

AIIC and ASTC Test

Analysis Date: 5 December 2018
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Performed For: [REDACTED]
Analysis Performed: Tapping Test for Floor/Ceiling Assembly

Overview:

This report was prepared by RNS Acoustics at the request of [REDACTED] to determine the AIIC and ASTC ratings for a floor ceiling assembly between units 103 and 203 at [REDACTED]. The tapping machine was placed in unit 203 and measurements were taken in 103. The measurements are to determine if the existing assembly meets the 55 IIC rating requirement. If the assembly does not meet the requirement recommendations will be provided to meet the 55 IIC rating requirement. A detailed report of the simulated results is attached in Appendix A and a detailed report of the measured results is attached in Appendix B.

Definition of Terms and Limits:

LAeq – The equivalent continuous sound level. This single number value represents the level of noise that contains the same amount of energy as a time varying signal.

A-Weighting – The level in decibels as measured on a sound level meter using the A- Weighted network. The A-Weighted network is the network for measuring sound that most closely resembles what the human ear hears. Sound measured using the A-weighted network is designated dBA.

1/3 Octave Bands – Displays the frequency spectrum content of a signal divided into 3 bands per-octave. The 1/3 Octave Bands are more useful for data interpretation and practical applications.

Transmission Loss (TL) – The level in decibels a barrier attenuates a noise. The transmission loss is presented in attenuation per 1/3 octave frequency band.

STC – The Sound Transmission Class of a barrier. The STC rating roughly equals the overall transmission loss of noise when passing through the barrier.

AIIC – The Apparent Impact Insulation Class. A single-number rating derived from values of ISPL in accordance with ASTM E989. ISR provides a measure of the isolation of the receiving room from the impact sound produced by the operation of the tapping machine in the source room, given existing conditions.

ISPL – Impact Sound Pressure Level. In a specified frequency band, the average sound pressure level in a specified frequency band produced in the receiving room by the operation of the standard tapping machine on a floor-ceiling assembly, averaged over each of the specified tapping machine positions.

Section 1 – Simulations:

The existing assembly was simulated using INSUL 9.0. Table 1-1 shows the existing assembly construction. Figure 1-1 shows the results of the simulation. The assembly is expected to have an IIC of 55. The simulation report is attached in Appendix A.

Existing Assembly Construction	
Wood Floor Laminate	5/8"
Underlayment	1/16"
Lightweight Concrete	1-1/2"
Wood joists	2"x10"
R11 Batt Insulation	3"
Resilient Channel	1-1/2"
1/2" Type 'X' Gyp. Board	1/2"

Table 1-1. Floor/ceiling assembly construction.

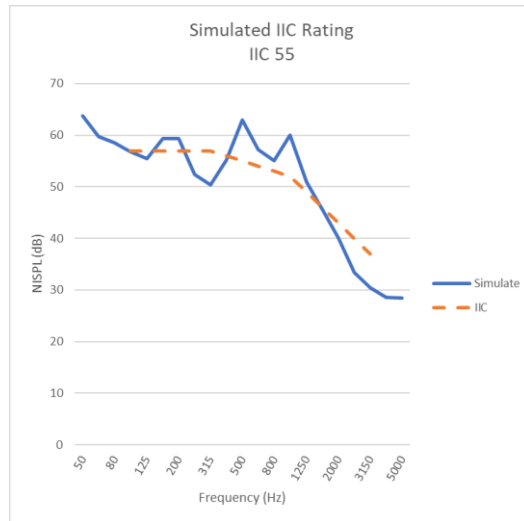


Figure 1-1. Simulation results using the assembly construction in Table 1-1.

Section 2 – Assembly Field Test:

Section 2.1 – Test Configuration

The field test was conducted with the tapping machine located in unit 203 and measurements taken in unit 103. Figure 2-1 and 2-2 show the tapping machine locations and measurement locations, respectively. The measurements in 103 were taken using the scanning mic configuration. Table 2-1 shows the floor construction. The detailed report is attached in Appendix B.

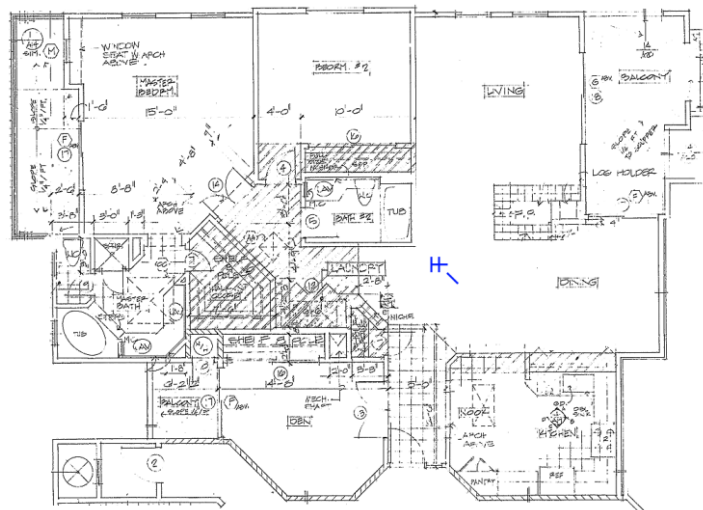


Figure 2-1. Tapping machine locations in unit 203.

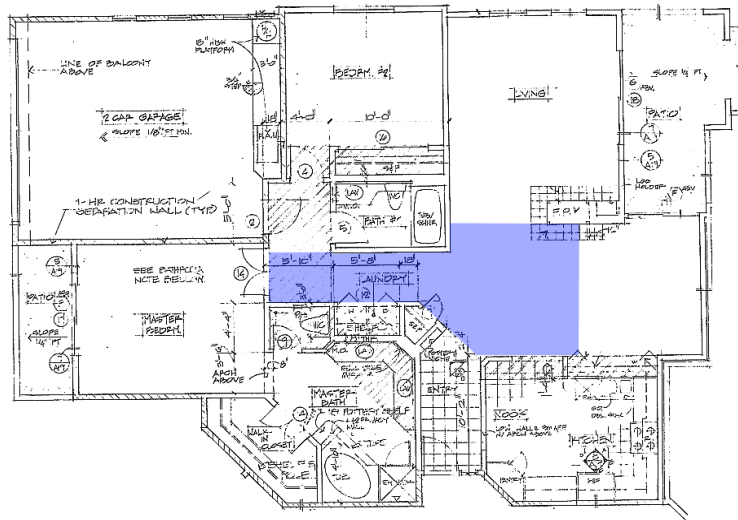


Figure 2-2. Measurement area located in unit 103.

Existing Assembly Construction	
Wood Floor Laminate	5/8"
Underlayment	1/16"
Lightweight Concrete	1-1/2"
Wood joists	2"x10"
R11 Batt Insulation	3"
Resilient Channel	1-1/2"
1/2" Type 'X' Gyp. Board	1/2"

Table 2-1. Floor/ceiling assembly construction.

Figure 2-3 shows the results of the test. The AIIc rating of the floor was determined to be 57. Also tested was the STC of the floor ceiling assembly. Figure 2-4 shows the measured STC rating of the floor.

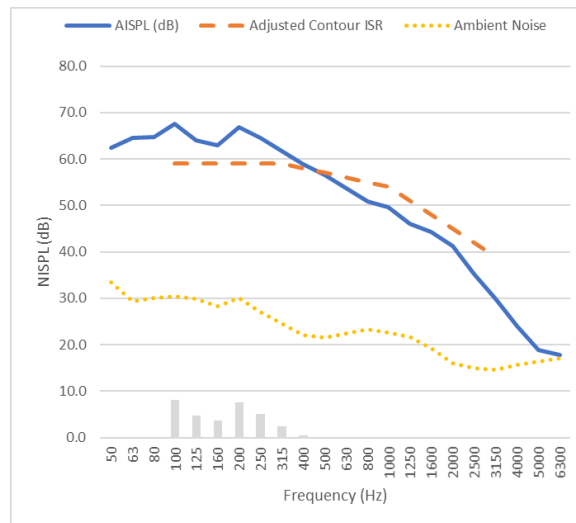


Figure 2-3. Measured AIIc rating of the floor.

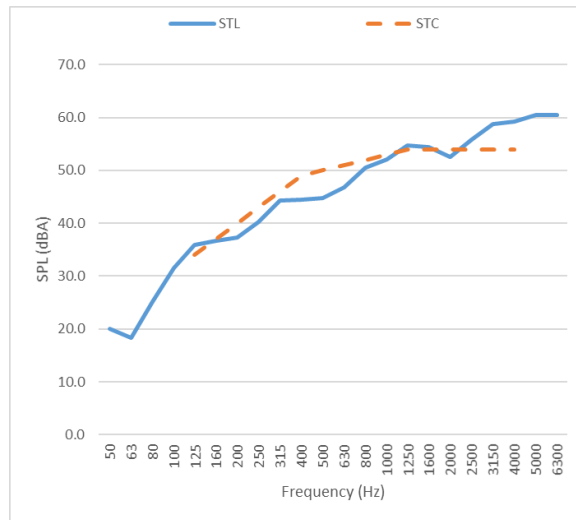


Figure 2-3. Measured ASTC rating of the floor.

Section 3 – Results:

The simulated flooring assembly predicted an IIC of 55. The actual flooring assembly had a measured AIIIC of 57. The measured ASTC of the flooring assembly was 50. Figure 3-1 shows a comparison of the ISPL from the simulated and measured results.

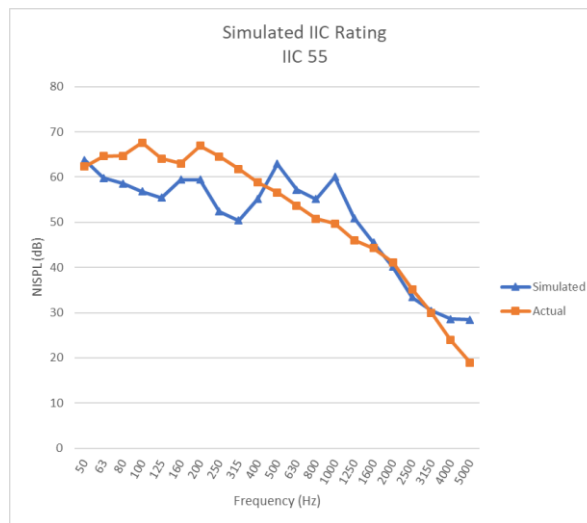


Figure 3-3. Comparison of the actual and simulated IIC results.

Section 4 – Recommendations:

Based on the requirement of a 55 IIC, the existing flooring assembly AIIIC of 57 meets the requirements.

Section 4 – Additional Information:

Using standard techniques for creating noise models such as this can expect an error margin of +/- 3dBA. The error can be due to varying climate conditions, estimations and the simplifications necessary to produce the models. All recommendations for noise control are based on the best information available at the time our consulting services are provided. However, as there are many factors involved in sound and impact transmission, and RNS Acoustics has no control over the construction, workmanship or materials, RNS Acoustics is specifically not liable for final results of any recommendations or implementation of the recommendations.