

INDUSTRY DEVELOPMENT BULLETIN

Sent to Eng. Personnel
Lead Industries Association, Inc.
292 Madison Ave.
New York 17, N. Y.



Look Ahead with Lead

December 4, 1962

SUBJECT: NOISE CONTROL

To Members of the Lead Industries Association, Inc.:

Attached is the first detailed report of a case history of a successful installation of lead for noise control. At this time it is strictly for the information of members of the Lead Industries Association, as the material has not been cleared for publication yet.

We intend to follow this first report with additional case histories of other experimental installations in order to build up a background of practical field data for use in evaluating and developing the market for lead in noise control. We are continuing to encourage experimental installations and have limited funds for partial subsidization of such installations as indicated in the attached report.

We will welcome information from members of other opportunities to work with people interested in making test installations within our ability to do so.

Very truly yours,

Executive Vice President

RLZ:mk
Enc.

INDUSTRY & DEVELOPMENT BULLETIN

Lead Industries Association, Inc.
292 Madison Ave.
New York 17, N. Y.



Look Ahead with Lead

November 26, 1962

LEAD FOR NOISE CONTROL -- CASE HISTORY # 1

Noise Laboratory at Franklin Institute

IMPORTANT -- For internal LIA use only. This material is not cleared for publication at this date.

SUMMARY: The Franklin Institute, following the recommendations of the LIA, has successfully soundproofed a critical facility with sheet lead. Tests of the soundproofed room, a noise laboratory, show that the treatment was responsible for a 14 db improvement in the wall and produced a noise reduction of about 45 db as finally employed. The project used about one ton of four pound sheet lead (bought for the job by Franklin Institute) and a leaded X-ray door supplied jointly by Bar-Ray Products Co. and LIA at a cost of \$62.50 each. Tests were made by Bolt Beranek and Newman at a cost to LIA of about \$1000.

History and Problem: In September 1961 the Franklin Institute phoned LIA to ask how lead might be used to quiet a room designated for critical noise studies. The room (see sketch 1) was one of a number of workrooms separated from a noisy general area. The building was an old two-story high structure which had been one large open bay with exposed roof trusses and no floors or internal partitions. The work rooms had been put up of 1/2" plaster board on either side of 2 x 4 wood studs and roofed over at a ceiling height of 10 feet with 1/2" plaster board facing on 2 x 8 joists. One wall -- part of the exterior building wall -- was of cinderblock and the floor was concrete over earth fill. On the opposite wall of the workroom there was a door opening to the general area. Electrical service, high-pressure oil lines, and air conditioning and return ducts pierced the walls.

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The work to be done in the room is classified military research. It called for detecting small amounts of noise produced by machinery within the room.

In addition to the normal noise load expected in laboratories, the general work area and other workrooms nearby housed continually running equipment, light metalworking operations, and occasional operation of a very large air compressor.

Action taken: After inspecting the room, LIA made recommendations and these were followed almost exactly. As a result, the room was lined with 4 lb sheet lead at Franklin Institute's expense and an X-ray door with a 12 lb lead core was hung to replace the hollow door originally used. The door was furnished jointly by Bar-Ray Products and LIA.

The finished wall, after modification, consisted of: 1/2" plasterboard on both sides of 2 x 4 studs, 4 lb sheet lead borne by 3/4" furring strips positioned on the studs inside the room, 3/4" plywood on 1/2" furring strips positioned over the other furring strips. Interior finish of the room was acoustical tile. The 3/4" plywood was not added because of the sound problem but was needed to bear pipes and moderately heavy wall-mounted equipment. The seams in the lead were made by lapping the sheet lead and buttering the lap with a leaded plastic before the 1/2" furring was nailed down. (Sketch # 2) The cinderblock wall was treated in the same way as the other walls.

At the ceiling, 1/2" plywood was nailed up inside the plasterboard finish and this was faced with acoustical tile. On top of the joists (previously exposed on top) they laid 1/2" plywood, tarpaper and then damped 2" of dry sand.

The only major departure from our recommendation was the addition of 1/2" plywood on 1-1/2" battens to the outside of the front wall of the room (where the room adjoins the general work area.) The space between the original plasterboard panels and the plywood was filled with damped sand.

All of the added construction was footed on foam rubber and the wiring and piping entrances were well caulked (though we did later find some leaks around the air conditioning). The piping connection for high-pressure oil is through flexible pipe and the pump is shock mounted.

Results: The Franklin Institute agreed to let us have Bolt, Beranek and Newman test the room and publicize the results. Accordingly tests were made in April of 1962. BBN used a technique which allowed them to estimate accurately what the TL of the partition would have been if there had been no flanking paths. It is important to note that the partition tested in this way was the wall we have recommended -- not the front wall which had the additional sand loading.

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The results of the test showed that the 9 frequency average of the leaded wall was 46 db — a 14 db improvement over the drywall construction alone based on EBN's existing data for that construction. It is interesting to note, too, that the leaded wall achieved an average of 45 db in noise reduction — an excellent record in view of the fact that most field erections of a partition fail to come up to test lab results. The test results are tabulated here:

Frequency	TL for drywall construction (from EBN files)	TL for leaded wall without flanking (from test)	Noise reduction actually achieved
	db	db	db
125	15	30	27
170	20	33	31
250	25	36	35
350	29	41	40
500	34	45	45
700	38	51	50
1000	45	55	60
2000	42	63	65
4000	42	62	50
Average	32 db	46 db	

LIA's primary interest in work of this kind is in development of practical products and applications. From this point of view, "customer satisfaction" and the reaction of the people who work on the project are perhaps as important as the demonstration of the technology involved. It is therefore quite gratifying to note the reaction of both Mr. Harry Ripple, Research Group Leader at Franklin Institute, and Mr. Ranger Farrell of EBN.

Mr. Ripple, in the course of a discussion about what additional steps might be taken to quiet the room, said that he doubted whether any further work was justified. He said that, "Our primary mission has been accomplished. We have a relatively quiet room at a reasonable price."

Mr. Farrell, questioned about how this room compared with other critical acoustical facilities he has first hand knowledge of, said that it was not as good as a laboratory built expressly for the purpose, but quite good enough for the work to be done there. Then he added, "Of course, if you compare it with an executive office or something of that kind it is fabulous."

Respectfully submitted,



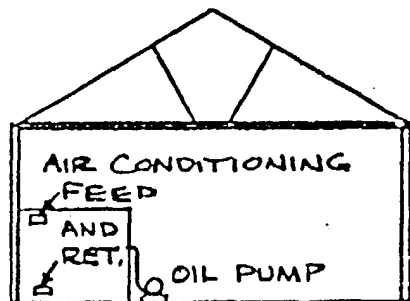
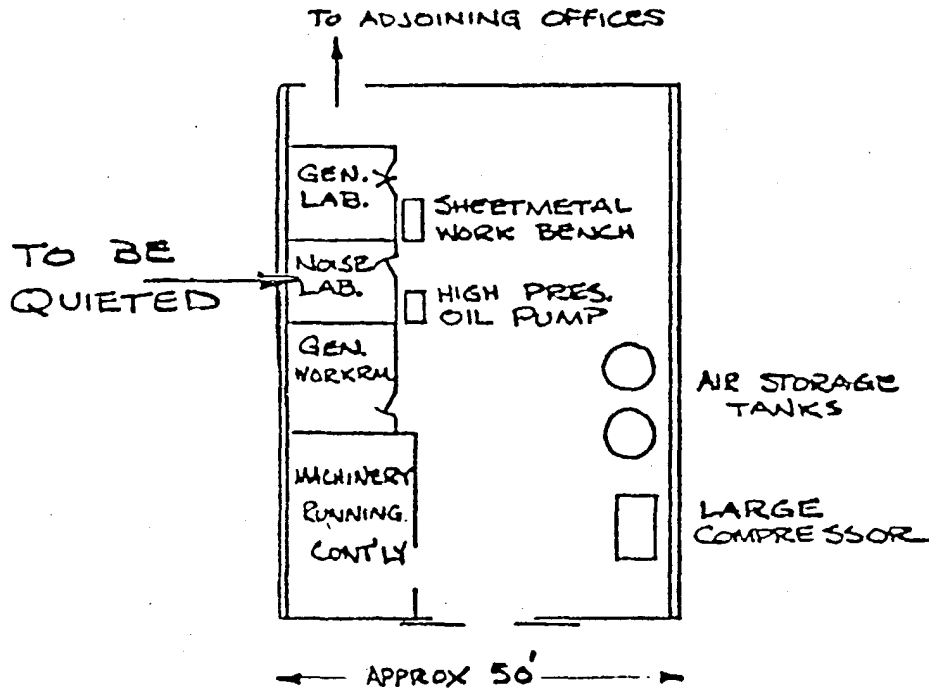
Bruce Fader
Manager, Technical Services

BF:bc

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SECTION AT NOISE LAB.

SKETCH #1

FRANKLIN INSTITUTE CASE HISTORY

LEAD INDUSTRIES ASSN 11/2/62 ~~FILED~~

Franklin Institute

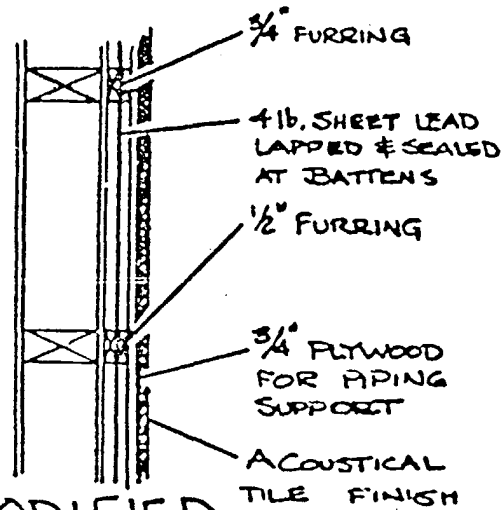
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ORIGINAL

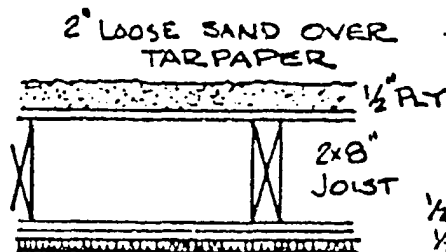
$\frac{1}{2}$ " PLASTERBOARD
ON 2x4 WOOD STUDS
16" O.C.



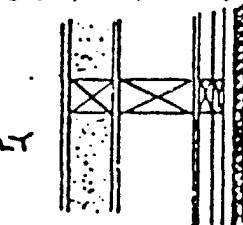
MODIFIED

FRONT WALL

ONLY



CEILING DETAIL



$\frac{1}{2}$ " PLASTERBOARD
 $\frac{1}{2}$ " PLYWOOD
ACOUSTICAL TILE FINISH

SAME AS MODIFIED
(ABOVE) BUT
 $1\frac{1}{2}$ " FURRING
OUTSIDE WITH
 $\frac{1}{2}$ " PLY FINISH
& DUMPED SAND

SKETCH #2

FRANKLIN INSTITUTE
CASE HISTORY

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