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.
Figure 2
Impact Noise Rating
INR + 24

Figure 3
Field Sound Transmission Class
FSTC 71
TEST RESULTS

A) IMPACT NOISE RATING (INR)

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

<table>
<thead>
<tr>
<th>Center Frequency (Hz) in One-Third Octave Bands</th>
<th>Sound Pressure Levels (db) Normalized to $A_o = 10 , M^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>51</td>
</tr>
<tr>
<td>125</td>
<td>49</td>
</tr>
<tr>
<td>160</td>
<td>48</td>
</tr>
<tr>
<td>200</td>
<td>48</td>
</tr>
<tr>
<td>250</td>
<td>47</td>
</tr>
<tr>
<td>315</td>
<td>42</td>
</tr>
<tr>
<td>400</td>
<td>36</td>
</tr>
<tr>
<td>500</td>
<td>34</td>
</tr>
<tr>
<td>630</td>
<td>28</td>
</tr>
<tr>
<td>800</td>
<td>29</td>
</tr>
<tr>
<td>1000</td>
<td>28</td>
</tr>
<tr>
<td>1250</td>
<td>24</td>
</tr>
<tr>
<td>1600</td>
<td>24</td>
</tr>
<tr>
<td>2000 2500 3150</td>
<td>*</td>
</tr>
</tbody>
</table>

Impact Noise Rating: INR + 24

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.

<table>
<thead>
<tr>
<th>Center Frequency (Hz) in One-Third Octave Bands</th>
<th>Transmission Loss (db) Normalized to $A_o = 10 , M^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>100</td>
<td>47</td>
</tr>
<tr>
<td>125</td>
<td>48</td>
</tr>
<tr>
<td>160</td>
<td>50</td>
</tr>
<tr>
<td>200</td>
<td>54</td>
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<tr>
<td>250</td>
<td>60</td>
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<tr>
<td>315</td>
<td>66</td>
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<tr>
<td>400</td>
<td>71</td>
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<tr>
<td>500</td>
<td>79</td>
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<tr>
<td>630</td>
<td>85</td>
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<tr>
<td>800</td>
<td>90</td>
</tr>
<tr>
<td>1000</td>
<td>95</td>
</tr>
<tr>
<td>1250</td>
<td>92</td>
</tr>
<tr>
<td>1600</td>
<td>92</td>
</tr>
<tr>
<td>2000 2500 3150 4000 5000</td>
<td>*</td>
</tr>
</tbody>
</table>

Field Sound Transmission Class: FSTC - 71

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:

<table>
<thead>
<tr>
<th></th>
<th>Field Tested</th>
<th>Laboratory Tested</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impact Noise:</td>
<td>INR + 24</td>
<td>INR + 17</td>
</tr>
<tr>
<td>Airborne Noise:</td>
<td>FSTC 71</td>
<td>STC 79</td>
</tr>
</tbody>
</table>

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

Cerami AND ASSOCIATES, INC.
PERIMETER ISOLATION
(MASON INDUSTRIES TYPE 3W-REG10)
3/4" THICK, X 6" WIDE, 10 lb DENSITY FIBERGLASS - ONE SIDE ASPHALT FACED.

SECTION A

FACE OF PARTITION TO STRUCTURE

SECTION B

FSN NEOPRENE JACK-UP MOUNT
MOUNT PRIOR TO POURING

MOUNT IN RAISED POSITION

Load Range

A  B  C  C
(lbs)  (in)  (in) (in)  (in)
50 to 825 4-5/8 5-1/2 3 As Req'd
200 to 1365 3-3/4 6-1/4 3 As Req'd

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

AFG-10 PERIMETER ISOLATION BOARD

Min 1/4"

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

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 WHEIM-7640, 60 DURO NEOPRENE ISOLATOR, HOUSING PAINTED WHITE.
— Denotes FSN-1336 WHEIM-7640, 50 DURO NEOPRENE ISOLATOR, HOUSING PAINTED RED.
+ Denotes FSN-1337 WHEAM-8452, 60 DURO NEOPRENE ISOLATOR, HOUSING PAINTED GREEN.
X Impact Test Locations.

Notes:
1. Isolators have been selected to operate at between 0.2 to 0.3 inches of deflection, based on a combined dead & live load of 181 psf.
FACE OF PARTITION TO STRUCTURE

TYPE W30N HANGERS

4" THK FIBRE BLANKET

NEOPRENE GASKET AT CEILING PENETRATION POINTS

RELSILENTLY SUSPENDED GYPOBOARD CEILING WITH ACOUSTICAL TILE

TYPE DMSB SWAY BRACE
2-0" O.C. BOTH WAYS

WALL ON FLOATED SLAB
3 LAYERS 1/8" SHEETROCK ON 2-1/8" METAL STUDS WITH 1/2" SOUND ATTENUATION BLANKET

4" FLOATED FLOOR SLAB
FLOATED SLAB REINFORCEMENT SHALL BE WELDED WIRE FABRIC (6 x 6-0/0) TOP AND BOTTOM

ONE LAYER 6 MIL THICK POLYETHYLENE (WATERPROOFING)

TYPE FSN HOUSING WITH EAFM ISOLATOR. SEE PLAN FOR SIZE AND LOCATION

3/4" x 5/8" PERIMETER ISOLATION MASON TYPE 34AFG10

DNSB SWAY BRACE

Min Braced

Weight to Establish Assigned
10Hz Max Weight per Brace A B C
(lbs) (lbs) (in) (in) (in)

50 250 2 3 3 3/4
400 1200 2 3 3 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.