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Reprint of Field Test Report

IMPACT AND AIRBORNE  
SOUND TRANSMISSION

Conducted by  
CERAMU AND ASSOCIATES

July 1974

# FSN

FLOATING FLOOR  
ACOUSTICAL  
FIELD TEST

TEST BULLETIN 100

## IMPACT AND AIRBORNE SOUND TRANSMISSION FIELD TEST REPORT

TESTED FOR: Mason Industries, Inc., Hollis, N.Y.

TEST NO. 2501

TEST DATE: July 1 and 2, 1974

TEST LOCATION: 25th Floor T.V. Studio  
Standard Oil of Indiana Building  
Chicago, Illinois

### INTRODUCTION:

The acoustical tests discussed and reported here were conducted by Cerami and Associates, Inc. on July 1 and 2, 1974 in the T.V. Studio of Standard Oil of Indiana Company at the above referenced test location. The purpose of these tests was to measure the Impact Noise Rating (INR) and Field Sound Transmission Class (FSTC) of a typically installed Type EAFM acoustical floating floor system as manufactured by Mason Industries, Inc. The subject test specimen installation was completed in September of 1973.

### DESCRIPTION OF TEST SPECIMEN:

The test specimen consisted of a 4 inch thick reinforced concrete slab, with an average weight of 50 lb. per square foot, supported on a grid of Mason Industries Type FSN-1336 and 1337 mountings with Type EAFM neoprene elements. The mountings are spaced on 24 inch centers, supporting the 4 inch thick "floating slab" 2 inches above a 5-1/2 inch thick LWC structural slab weighing an average of 50 lb. per square foot. The floating slab was finished in the Studio with a layer of 1/8 inch linoleum flooring. The floating slab was isolated along its perimeter with Type 34AFG-10, 3/4 inch thick, 10 lb. density fiberglass boards. The test surface area was 1054 square feet. Dimensions and details of the test specimen are as shown in Mason Industries drawings Z-1075-1 and Z-1076.

### TEST METHODS:

#### A) IMPACT-TEST

The test method used in obtaining the data is in accordance with ISO (International Standards Organization) Recommendation R-140-1960, "Field and Laboratory Measurement of Airborne and Impact Sound Transmission. The data obtained were corrected to a reference room-absorption of 10 square meters. In accordance with the R-140-1960 Standard Recommendations, the absorption of the receiving room was measured by recording the acoustical decay rate.

Test equipment consisted of the Bruel & Kjaer Tapping Machine Type 3204, which was placed at two (2) positions on the test floor. Sound pressure levels were measured in one-third octave bands in the receiving room by using the General Radio Noise and Vibration Analyzer Type 1564A, and corrected for ambient noise levels in the receiving room. Test results represent the arithmetic average of the two positions measured. Test positions are indicated with "X" marks on drawing Z-1075-1.

## B) AIRBORNE SOUND TRANSMISSION LOSS TEST

The test was conducted in full conformity with Section 6 of American Society for Testing and Materials Designations E 336-71, Standard Recommended Practice for Measurement of Airborne Sound Insulation in Buildings.

Acoustical test signals of pre-recorded 1/3 octave band random noise were generated in the source room with loud speakers placed in such manners as to generate a diffused sound field. Four loud speakers were used consisting of two 8 inch diameter acoustically suspended speakers, and two horn speakers.

Test frequencies were 1/3 octave band frequencies between 100 and 5000 Hz inclusive. Sound pressure levels were measured in the receiving room in 1/3 octaves by using the General Radio Noise and Vibration Analyzer Type 1564A, and corrected for ambient noise levels in the receiving room. The data obtained were corrected to a reference room-absorption of 10 square meters. In accordance with the ASTM E336-71 Test Standard, the absorption of the receiving room was measured by recording the acoustical decay rate.

### TEST CONFIGURATION

The test specimen separates the 25th floor T.V. Studio and elevator equipment room on the 24th floor. For the Impact Test, the receiving room was the elevator equipment room. Measurements were made in the elevator equipment room in the late evening hours with all elevator equipment as well as ventilation equipment shut down in order to permit measurable sound pressure levels due to the Tapping Machine.

For the Airborne Sound Transmission Test, the elevator equipment room was used as the source room and the T.V. Studio was used as the receiving room so as to minimize the amount of time elevator equipment was shut down. Partitions around the T.V. Studio were partially supported on the test specimen floor as shown on Mason Industries drawing Z-1076. Furthermore, the ceiling over the T.V. Studio consisted of a resiliently suspended gypboard ceiling with a layer of 4 inch thick glass fiber blanket laid over the top.

A general layout of the test configuration is shown on Figure 1 of this report.

# Cerami

AND ASSOCIATES, INC.  
ACOUSTICAL CONSULTANTS

PROJECT Mason Industries, Inc.  
Field Sound Transmission Tests

SHEET \_\_\_\_\_ OF \_\_\_\_\_  
DATE 7-8, 1974

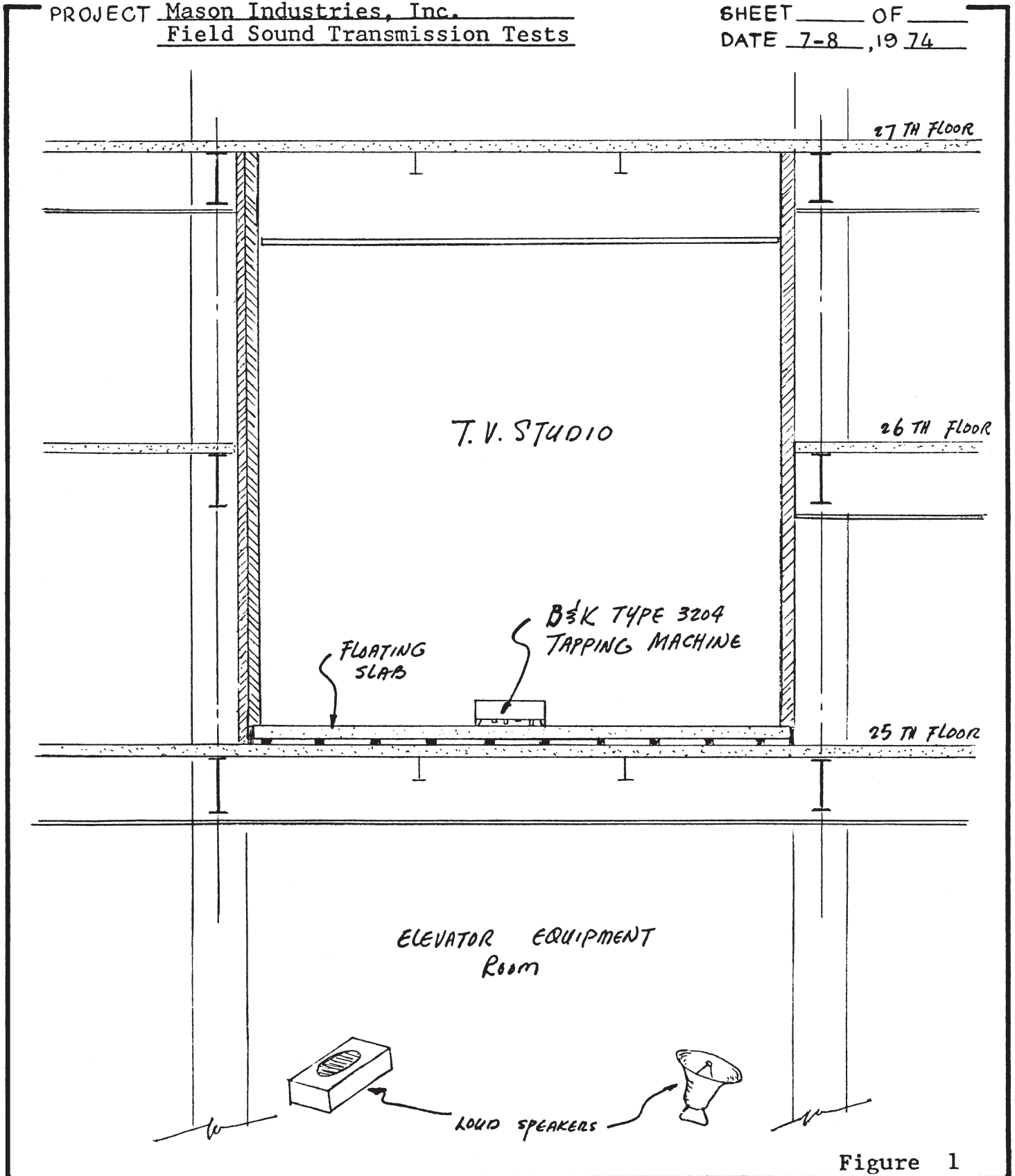


Figure 1

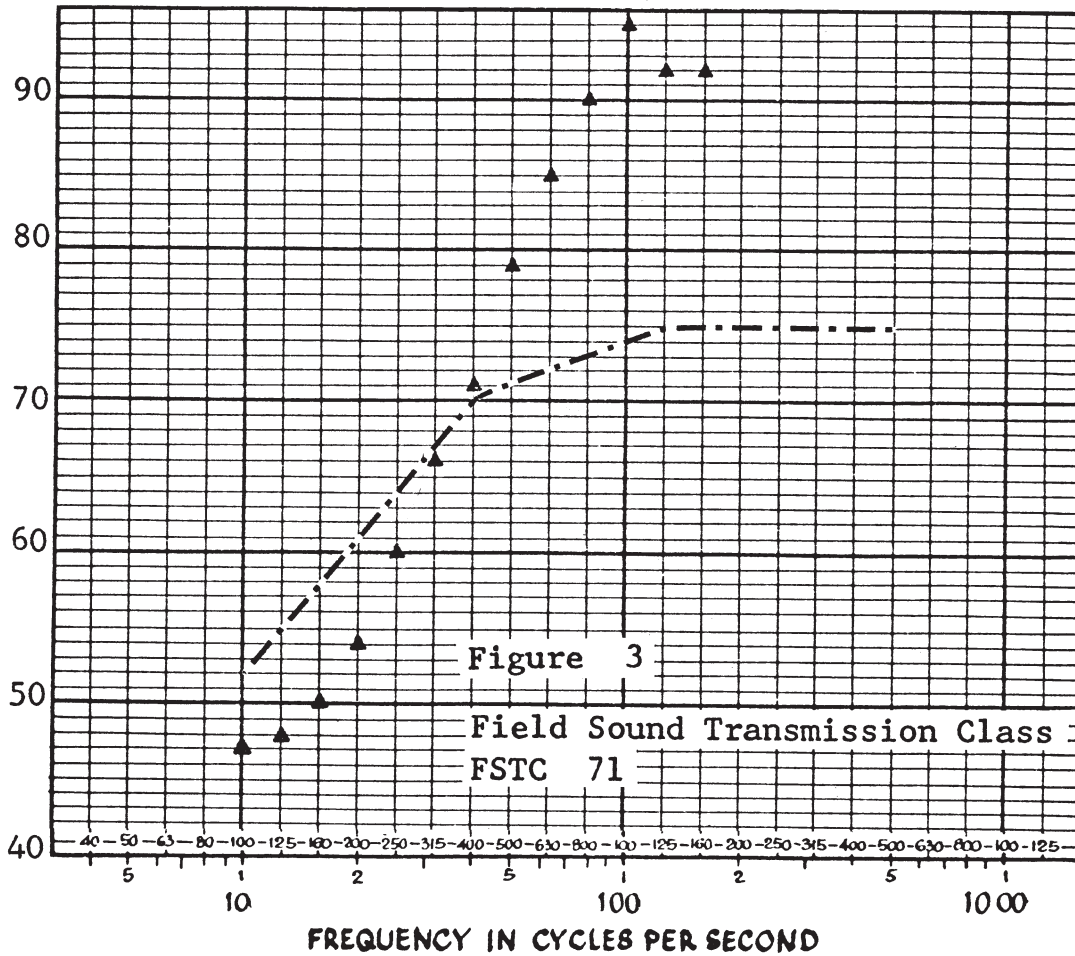
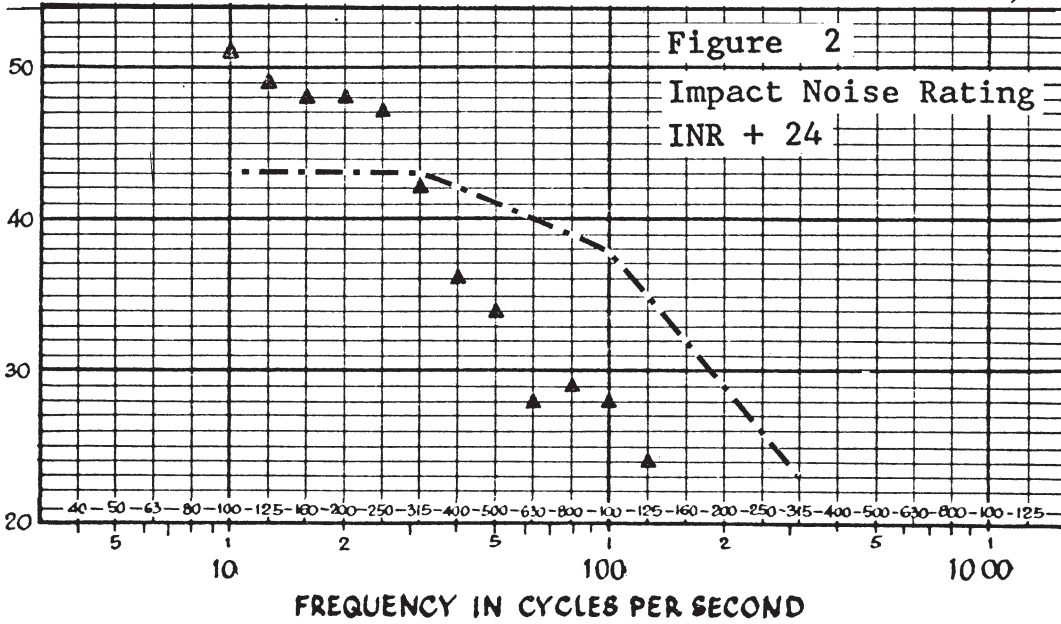
# Cerami

AND ASSOCIATES, INC.  
ACOUSTICAL CONSULTANTS

PROJECT Mason Industries, Inc.  
Field Sound Transmission Test

SHEET        OF         
DATE 7-8, 19 74

Normalized Impact Sound Level  
THIRD OCTAVE BAND LEVEL IN DB RE 0.0002 MICROBAR



TEST RESULTS

A) IMPACT NOISE RATING (INR)

Sound pressure levels at 1/3 octave intervals, normalized to 10 square meters, are as follows:

<u>Center Frequency (Hz) in One-Third Octave Bands</u>	<u>Sound Pressure Levels (db) Normalized to A<sub>0</sub> = 10 M<sup>2</sup></u>
100	51
125	49
160	48
200	48
250	47
315	42
400	36
500	34
630	28
800	29
1000	28
1250	24
1600	24
2000 2500 3150	*
Impact Noise Rating	<u>INR + 24</u>

Note: \* Denotes sound pressure levels due to Tapping Machine being below ambient noise levels for those frequencies indicated.

Graphical presentation of the above test results are shown in Figure 2 of this report.

B) FIELD SOUND TRANSMISSION CLASS

Sound transmission loss values are tabulated below at the eighteen standard test frequencies.

<u>Center Frequency (Hz) in One-Third Octave Bands</u>	<u>Transmission Loss (db)<sub>2</sub> Normalized to A<sub>0</sub> = 10 M<sup>2</sup></u>
100	47
125	48
160	50
200	54
250	60
315	66
400	71
500	79
630	85
800	90
1000	95
1250	92
1600	92
2000 2500 3150 4000 5000	*
Field Sound Transmission Class	<u>FSTC - 71</u>

Note: \* Denotes transmitted sound pressure levels being below the ambient noise levels for those frequencies indicated.

Graphical presentation of the above test results are shown in Figure 3 of this report.



COMMENTS:

The above field tested data as compared to laboratory tested ratings are as follows:

Impact Noise:	Field Tested	INR + 24
	Laboratory Tested	INR + 17
Airborne Noise:	Field Tested	FSTC 71
	Laboratory Tested	STC 79

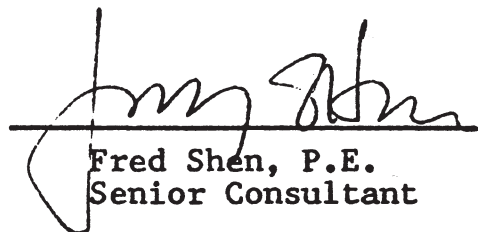
The higher INR field tested rating was attributable to the following:

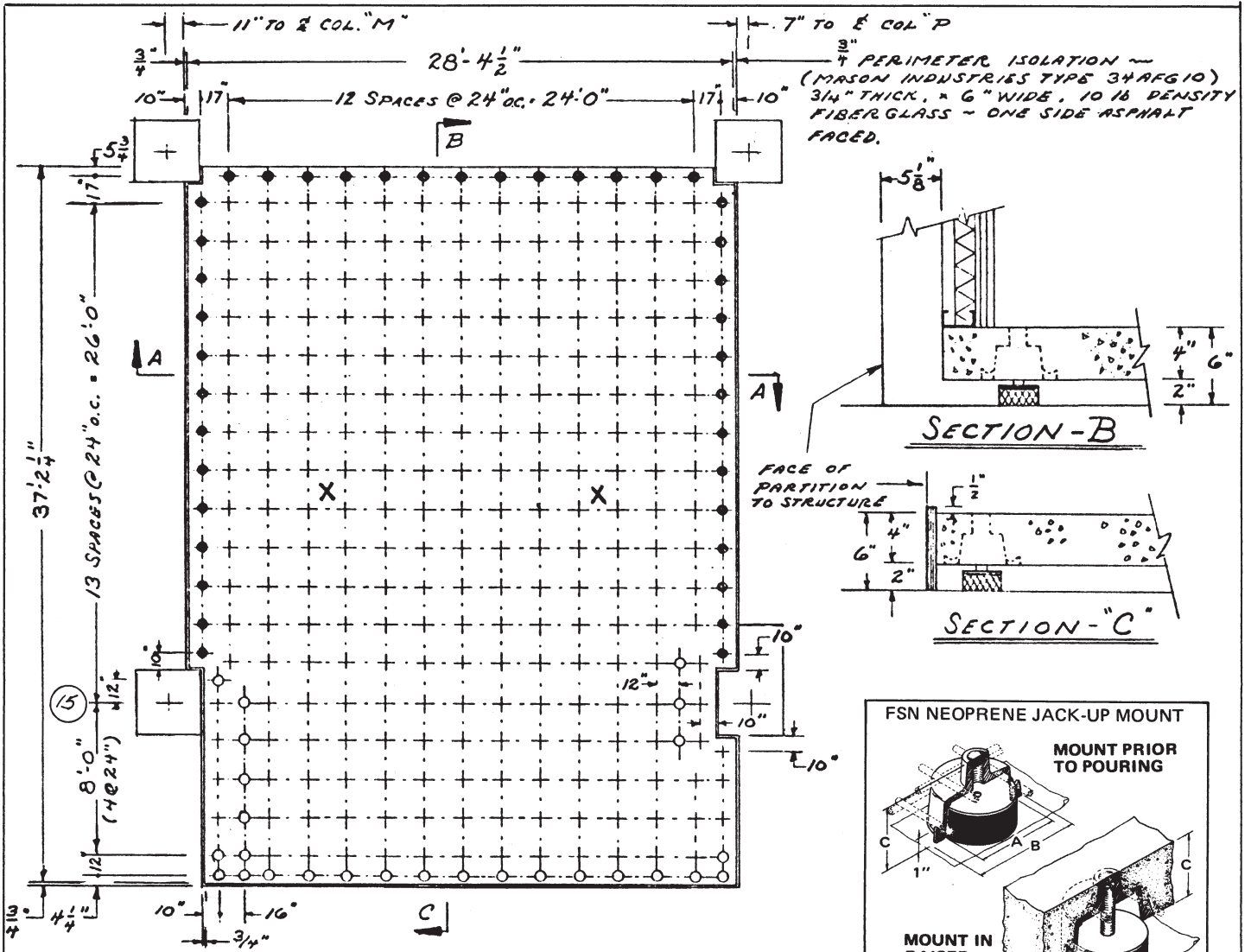
- 1) 1/8" linoleum floor provided a higher degree of impact noise insulation as compared to the laboratory test conducted directly on bare concrete surface. Based on National Bureau of Standards, Monograph 77, Test Panels 808 and 808A, 1/8 inch vinyl tile over concrete slab increased the INR rating by 3 points.
- 2) The difference in construction of the structural slab construction at Standard Oil of Indiana as compared to the precast "T" sections of concrete panels used in the laboratory tests.

The lower STC rating in the field was attributable to the following:

- 1) drywall partitions around the T.V. Studio were less in sound attenuating capability in controlling flanking paths than the double wythe, cavity masonry partition construction used in the laboratory tests.
- 2) single layer of gypboard sound barrier ceiling over the T.V. Studio was less in sound attenuating capability in controlling flanking paths than the double layers of gypboard ceiling construction used in the laboratory tests.
- 3) less than idealized installation conditions in the field as compared to laboratory conditions.

SUBMITTED BY:

  
Fred Shen, P.E.  
Senior Consultant



**DESIGN DATA:**

4" REINFORCED CONC. SLAB — 50 PSF  
 1/8" THICK INDUSTRIAL LINOLEUM — 1 PSF  
 LIVE LOAD ALLOWANCE — 130 PSF  
 TOTAL 181 PSF

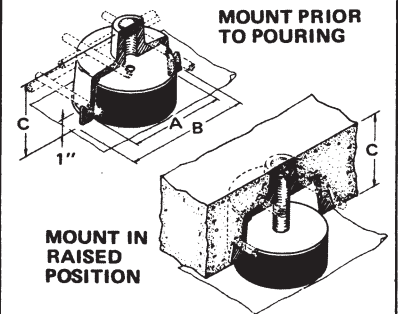
**LEGEND:**

- "+" DENOTES FSN-1336 W/EAFM-7640, 60 DURO NEOPRENE ISOLATOR, HOUSING PAINTED WHITE.
- "⊙" DENOTES FSN-1336 W/EAFM-7640, 50 DURO NEOPRENE ISOLATOR, HOUSING PAINTED RED.
- "⊛" DENOTES FSN-1337 W/EAFM-8452, 60 DURO NEOPRENE ISOLATOR, HOUSING PAINTED GREEN
- "X" IMPACT TEST LOCATIONS.

**NOTES:**

1. ISOLATORS HAVE BEEN SELECTED TO OPERATE AT BETWEEN 0.2 & 0.3 INCHES OF DEFLECTION, BASED ON A COMBINED DEAD & LIVE LOAD OF 181 PSF.

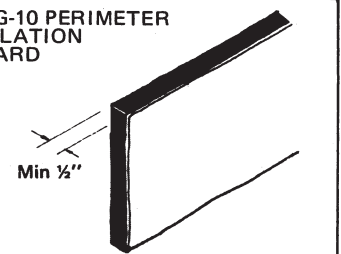
**FSN NEOPRENE JACK-UP MOUNT**



Load Range (lbs)	A (in)	B (in)	Min C (in)	Max C (in)
50 to 825	4-5/8	5-1/2	3	As Reqd
200 to 1365	5-3/8	6-1/4	3	As Reqd

Lowest Dynamic Frequency  
7.5 Hertz @ 0.3" Deflection. (60 Duro)

**AFG-10 PERIMETER ISOLATION BOARD**



10lb FIBERGLASS WITH 1/8" ASPHALT FACE. CUT AS REQUIRED



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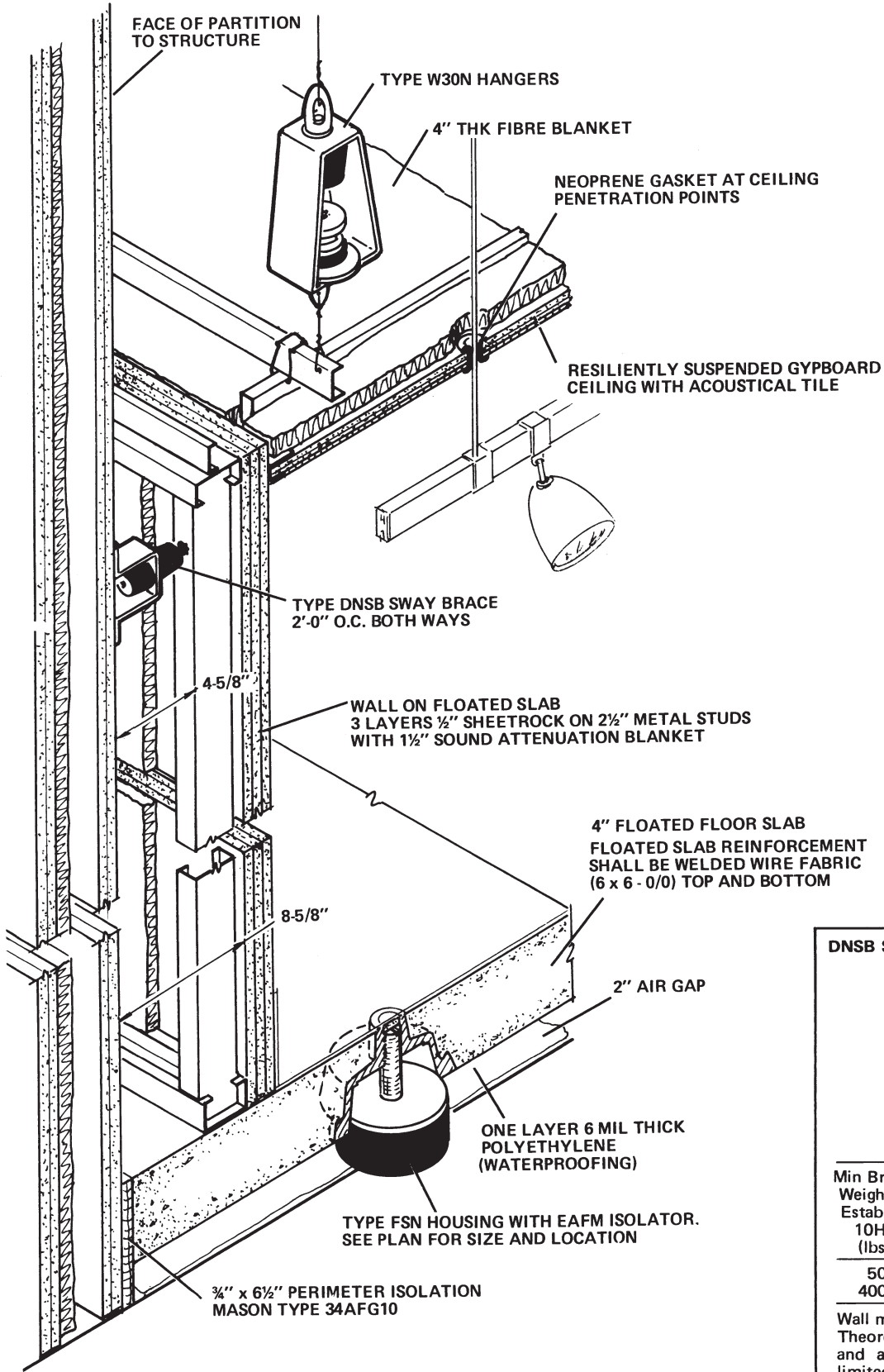
92-10 182nd Place  
 Hollis, New York 11423  
 Area code 212/523-3355

3335 E. Pico Boulevard  
 Los Angeles, Cal. 90023  
 Area code 213/263-9557

DR: K  
 CK: \_\_\_\_\_  
 DATE: 6-28-73

FSN ISOLATOR LAYOUT  
 25th FLOOR STUDIO 'A'  
 STANDARD OIL CO (INDIANA) BLDG  
 CHICAGO, ILLINOIS

DRAWING NO.  
  
 Z-1075-1



**DNSB SWAY BRACE**

Min Braced Weight to Establish 10Hz (lbs)	Assigned Max Weight per Brace (lbs)	A (in)	B (in)	C (in)
50	250	2	3	3 3/4
400	1200	2 1/2	3	4 1/4

Wall must be supported at the base. Theoretical horizontal load is zero and assigned maximum weight is limited by possible development of buckling or overturning forces.



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SECTION A TO Z-1075

25th FLOOR STUDIO 'A'

STANDARD OIL CO (INDIANA BLDG  
CHICAGO, ILLINOIS

DRAWING  
NO.

Z-1076a