, the grit plugge carburetors. Often enough, this meant stripping down carburetor

A load of pig for the furnace.

fuel lines. On cold winter mornings was always a question of wheth either truck would start.

But though maintenance led to t change, the cupola crew wouldn change back even if maintenan were no problem at all. They've foun the battery truck faster. With grit an

### attery-powered truck effectively laces two gas trucks h handsome gains cost, speed, and efficiency

and over all the deck and yard, the sure footedness peculiar to battery power counts heavily here. Management is pleased, too, for there is no wheel spinning, jackrabbit starting, or general hot rodding.

Management can also be pleased with the cost of power for the truck. It estimates that the annual gas-and-oil bill used to be $575. Electric power for charging the batteries is $160, less than a third as much.

As expected, though, the real pay-off is in the figures for maintenance. The gas trucks were, at the time of replacement, 12 and 14 years old. This is much older than most gas trucks are allowed to grow in actual service, it is true. The reason was that any gas truck was an old truck after two years of hard work and eating grit on this job. Thus use of new gas trucks at the cupola did not make sense.

The estimate of maintenance for a year's service from the gas trucks:

| | |
|---|---|
| preventive maintenance | $ 350 |
| parts | 580 |
| labor | 1425 |
| TOTAL, no allowance for cost of downtime | $2355 |

The actual cost incurred in using the battery truck in the same service *for two years* have been $32.28 in parts and three hours of labor. Interestingly, the standby gas truck, now used perhaps one or two per cent of the time in its odd jobs, has run up a parts bill of $53.34 in the same two years period.

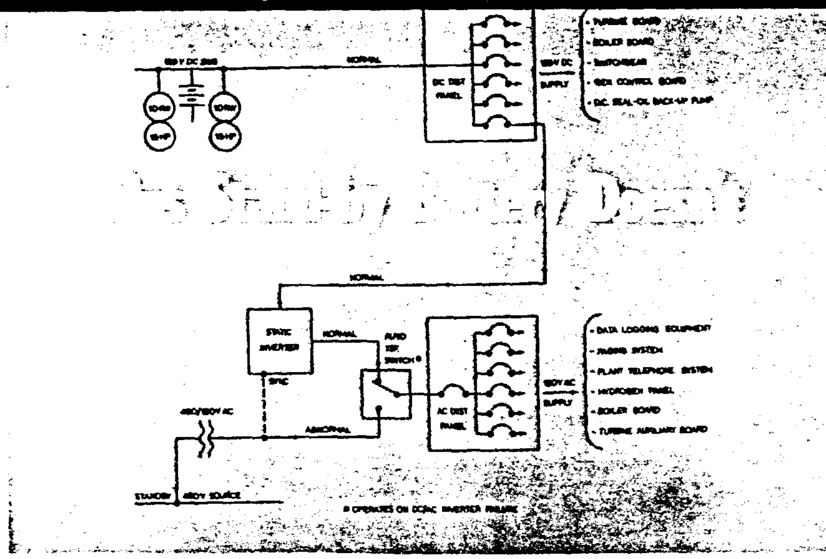



Diagram shows how storage battery supplies both DC load and, via static inverter, AC load at the City of Jacksonville's Southside Station.

Today's sophisticated science of generating and delivering electricity is more exacting and complex than ever before, and lead-acid batteries are making a major contribution to new methods.

For years, the power station battery's role has been to wait patiently on stand-by for the time when, by accident on necessity, the plant shut down—went "off the line". Only then was the battery system called on to operate emergency lights, switch gear, signal devices, relay equipment and other necessary functions until station power was restored.

But now at the City of Jacksonville's new addition to its Southside Station the stand-by battery no longer stands! A static inverter continuously converts the direct current of a storage battery to the alternating current required to operate sensitive devices.

Sixty cell, 120 volt battery (foreground) provides power to static inverter (background) at Southside.

One of these devices, unheard of a few years ago in power station operation, is a digital analog computer. This apparatus enables the nerve center of the electrical system, located at Southside Station, to send and receive signals from all its plants, as well as from other companies tied into the power network of the area. The data are logged and analyzed and, as electrical loads fluctuate, turbine outputs are changed by telemetry, loading the turbines at the lowest incremental fuel cost. The equipment is so sensitive that it cannot tolerate even the fraction of a cycle delay formerly required in emergency switching from station ac to battery sources — hence, the new technique.

The 60 cell, 120 volt lead-acid battery at Southside is designed for long service life with a minimum of maintenance. It is rated at 720 ampere-hours (at the 8 hour rate of discharge). Constant voltage is maintained by two 15 horsepower diverter-pole chargers, one operating and one held in reserve.

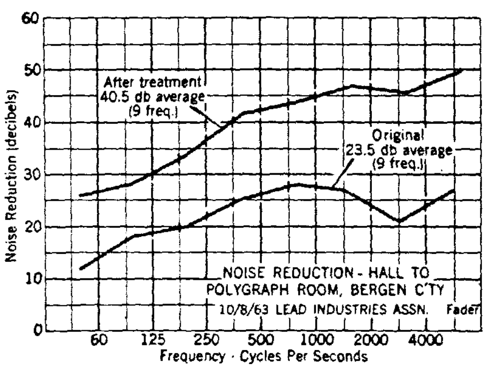
Across the nation, power suppliers are interconnecting their systems into a huge network which will assure continuation of an ample supply of low-cost electricity. Dispatching of loads through these interties will increasingly demand more complex technology. Therefore, control systems such as that at Southside Station will become a major factor in construction and design of new and additional facilities.

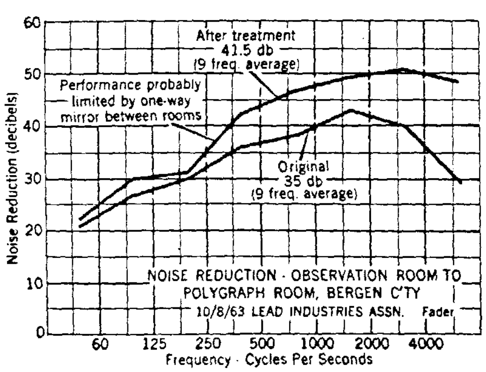
# QUI

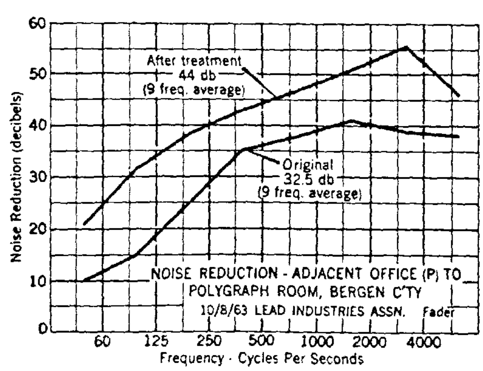
## Sheet lead bloc
## for p

The polygraph (left) records minute physiological changes in response to the questions asked by the operator. Quiet and lack of distraction are important because disturbances cause spurious results which require retesting. Lead was used to soundproof this room in a busy office and make it suitable for such tests.

The three pairs of curves (below) refer to the performance of the walls separating the polygraph room from the adjacent rooms and hall shown on the plan. The measures shown on the plan at right raised the minimum noise reduction by 17 decibels.




"Dragnet" and other popular police lore may exaggerate a bit, but the fact remains that police officers on a case work long, irregular hours. Three, four or more detectives comparing case notes over a mid-morning (or midnight) cup of coffee may generate a noisy give-and-take. Add this to the background noise of typewriters and telephones in the busy office space housing the investigative staff of the Bergen County, N.J. Prosecutor's office and you have a distractive, bustling atmosphere.

One of the modern techniques of police work — polygraph, or more popularly "lie detector," examination — requires quiet and freedom from distraction. In such an examination the subject is told ahead of time exactly what questions will be asked of him. Then the instrument is set up to measure certain physiological changes as he is asked—and answers—these questions.

In the hands of an expert operator like Detective Herbert Allmers, who holds an MA degree in psychology and is fully trained in the use of the instrument, the polygraph can save hours and days of police work by verifying statements, indicating innocence, or turning up profitable leads for investigation. But Detective Allmers stresses that quiet and absence of distraction are vital in such examinations. Disturbances can cause reactions by the subject which obscure the effect of the question and answer. Of course these spurious reactions can be recognized and allowed for, but it is far better to avoid them.

One of the regular offices had been set aside for this testing. It was a room 9 x 12 feet with three walls made of movable steel pa ing. Sound leaks through cra the partitions, through the around the door, and throug ventilating ducts allowed a gre of the normal office noise to en room. Running a polygraph exa tion meant holding all phone and conducting regular office "on tiptoe".

Acoustical tests of the poly room were made by generating noise in the two adjacent office in the corridor and measuring much entered the room. The r of these tests are shown as the curves in the three plots.

It was decided that the major enumerated above should be tr in the following ways:

- To close the cracks in the partitioning and to raise the t mission loss of the panels themse four-pound (1/16 inch) shee was adhered directly to these w For ease of handling, the lead cut into 20 x 20 inch squares cemented in place with a "cont cement. Care was taken that squares covered cracks at the p edges and corners of the room lead was "dressed" or folded int around these corners). One wal the room was plastered masonry the lead was applied over furr strips with glass fiber between it the existing wall.

- Air feed and return ducts w lined with glass fiber batting for s eral feet on either side of the op ings in the polygraph room.

- Cracks around the door openi were carefully gasketed with clos



LIA26405

# AMID THE BUSTLE

## office noise to create proper conditions ph testing at the Bergen County Prosecutor's Office

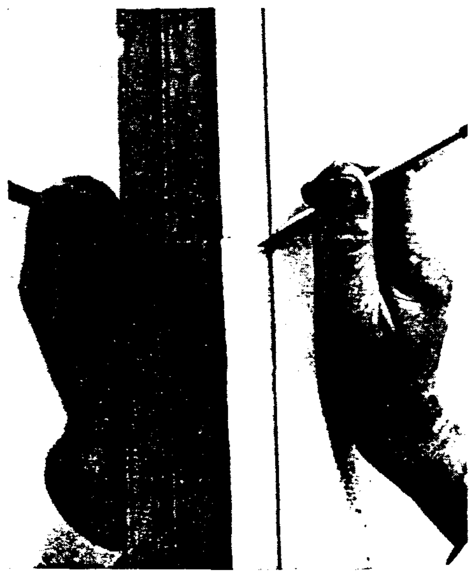
ll foam weatherstripping and with resilient folded strip of leaded rubber which compressed, on closing the oor, against the door frame.

All the exposed lead was finished covering it with acoustical tile. In e case of the lead on furring, sheets f homosote were used to provide a rm base for the tile.

When the room was again tested, before, very noticeable improvements were found for each sound ource location. The performance ound in these tests (made after six onths of normal use of the room) shown as the upper curve in each f the three plots. When all the data ere reduced it was possible to show 17 decibel increase in the noise eduction controlling the levels in the oom. This figure is taken as a nine-requency average from the plots owing the wall between the poly-raph room and the hall. This was the critical wall governing performance.

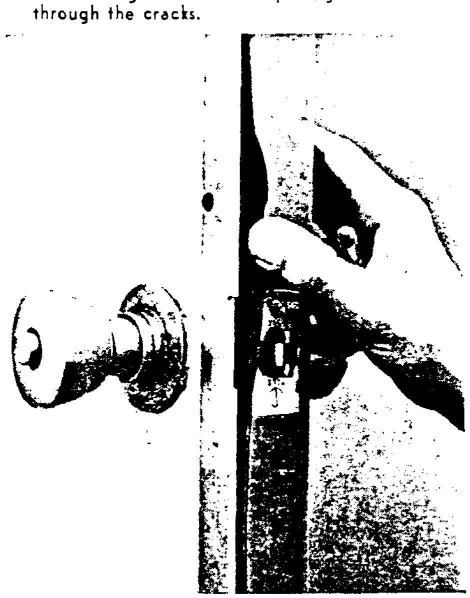
The average noise reduction obtained (about 40 db) was not sufficient for the conditions required. Therefore, a small electric fan was placed in the room. It is started before the subject enters the room and, under these circumstances, it is rarely even noticed. With this addition of masking noise in the polygraph room extraneous noises outside are no problem at all. In fact, to demonstrate this, a separate test was run in which the sound source was operated in each of the three test locations. It was impossible to detect it in the polygraph room when the fan was running.

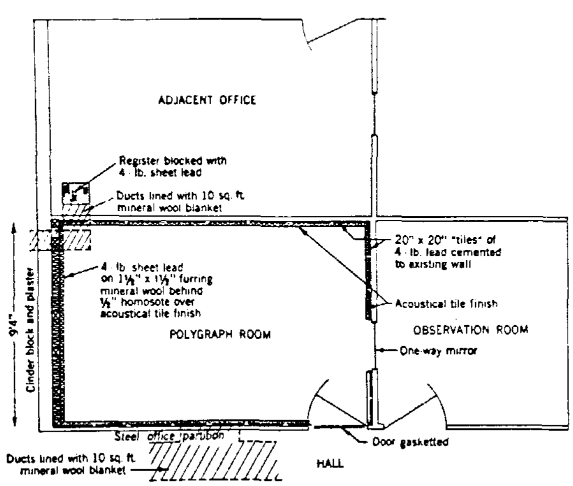
Detective Allmers is well pleased with the facility. It is not only adequate for his purposes, but probably better than the majority of rooms used for polygraph examination.



Sheet lead (indicated by pencil point) was dressed around corners of the steel office partition.

Soft leaded rubber around the door edge acts as a gasket to block passage of sound through the cracks.



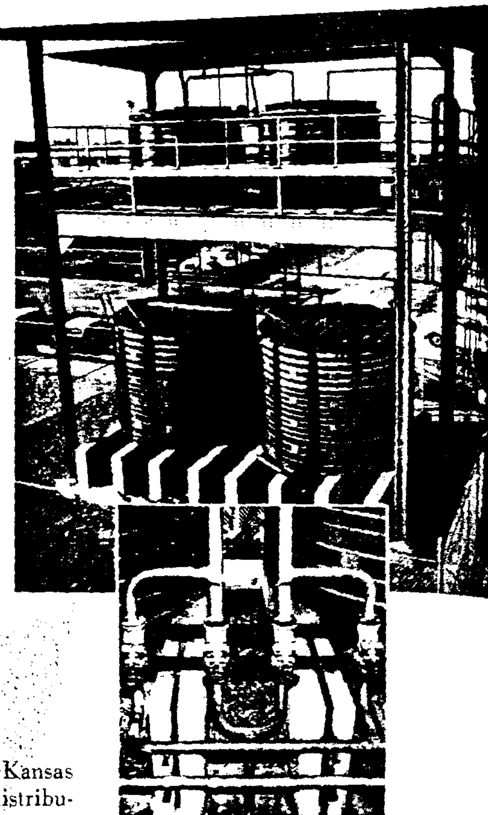





LIA26406

# BRINGING THE ACID TO THE BATTERY

Lead lined cage type reservoir tanks (below) and acid cutting tanks (above) are located near to the battery plant. All valves and pipes are lead (inset closeup).



The new battery manufacturing plant just opened by Consumers Cooperative Association is a model of organization and uncluttered efficiency. No pains seem to have been spared to utilize the most modern machines and materials for this 750 unit-per-day plant.

The "lifeblood" of a storage battery assembly line might be said to be the sulphuric acid that is stored and then piped to various stations where it is needed on the assembly line. In CCA's new plant in North Kansas City, Mo., the storage and distribution tanks, the pipes and the valves of this feed system are made of lead.

One of the 26 workers at the battery plant placing the positive and negative lead plates in their cells.

When commercial grade sulphuric acid first enters the battery plant, it is first stored in two 6000 gal. reservoir tanks located outside of the factory building. Engineers at the firm of Messaglia-Neustrum-Middleton Co., Kansas City, Mo., designers of the plant, used lead lined tanks supported in a steel cage or basket type of construction throughout. This type of construction offers the advantage that any leak can easily be repaired without having to drain the tank and thereby possibly slowing production.

The two big reservoir tanks are lined with $1/8$ in. thick sheet lead installed by Larry Goad and Co., St. Louis, who did the lead work throughout the system. All lead joints and seams are sealed by burning (welding) in the system.

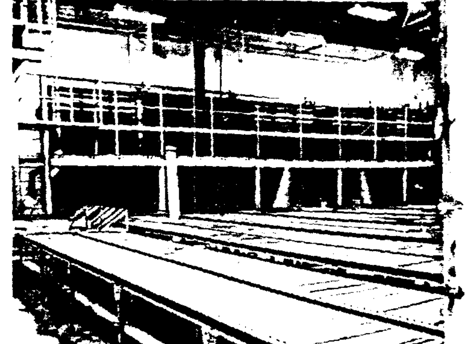
Before the sulphuric acid is used, it is taken from storage, diluted somewhat, then stored in two 2250 gal. tanks housed in the same structure as the reserve tanks. These cutting tanks are also lined with 3/16 in. thick lead.

When needed, the acid is piped into the plant and kept in five rectangular tanks located in the battery forming room. These tanks, each 7 by 4 by 5 ft., feed acid directly to assembly line stations and to the final filling station in the forming room where it is put into the completed battery.

In the forming operation, the battery, filled with acid, is subjected to an electrical charge, the lead oxide is thereby converted to sponge lead in one set of plates and lead peroxide in the other and the battery is ready to go to work.

In addition to the tank linings, Larry Goad and Co. installed over 2500 ft. of lead piping and a number of lead valves in the acid system. In all, probably more than 60,000 lb. of lead has been used in getting Consumers Cooperative Association batteries to the cars and tractors they will serve.

View across the battery forming room assembly conveyors showing the five rectangular lead-lined acid storage tanks elevated to be out of the way.



The 100-ton steel and lead shield (the inner surface is lead). Inside diameter is 87 in. and the shield is 17 ft. high. Ports through the shield will permit access to the core for experiments.

# LEAD JACKET COOLS REACTOR

A two inch thick wall of lead bonded to an eight-inch steel jacket is serving as the "thermal shield" of the new research reactor being built for the National Bureau of Standards. The heavy water moderated reactor will be completed this Summer.

As almost everyone knows, the core of an atomic reactor emits deadly quantities of atomic radiation and vast amounts of heat. That is why the NBS reactor is protected by two shields. The inner "thermal shield" consists of steel and lead walls entirely surrounding the core and cooled by water piped through tubes in the lead. This thermal shield's primary function is to absorb heat so that the outer "biological shield" made of concrete will not be damaged. Workers around the reactor are protected from radiation primarily by the concrete shield.

The thermal shield on the 20 million watt reactor being built at the new National Bureau of Standards site at Gaithersburg, Md., is designed to use more than the mass of the lead and steel to absorb the heat from the reactor core. Burns and Roe, the New York City consulting engineering firm that designed the reactor shield, included almost one-half mile of ½-in. diameter copper tubing to carry water through the lead sides and the bottom of the shield.

The excellent casting properties of lead made it feasible for O. G. Kelley and Co., Dorchester, Mass., to hand cast the 17-ft. high lead wall around some 153 vertical sections of tubing about 50-ft. long. In addition there are 100 horizontal sections of tubing approximately 18-ft. long.

In the casting process, maximum heat conductivity was assured by first silver brazing the tubing to the steel outer shell with at least a ⅛-in. fillet along both sides of the contact line. Each tubing section was manufactured as a single piece to assure dependability and pressure tested to assure leak-tightness. Then the lead was hand cast around the tubing so that it bonded dependably with both the steel casing and the copper tubes.

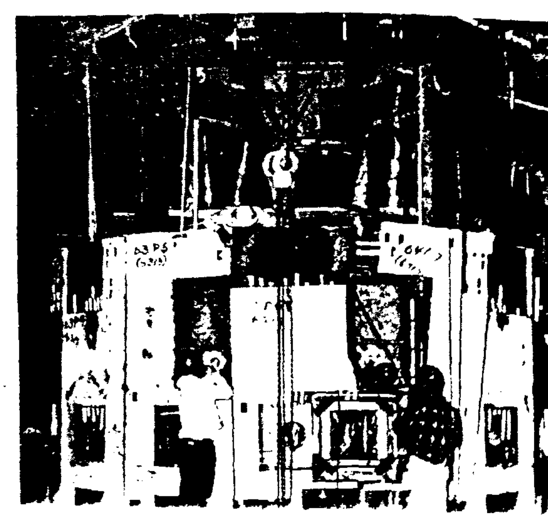
When the reactor is in operation, 660 gal. per min. of demineralized water circulates through the tubing system where it is heated from an entering temperature of 97°F to 104°F as it leaves the system. Through this means enough heat is withdrawn from the shield to drop the temperature from the reactor vessel to a safe temperature for the concrete biological shield.

The outer shield, a thick mass of concrete weighted with magnetite (iron ore) instead of gravel is the operating personnel's protection against dangerous gamma rays and penetrating neutrons.

### Extreme heat, cold mixed

One of the features that makes the NBS reactor an unusually sophisticated research tool is a two ft. diameter port passing through both the biological and thermal shield to permit the production of cold neutrons in a cryogenically cooled moderator. The novel aspect of this is that the cooled moderator can be held at temperatures very close to absolute zero (–460°F), even though it is adjacent to the reactor core. Construction of this, and other experimental ports, of course, required the removal of a certain amount of shielding concrete from the biological shield. The engineers analyzed each such port and determined the equivalent amount of lead and neutron absorber needed to restore the same shielding properties. The greater space efficiency of lead permits substitution for the removed concrete to preserve the safety of the reactor. In the NBS reactor about 22 tons of lead was used in the thermal shield and approximately 15 tons in the biological shield.

Outside of the NBS research reactor. The thermal shield can be seen above and behind the biological shield. The square opening protected by a plastic sheet is part of the cold neutron facility where temperatures may reach 453 F.

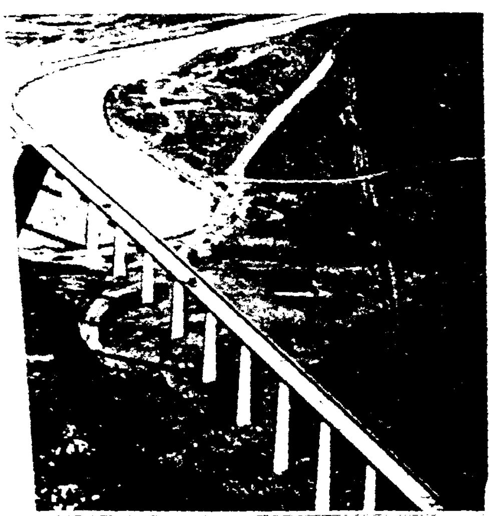


# FOUR PRIZE BRIDGES

DEVIL'S CANYON BRIDGE NO. 2, near San Diego County line, Calif. Jury said, "Done in rather harsh simplicity, fitting in with surrounding country. We particularly like the proportionate simplicity of the piers."

-ICAGO'S NORTH DEARBORN STREET BRIDGE. "It solves ) problem of the bascule bridge in a very simple manner."

-IITE RIVER BRIDGE, Rogers, Ark. "A ribbon of steel. We ·e struck by the simplicity and slenderness of the vertical ports."



We're showing you four prize bridges. They were chosen for their beauty from more than 135 entries in the American Institute of Steel Construction 1963-64 Prize Competition.

The distinguished jury of architects, engineers and designers that selected these winners agreed that the choice was hard because: "Bridges are getting better looking — as well as more economical". But one area where the choice was not hard was in the selection of a paint system to protect these four beauties. Red lead primers were the unanimous choice.

Prize winner in the long span category was the Cold Springs Canyon Bridge, Santa Barbara, California. Designed and owned by the State of California, the bridge was erected by the American Bridge Division of U.S. Steel Corp. Of course, the state's rigid specifications for a red lead protective paint system were followed by the fabricators. In this case, 3 mils of Specification 58-G-53 in two coats were called for as a primer system. Roughly 15.7 lb. of red lead was used in each gallon of the two-coat system.

Medium Span Prize Bridge (for fixed span bridges under 400 ft. and less than $500,000) was the White River Bridge at Rogers, Arkansas. General Contractor was Guy H. James Construction Company, Oklahoma City, Oklahoma. The Arkansas State Highway Department specified two coats of red lead primer paint for this bridge to meet AASHO specifications for Highway Materials, M-72, Type I.

Winner among the bridges with fixed short spans costing less than $500,000 was the Devil's Canyon Bridge No. 2, five miles east of the San Diego County line, California.

The Movable Span Bridge Prize went to Chicago's North Dearborn Street Bridge. Owned by the City of Chicago, the steel on this bridge received a shop coat of red lead and linseed oil, meeting the specifications of the State of Illinois Division of Highways. Here the jurors felt that the designers "have lent the bridge individuality and a pleasing appearance by integrating the abutments with the truss work on the bridge."

COLD SPRINGS CANYON BRIDGE. "A steel arch, very simply and directly handled." By using red lead primers, the State of California is assuring its continued beauty.

LIA26409

# Interesting Odds 'N' Ends about Lead

Deuxieme Congres
International Du Plomb

Internationale
...renz Uber Blei

**4-7 October**
**Second International Conference on Lead**

Secondo Congresso
Internazionale Del Piombo

The Second International Conference on Lead will be held October 4 through 7, 1965 in Arnhem, Holland. Three parallel programs of papers will be held each day embracing the use of lead in cable sheathing, in batteries, and in a variety of more general applications. All papers and programs will be either in English or simultaneously translated into English and other languages.

The general session will deal with lead and lead alloys and coating for corrosion resistance and chemical construction, and the use of lead in sound and vibration control.

Both the cable and battery sessions include planned tours of nearby European plants.

Further details about the meeting are available through Lead Industries Association, Inc., 292 Madison Ave., New York, N.Y. 10017.

**"See them shufflin' along" . . .** A retired cobbler has proposed a novel method of making prisons escape proof; reports the FBI. Lock a pair of special boots on each prisoner. The boots would be comfortable for walking, it is said, but 26 lbs. of lead in each sole would easily prevent running. "Escape is virtually impossible without the key," says the FBI monthly law enforcement bulletin.

**Lead secreted in jewelry case! . . .** Approximately one-quarter pound of quarter-inch lead burning wire goes into the front plate of this specially designed Lift-A-Way Valet case to provide weight and balance for proper functioning of the hinged-top section. "We considered several ma-

terials and found that lead is the only product that can provide the needed weight and dimensional characteristics —at a realistic price," said a spokesman for London Leather Novelties, New York, producers of the case.

**You can't see the lead . . .** but it's easy to see the results. Old World skills, taught and passed down from father to son show up in this hand crafted paperweight. Joseph L. St. Clair of the St. Clair Glass Works in Elwood, Indiana uses lead in the manufacture of every piece he turns out. St. Clair sells all the items he can make—perfume bottles, paperweights, penholders, lamp bases and ash trays all have the flowery designs popular in Grandma's day and now.

**A Lead sap . . .** consisting of a leather glove beefed up with six ounces of strategically placed lead powder is the latest for law enforcement officers. The glove comes with the lead loaded in either the palm or the knuckles to suit individual preferences for infighting.

**CHANGE OF ADDRESS OR NEW READER**

**Use this side of the coupon if you have recently changed your address or if you would like to be added to the mailing**

LIA26410

CHANGE OF ADDRESS — ADD ME TO YOUR MAILING LIST
(please circle one)

PLEASE CHECK INTEREST

From ______
Name, title
______
Company
______
Street
______
City, zone, state

To ______
Name, title
______
Company
______
Street
______

☐ Architectural & building
☐ Design Engineer
☐ Ceramics
☐ Radiation
☐ Other (please specify)

# lead

## LIBRARY OF TECHNICAL INFORMATION

The following publications are available free of charge unless otherwise noted. Send request to th

LEAD INDUSTRIES ASSOCIATION, 292 MADISON AVENUE, NEW YORK 17, N.

### NEW LISTINGS

**Ceramic permanent magnets**
Six-page reprint describes ceramic processes, applications and potential markets for ceramic permanent magnets, particularly high-lead ferrites.

**Lead roofing and flashing**
Handbook for contractors, architects, and others in the building field gives detailed descriptions and layouts of all standard lead roofing systems. Performance characteristics, gages and specifications included in profusely illustrated, 16-page guide.

**Organo-lead job hunt**
Two-page description of new compounds and possible areas of application.

**New uses for terne coated steel**
Two-page reprint summarizes the applications for industrial terne, a lead alloy coated steel. Corrosion resistance and formability spur increased application.

**Use epoxies to line tanks with lead**
Reprint describes novel method of bonding lead linings to steel tank walls with epoxy cement. Result: lighter sheets, less leadburning.

### GENERAL

**New uses for lead**
**Design engineering data**

### BATTERIES

**The picture book of power batteries**
**Truck costs in a jiffy**

### CONSTRUCTION

**High temperature lead joints**
Results of comparative tests of lead calked joints in cast iron soil pipe.

**Waterproofing with sheet lead**
Gives methods and specifications for waterproof constructions.

**Pools and planters**

**Removable walls with lead linings**

**Isloation of buildings from vibrations**

**Silver anniversary roofs**

**Laboratory drainage systems**

**Lead work for modern plumbing**
$2 postpaid, $1.50 per copy in orders of 10 or more.
Profusely illustrated 164-page text presenting clearly to the plumbing student the necessary tools, procedures and methods.

**Lead plumbing systems**

### ENGINEERING

**Modern chemical construction**
Description of types of lead products, and constructions used in the chemical industry.

**Cleaning "hot" parts ultrasonically**

**PZT transducers for ultrasonic cleaning**

**High speed lead plating**

**Importance of lead in glass**

**Phase relations: PbO, PbO-$Fe_2O_3$ systems**

**New electroceramics data**
Pb-, Ba-, $SrHfO_3$ systems.
PbO-BaO-MgO-$SiO_2$ system.

**Soldering and soldering alloys**

**Lead sheathing for power cable**

**Materials of construction review**

**Corrosion data-lead and alloys**

**Methods of lining lead tanks**

**Cutting press vibrations**

**Nuclear materials**

**Radiation protection**

**Lead alloy anodes for cathodic protection**

**Lead to control sound and vibration**

**Anodes for ship protection**

### FINISHES

**Lead paint systems for bridges**

**Decorative finishes for lead**

**Red lead based paint systems**

**Porcelain enamels:**
For aluminum.
Low temperature steel.
Molybdate opacified enamel.

**Glazes for brick**

UPON REQUEST, THE LEAD INDUSTRIES ASSOCIATION WILL BE GLAD TO MAIL "LEAD" REGULARLY, FREE OF CHARGE, TO THOSE INTERESTED, AND WILL COOPERATE WITHOUT OBLIGATION IN THE SOLUTION OF YOUR LEAD PROBLEMS.

287

Reproduced by letterpress from lead type.

PRINTED IN U.S.A.
GUIDE-KALKHOFF-BURR, INC
NEW YORK, N. Y.

Mail to: Lead Industries Assn., Inc., 292 Madison Ave., New York 17, N. Y.

ame, Title ______

ompany ______

reet ______

ty, Zone, State ______

ease send ______

TO REQUEST LITERATURE

LIA26411