Increasing Sound Transmission Coefficient for an Existing Wall Assembly

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Abstract

There are not enough well-designed wall assemblies for soundproofing. In the world of construction, sound transfer is on the lower end of importance. Young and active students in the Student Residence building do not think about noise pollution. It can be transferred through the walls and be heard on the other side. This report shows the lack of soundproofing within the student residence building and addresses how to change that. The report aims to design a new party wall assembly from framing to paint to increase the wall's sound transmission rating (STC). New manufactured materials and wall components to increase the STC rating were considered, and construction assemblies to fix the problem 52 STC rated existing wall were examined. A new design from the structural framing to the wall finish face was designed to determine the best method to fix the problem wall, resulting in an increased rating wall, creating a superior sound-reducing wall. From the newly designed wall, a review of the existing components within the existing wall was evaluated. It was determined that adding three wall components would drastically increase the existing walls STC rating. The drastic increase to reduce noise will allow for quiet space seeking individuals to reside in their rooms rather than looking for quiet spaces outside the Residence.

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1. Introduction

Design innovations are a key tool to reduce noise pollution in communal buildings, such as student residences. This research project looks specifically at the potential to reduce the amount of noise that can be transferred through an interior party wall assembly. Specifically, the project will create a wall that exceeds the party wall STC rating of 60 and accomplish this without tearing down the existing wall within the student residence. The future wall design assembly will look at the functionality to update the walls that reside within the existing building. At the same time, new construction will look at the individual components within a wall assembly to create a quiet wall that can be implemented into future student residence buildings.

The report will look at an overview of items considered when designing an interior party wall assembly. The list of items will allow for reasoning as to why a specific component is heavily favoured in the assembly. Since this project also looks at existing and new construction, a section view of the primary wall assembly will be considered and look to make the assembly quieter.

2. Background/Context

During the 1890s, a Harvard professor named Wallace Clement Sabine noticed that the noise in his classrooms [1] grew louder during his lectures and that there was an echo. He decided to change the acoustic signature that made the room noisy. Sabine [1] is the founder of protection against acoustic noise; he modernized his lecture hall at Harvard to implement an acoustic soundproofing tile design [1]. While Sabine may have been one of the first to change how sound resonate within a building, it is still an ongoing issue within the construction industry.

2.1. Sound Transmission

Building assemblies that reduce noise must mitigate sound transmission. Noise or sound is created when something vibrates, creating sound waves that propagate from the original vibrations. These sound waves travel through various media: air, water, drywall. The waves pass through the medium or are reflected in the source. For example, when a person speaks, their vocal cords create a vibration that creates words. As we listen to the words, the generated sound waves move rapidly through the air towards the other individual. Sound waves enter our inner ear through the ear canal. The inner ear then converts the sound waves into an electrical signal, which sends it to the brain, where we hear the words.

Another key to understanding sound is the perception of sound. Sound is divided into two main areas: pitch and volume [2]. Pitch, commonly known as frequency, is measured in hertz. Hertz is the time for the wave to complete one cycle; a higher frequency results in a high-pitched screech that a limited number of people of a certain age can hear. The other recognized area is volume or how loud the sound can be and is measured in decibels. A decibel is the measurement of the intensity of the wave as it travels from medium to medium. Unlike frequency, the decibels of sound decrease with increasing distance. Additionally, within the construction design field, designers use a sound transmission coefficient to determine if the design is practical and meets code or use requirements.

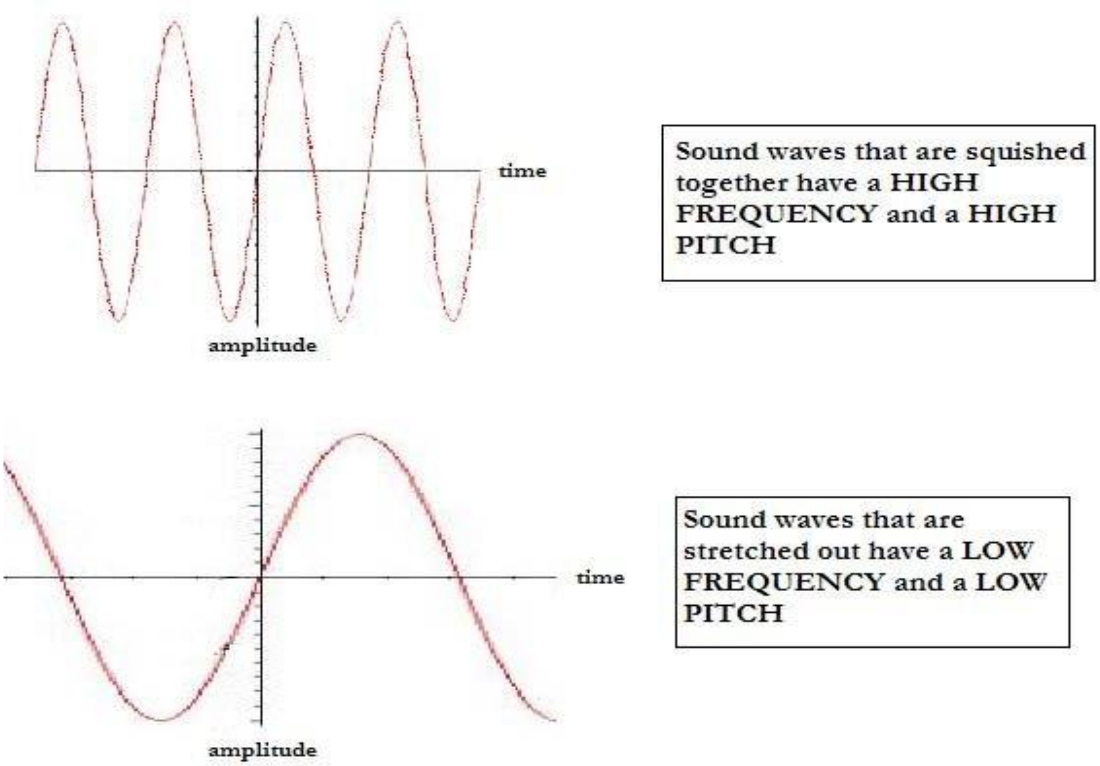

Figure 1- Sound waves to show Frequency and Pitch

Source: https://www.researchgate.net/figure/High-frequency-pitch-sound-waves-compared-to-low-frequency-pitch-sound-waves_fig3_29734945

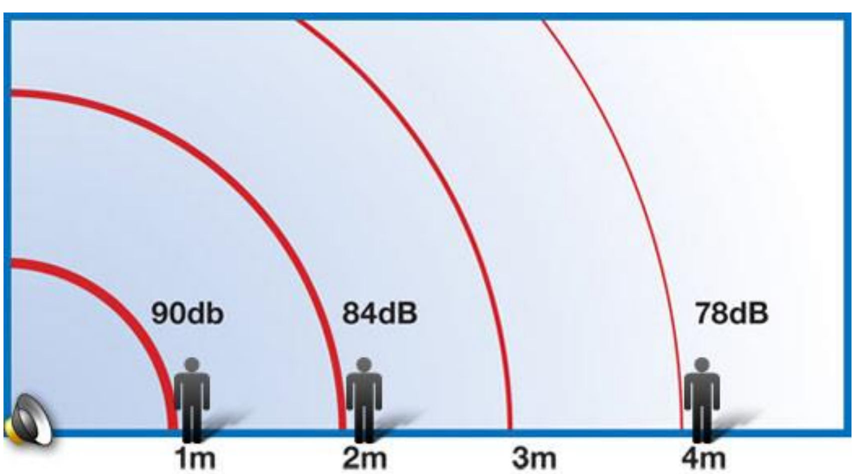

Figure 2- How Volume dissipates over distance

Source: https://www.extron.com/calculators/inverse-square-law/?tab=tools

2.2. Noise Transmission Coefficient (NTC)

Noise transmission has a specific coefficient used to determine how sound transfers through materials. The coefficient is determined through various materials to determine the noise transmission rating for building spaces [3]. The coefficient is used to measure sound absorption within a wall; to decrease the sound transmission, the structure of the building must act as a mass barrier. The mass barrier reduces the strength of the sound waves passing into the adjoining room. The sound absorption of sound waves through an assembly is referred to as an NTC rating. The values of NTC range from zero to one: with one being that no sound gets through the material. Sound absorption is primarily used in insulations and contains an NTC rating.

2.3. Sound Transmission Class (STC)

In addition to the noise transmission coefficient, a sound transmission class [4] also coexists. STC is the evaluation of an assembly of building components. STC is a value that considers the transmission of sound through the entire assembly. As such, a 2x4 wall with drywall on each side has an STC of thirty-five [4]. This indicates that this particular wall arrangement reduces noise transmission by thirty-five decibels. Essentially, if a wall is rated at fifty decibels, with a 2x4 wall in the middle, the sound on the other side of the wall should only be fifteen decibels. STC is the universal measured sound value to determine the degree of sound absorption of the assembly [5]. In addition, new assemblies are tested to determine the most efficient noise damping system that could be incorporated into future development at an economical price [4]. This coefficient is used to justify why a building system must include certain materials in the assembly.

STC	What can be heard
25	Normal speech is understood easily and distinctly through wall
30	Loud speech can be understood, while normal speech heard but not understood
35	Loud speech is audible but not intelligible
40	The onset of “privacy”
42	Loud speech audible as a whisper
45	Loud speech not audible; 90% of statistical population not annoyed
50	**Very loud sounds such as musical instruments are barely heard**
60+	Superior soundproofing; most sounds inaudible

Figure 3- Comparison of STC ratings

Source: https://www.stellrr.com/comparing-sound-attenuation-insulation-materials/

2.4. Wall Assembly Materials

This section of the paper explains the uses of different products to reduce the amount of noise transferred through wall assemblies and their tested sound-reducing value. Each material, when properly installed, has the ability to make a space quieter. The materials below are placed as if they are being placed into the wall assembly from the inside of the wall, starting at the studs and going through each component considered for the assembly.

2.4.1. Stud layout

For the studs of the wall assembly, there are three ways that the wall could be built. Either a single row of studs, double stud walls or a staggered stud wall. Each layout of studs has its benefits. Figure 4 shows how the walls are constructed; additionally, it shows how metal studs are staggered using stud clips.

One key term for deciding on stud orientation is decoupling within the wall assembly. The idea behind decoupling the studs is that once sound hits a surface, it makes the surface vibrate. If the studs are not decoupled, the vibrations caused by the sound waves to be directly transferred through the studs and into the adjoining room [12]. Decoupling is used in the staggered and double stud orientations, and significantly double stud layouts can add a constant disconnect between the two rows of studs.

Single Stud

Single stud wall construction is the most common way to build a wall. It uses the least number of studs while still being structurally sound. The ability to outfit the wall with different assembly components is not restricted or reduced. The down side of single stud framing is that there is no decoupling occurring; allowing the sound waves to be directly pass thru the wall studs into the other room without being muffled by air or insulation.

Staggered Stud

In single stud walls, both sides of the wall are connected. This connection allows the sound to move through the wall to the other side directly. Staggered stud framing prevents both sides of the wall from touching studs and reduces its overall sound transmission. The wall's top and bottom plates should be 2x6 with 2x4's staggered studs, creating two different framing patterns in one wall. That creates a disconnect that preventing the sound from resonating through the studs if they extend from one side of the wall.

Double Stud

The benefits of double-stud walls gives the ability to decouple the two single stud rows completely. It gives a thicker wall for the sound to dissipate due to the additional mass. Since there is a gap between the studs, it is possible to add drywall to the center of the wall can make this wall denser. Ultimately, this would be the best wall to mitigate sound transfer, but the downfall is that double stud framing takes up one foot per wall. Instantly, a single room will have lost two feet of space down the length of the room due to the size of the stud orientation.

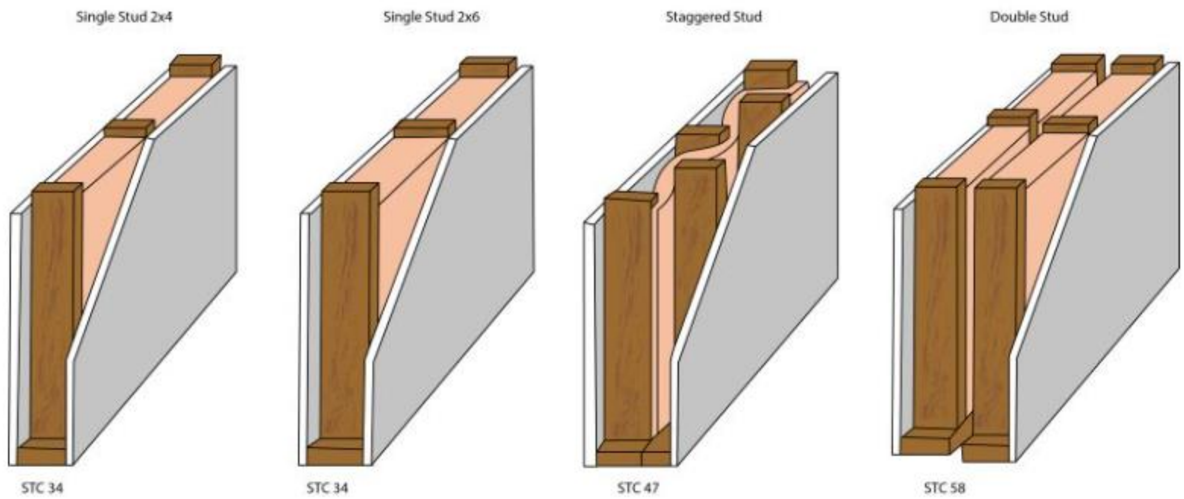

Figure 4- Shows the different stud layouts

Source: https://www.clarkdietrich.com/products/rc-deluxe-resilient-channel-rcsd

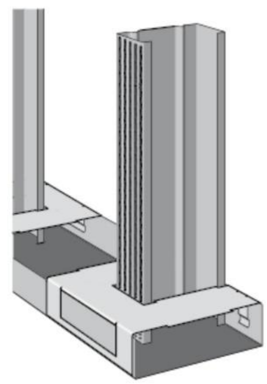

Figure 5- Clips to make staggered/double studs possible.

Source: https://www.ceilings.com.au/products/suspension-components/csr-staggered-wall-stud-clip/

2.4.2. Insulation

One of the most overlooked materials within the wall assembly is insulation from batt insulation to blown-in to spray foam. Each insulation has different acoustic properties and densities that affect the NTC value. The greater the NTC value the resulting wall STC rating will increase. Acoustic insulation batts have absorption qualities, while regular insulation batts have some sound-absorbing properties but are mainly used for their thermal properties. To a more significant extent, acoustic insulation absorbs sound waves, preventing them from passing through to the next room. Because sound insulation absorbs sound waves, it can also lessen the amount of echo in enclosed spaces. Acoustic insulation is denser than thermal insulation and can be used outside and inside a wall.

As sound insulations densities increase, the NTC value and the STC value increases which increases noise reduction. Sound insulation values change based on the density of the material, how the material is formed and how it is installed into the wall cavity;

Fiberglass

Fiberglass comes in rolls or batts that are made of glass particulates that entrap sound waves as they try to move through the material. Fiberglass batts have a high NTC value of 0.9 per 3 ½" batt thickness [25].

Mineral Fiber

Mineral fiber batt insulation is a dense stone wool insulation designed for interior soundproofing. The 3" batts have an industry high NTC of 0.9 to 1.0 values [26].

Blown-in Cellulose

Cellulose is made of recycled materials that are grounded up and blown into wall cavities. The loosely blown in material provides lots of surface area that absorbs sound. Since blown-in insulation has uncompressed air pockets the resulting NTC value is 0.8-0.95 [27].

Denim Insulation

Denim insulation is made from left over cotton and denim products. The material has voids and pockets of air to absorb sound waves that are penetrating the denim. It has a high NTC rating of 0.9 to 1 [28].

Spray Foam

Spray foam is an expanding polyurethane foam that upon spraying expands into cracks within the wall cavity. Spray foam after it has expanded fills the entire cavity with a dense and hard surface that reduces the sound absorbing properties that insulation should possess. As such, the NTC of spray foam is comparable lower at 0.7 per 3 ½" wall cavity [29].

Styrofoam

Styrofoam is a dense rigid insulation that has minimum acoustic benefits to being used within a wall assembly. Since it's a rigid material rather than absorbing the sound waves the foam will reflect the waves back to the wave's origin point [30].

Insulation Types	Resulting STC Value
Fiberglass	10-12
Mineral Fiber	9-14
Blown Cellulose	7-11
Denim Insulation	7-14
Spray Foam	10-15
Styrofoam	5

Table 1- Insulation values of STC based on 2x4 @ 24" O.C.

Source: [7][8][9] [10] [11] [23]

2.4.3. Sound Barrier

Mass Loaded Vinyl is a fabric that is attached perpendicular to the wall studs. The fabric has a high-density film in the middle that reflects sound away from the wall. Additionally, the material has an individual STC rating of 16-32 [6].

2.4.4. Resilient channel

Resilient channels are thin pieces of sheet metal that look like an angle "Z". They attach to the studs to create a disconnect between studs and the drywall. This allows the metal to flex freely and dissipate the sound waves that hit the drywall. The resilient channel can add between 11- 13 STC upon installation [16].

Figure 6- Single piece of resilient channel

Source: https://www.clarkdietrich.com/products/rc-deluxe-resilient-channel-rcsd

2.4.5. GreenGlue

GreenGlue compound is a unique, sound-dampening material that is ideal for new build and renovation projects. The compound is one of the most affordable soundproofing materials on the market. The characteristic property of the compound is that it acts as a dampening material that dissipates the vibrations that occur when the sound waves travel through the ceiling, walls, and floor. The glue is placed between two pieces of drywall and can add up to twenty STC ratings. Below is how the glue is used to eliminate sounds from penetrating the drywall. The compound takes the energy of the sound wave. It converts that energy into heat that will dissipate in the wall assembly [13].

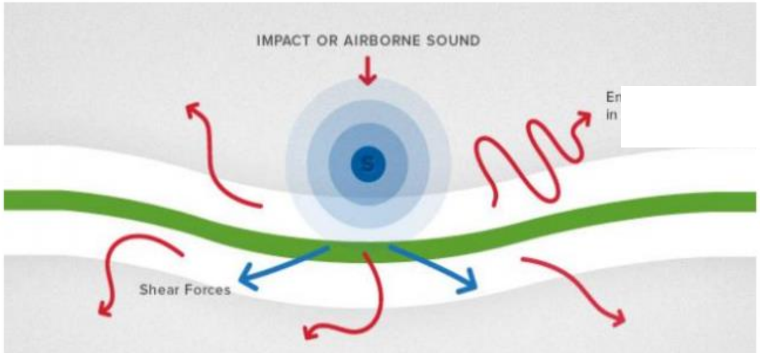

Figure 7- How GreenGlue dissipates the sound waves into heat energy

Source: https://www.buyinsulationproductstore.com/blog/what-is-green-glue-noiseproofing-compound-and-how-does-it-work/

2.4.6. Drywall

The development of soundproofing drywall is in the making, and manufacturers have come out with viable options. The cost of these products is a significant deterrent for homeowners. Commonly drywall is made from gypsum. Gypsum is a fireproof, sound muffling material and is the default material on the exterior face of a wall assembly. A new drywall alternative is called QuietRock. QuietRock uses gypsum as the primary material, but the mixture includes dense metals to add mass to the product to reduce the noise being transferred through the material. Two pieces of 5/8" drywall have an STC value between 30-34 [20], and QuietRock has an STC rating of 48-60 [21] when placed on 2x4 wood studs at 24 inch on center.

2.4.7. Sealant

A simple but often overlooked part of the wall assembly is the use of sealant around the wall's perimeter. The use of sealant is a great option when it comes to tight corners and spaces. An example of where sealant would be used is at the base of the drywall. Often, installers will lift the gypsum board up to create a tight gap at the top of the wall, leaving a small gap at the bottom of the wall. The sealant does not add an STC value, but it does keep the STC value from decreasing when the sound waves penetrate the assembly.

2.4.8. Sound Reducing Paint

Acoustic paint is made to have a lasting ridged feel. The texture helps dissipate the sound waves that flow into the wall. The acoustic paint differs from regular paint as it is thicker and has different metals that are mixed into the can. The paint itself can increase the wall assembly STC value by 3-7 values [19].

2.4.9. Acoustic tiles

Acoustic tiles are made of foam that is then attached to the exterior face of the wall. The use of acoustic tiles is generally intended for sound acoustic signatures and not for soundproofing. However, when placed, these tiles can reduce the noise within the room, thus creating a quieter space. Acoustic tiles don't have an STC value. They are used to dampen the noise produced within the room rather than the noise transmitted through the wall. Acoustic tiles would not be appropriate for a Student Residence due to the difficulty in cleaning.

3. Methodology

The creation of a new modern wall assembly with the core aim to reduce the noise transferred between student suites within a student residence will be examined. The project's criteria are how to increase the STC rating based on the existing wall construction and keeping the current components while adding more components to increase the existing wall's STC rating. The project will also look at creating a new wall assembly while also looking for materials that are locally available materials.

The existing wall assembly will be compared to an uninsulated 2x4 stud wall with 5/8" drywall on both sides. Having the baseline assembly will help explain why certain materials should be added to the future design used in student residence buildings and express the best way to upgrade existing buildings by comparing the feasibility of adding and removing materials. The feasibility aspect will not look at a cost analysis due to the fluctuation of construction and labour prices at this time, but at external issues in an existing building; relocating a student resident out of the room to perform the wall retrofit. Additionally, understanding different wall assemblies will enhance the ability to select the best wall components for the existing wall assembly from the selected components of the new construction wall. The ability to see what increases the new wall construction's STC rating directly relates to the existing wall and what should be added to increase the existing wall STC rating.

4. Discussion

4.1. Case Study Building

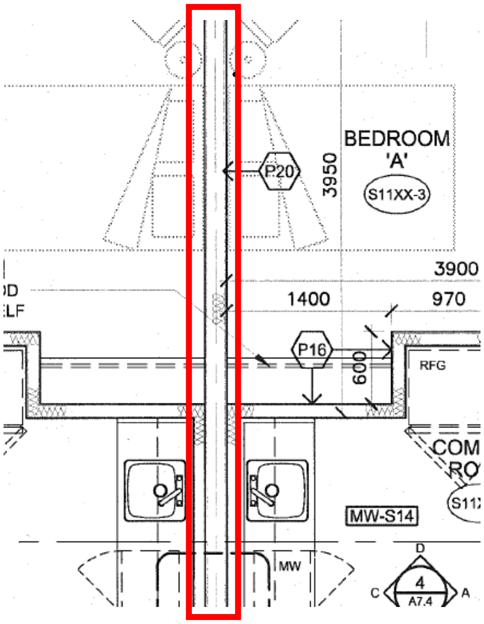

Figure 8- Visual of base wall location

Source: TRU Facilities

The research project's case study building is the student residence North Tower, located in Kamloops, BC. The eleven-story building is home to over five hundred and seventy students year-round. Despite being built in, noise pollution in the building is significant, with anecdotal evidence suggesting residents are able to listen to whole conversations word by word. This invasion of privacy within communal housing restricts quality of life. A party wall is a common wall between adjoining rooms; note that the minimum amount of materials were used in the wall assembly to just meet code requirements. While meeting code minimums, the use of the spaces should have forced the designer to specify a higher rated STC party wall. The party wall within the case study building can be seen with the P-20 tag.

4.1.1. An existing wall within Residence

The party wall within the Residence is located as the shared wall between adjoining units. The wall with the P-20 tag is assembled as such:

Materials	Individual STC rating
2x5/8” GWB w/ 2x6 Steel Studs @ 24” O.C.	40
4" Sound Attenuation fiberglass batts	12
Wall Assembly STC Rating	**52**

Table 2- Base walls resulting STC rating

Source: TRU Facilities

The wall has a combined STC rating of 52. From the B.C. Building Code section 9.11.1.1(b), the minimum STC value for separating assemblies shall not be less than an STC rating of 50. While the party wall is designed and specified to abide by the B.C. Building Code, the party wall barely meets the minimum sound transmission requirements. It does not consider factors such as the age group of the users in the building or what the use of the building will be. Student residences are not quiet buildings. Residences have active, social young individuals with little regard for noise.

4.2. Base Wall

4.2.1. Structural Components

The base wall that will be altered and compared until the best wall assembly is designed will be based on the existing P-20 party wall in the case study building. The wall structural components are made with two pieces of 5/8" drywall on both sides of the six-inch steel studs at two feet on center. With the exclusion of the sound insulation, the STC rating of the wall is 40 [31].

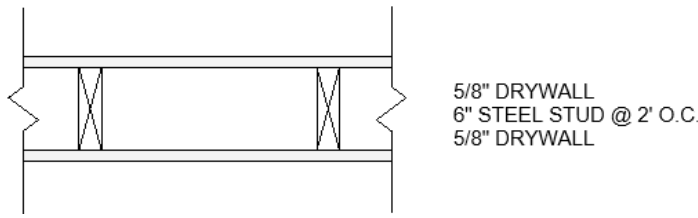

Figure 9- Visual of the structural part of the base wall

Source: Author generated

4.2.2. Sound Insulation

In addition to the based structure STC rating of 40, the four inches of acoustic insulation in place increases the total STC to 52 [31].

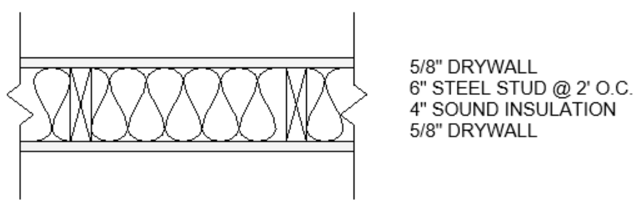

Figure 10- Base wall plus insulation

Source: Author generated

4.3. Improving STC in New Construction Scenario

Since new construction gives the designer the ability to design the interior structure of the wall assembly, the wall can incorporate the maximum amount of wall components into the structure from section 2.4 breakdown of materials.

4.3.1. Stud Orientation

Based on the need for metal walls for the party wall, single row studs are chosen. The use of a double stud orientation would be the better choice if using wood because clips are not necessary. However, most party walls are located in mixed-use buildings, the walls would be constructed out of metal. Metal double-stud walls need to be supported by top and bottom clips (See Figure 5) resulting with no decoupling. Therefore, the best choice because of the decoupling issue is to use a single row of studs as the structural component of the wall assembly.

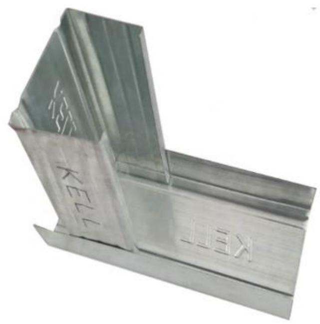

Figure 11- Single row metal stud profile

Source: https://partition-ceiling.en.made-in-china.com/product/sBoxQRvYgVpD/China-Professional-Metal-Drywall-Profiles-Steel-Stud-Furring-Channel-and-Wall-Framing-Systems.html

4.3.2. Insulation

The best selection of insulation is a dense mineral fiber batt. Since the location of the party wall is an interior wall, installers will not put in poly vapour barrier. Since there is no poly, this limits the type of insulation that can be used in the wall cavity. While the ideal choice would be blown in cellulose, this could only be done if a poly barrier enclosed the wall cavity to trap the insulation since the insulation is loosely shredded. Since blown-in is not an option, the next best option is dense mineral fiber batt insulation. The batt insulation can be easily installed within the wall cavity and will not settle over time like blown in would. Therefore, it will create a dense interior wall section filling the void spaces in the metal studs, and eliminating the free air located in the "U" part of the steel stud (see figure 10) that can quickly transfer sound waves into the adjoining room.

4.3.3. Sound Barrier

One of the new products used in wall assemblies for soundproofing is mass loaded vinyl (MLV). MLV can be rolled perpendicular to the outside face of the metal studs. MLV (Figure 11), while relatively new, has been developed for the sole purpose to create quieter wall assemblies. Since MLV is a dense material, it adds directly to the wall's mass to deflect sound waves being transmitted through the party wall.

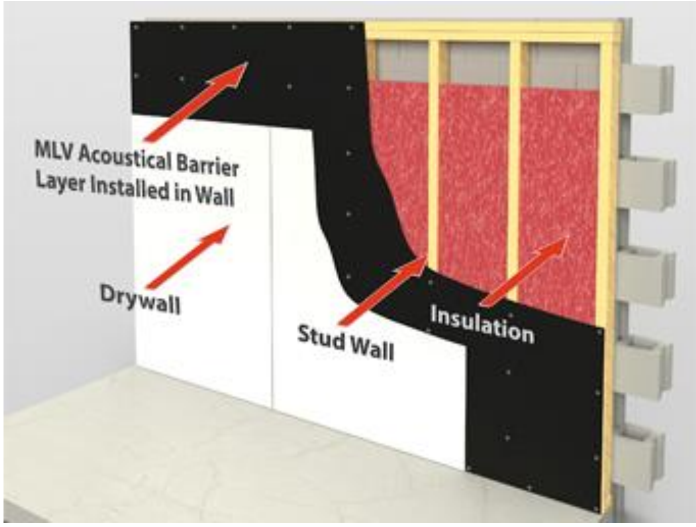

Figure 12- MLV application

Source: https://www.soundproofingmlv.com/install/

4.3.4. Drywall

The next major component for the wall assembly is the selection of drywall. One of the initial criteria for the paper was the feasibility to get the materials to the building location and if it is worth it. Different manufacturers are coming out with new and different drywall options. The cost and shipping fees to get the materials to Kamloops, BC would be a significant issue. Regardless, QuietRock's drywall data indicates a decrease in the amount of sound transmission by having a significantly high individual STC value. The value that you gain with a higher STC rating does not warrant the cost of one sheet of 5/8" QuietRock compared to one sheet of 5/8" regular GWB. Therefore, selecting a regular sheet of 5/8" drywall is the best option to add to this wall assembly. The wall will need four sheets of drywall because GreenGlue will be added between each sheet.

4.3.5. GreenGlue

GreenGlue is an essential material to be added to this wall assembly. The properties of the glue dissipate sound waves into heat energy to (see figure 7) significantly reducing the sound transmission through party walls. The easy installation process of filling in the interior face of the drywall to create a mechanical sound barrier that can add between 16-32 STC ratings to the wall to significantly increase the wall assemblies STC value; there is not a significant increase in labour or time cost. This material should be looked at as being included as a standard component-based off of its soundproofing capabilities. Since GreenGlue is a newly developed product there are currently no comparable product to compare the values too.

4.3.6. Sealant

The most overlooked aspect to soundproof the wall is the use of sound sealant. In comparison, the sealant itself does not add to the wall STC rating. Sealant is used to keep the wall STC value at its actual wall rating. The sealant removes the flanking issue when sound waves find the least dense area of the assembly and penetrates the wall; significantly reducing its STC value. Since the sound waves have penetrated past the added mass part of the wall, the drywall and GreenGlue components, the addition of a bead of sealant around the perimeter and cracks within the wall will significantly help to keep the wall's overall rating from decreasing.

4.3.7. Paint

Finally, using acoustic paint to reduce the number of sound waves that directly contact the internal components will make a lasting difference every time the sound wave hits the walls face. The paint helps to redirect the sound waves away to other areas in the room with less initial energy. Once the waves bounce back from a different wall, the wave strength will have been reduced. Once the reduced wave penetrates the initial paint layer, the interior components of the assembly will have an easier time dissipating the rest of the wave's energy, creating a quiet space on the other side of the party wall.

4.3.8. Co-Resulting Individual STC Ratings

Based on the selection of wall components, we can create a design wall assembly STC rating. The lowest value from each material will be selected to account for any installation error. The table below shows the selected materials and the resulting STC values:

Wall Assembly Components	Individual STC Ratings
4x5/8" GWB w/ single row metal studs @ 16 O.C.	38-40
Mineral Fiber Insulation	9
Mass Loaded Vinyl	16-32
GreenGlue	11-26
Acoustic Paint	3-7
Resulting Wall Assembly STC Ratings	**77 - 114**

Table 3- STC ratings for each component.

Source: In 2.4 Section

Comparing the resulting STC ratings for the newly designed 77 rated wall and the existing base wall (52 STC), demonstrates the new wall will have a much better STC rating that is be well above the B.C. Building Codes minimum STC rating of 50.

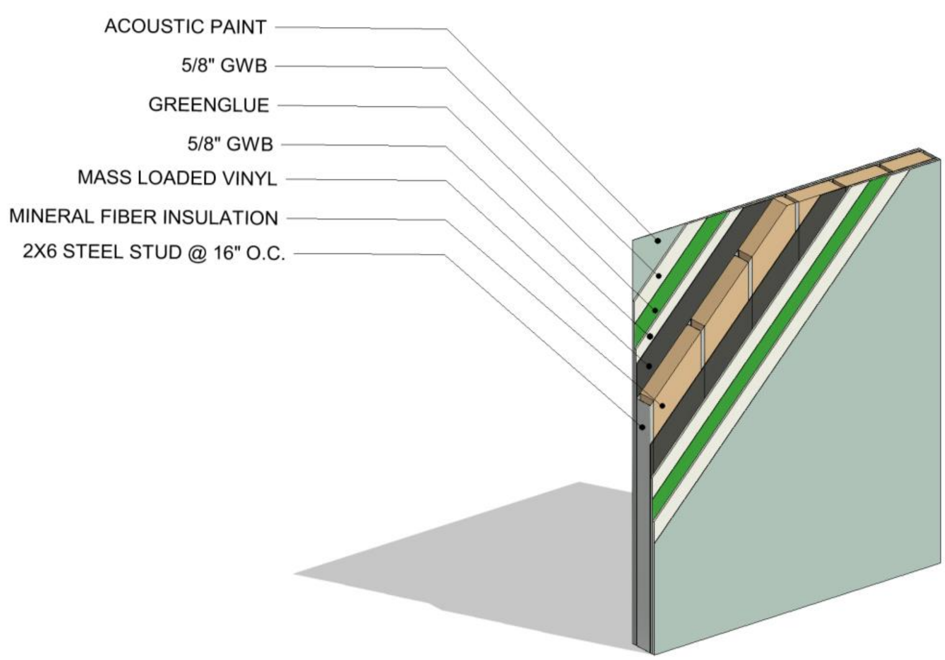

Figure 13- Visual model of newly designed wall assembly

Source: Author generated

4.4. Reno Construction

Unlike new construction wall assemblies, options for renovation assemblies are different. Decision making is needed to determine if the existing wall needs to be demolished or if wall component can be added to increase the STC rating.

4.5. Updating Existing P-20 Wall

The difference between new construction and reno construction is that you are creating a new assembly that is not restricted in materials unlike an existing wall. From the beginning, this project aims to look at updating the P-20 wall tag within the case study building. Removing the wall in its entirety will affect the Residence and restrict students' ability to live in the Residence during construction as well as increasing costs. As such, the existing wall assembly can only be added onto. The base P-20 wall has an STC rating of 52. The aim is to create a wall assembly that will reach an STC value of 60 or better (see figure 3). This wall assembly will eliminate the majority of noises occurring on the opposite side of the adjoining wall. While going from 52 to 60 plus STC rated wall might not seem like a significant jump, the resulting sound profiles in the adjoining rooms will be significantly different. There will be three additions since the goal is to update the existing wall without removing any existing layers.

4.5.1. Sound Barrier

Firstly, a sound barrier will be attached to the existing drywall, such as mass loaded vinyl. This will add mass to the wall to help in the reducing unwanted noise.

4.5.2. Additional Mass

Secondly, an additional piece of 5/8" GWB will be attached on each side of the party wall with its back coated with GreenGlue. The combination of GreenGlue and GWB will add a significant sound-reducing agent to dissipate the sound as there is no way to open the existing wall up to replace the inadequate fibreglass insulation.

4.5.3. Exterior Surface

Finally, add a fresh coat of acoustic paint that can muffle the initial sound waves trying to penetrate the party wall.

4.5.4. Resulting Wall

Combining these three changes will increase the party wall's STC rating to 68, as shown below in table 3. Since the existing wall assembly had an STC rating of 52, the wall would have an 30.7% increase in its sound reducing performance. Furthermore, the wall meets the project's criteria to create a wall that exceeds the 60 STC rating and not tearing down the existing wall within the student residence.

Wall Assembly Components	Individual STC Rating
4x5/8" GWB w/ single row metal studs @ 16 O.C.	38-40
Mass Loaded Vinyl	16-32
GreenGlue	11-26
Acoustic Paint	3-7
Resulting Wall Assembly STC Rating	**68 – 105**

Table 4- Resulting individual STC rating for updated existing wall

Source: In 2.4 Section

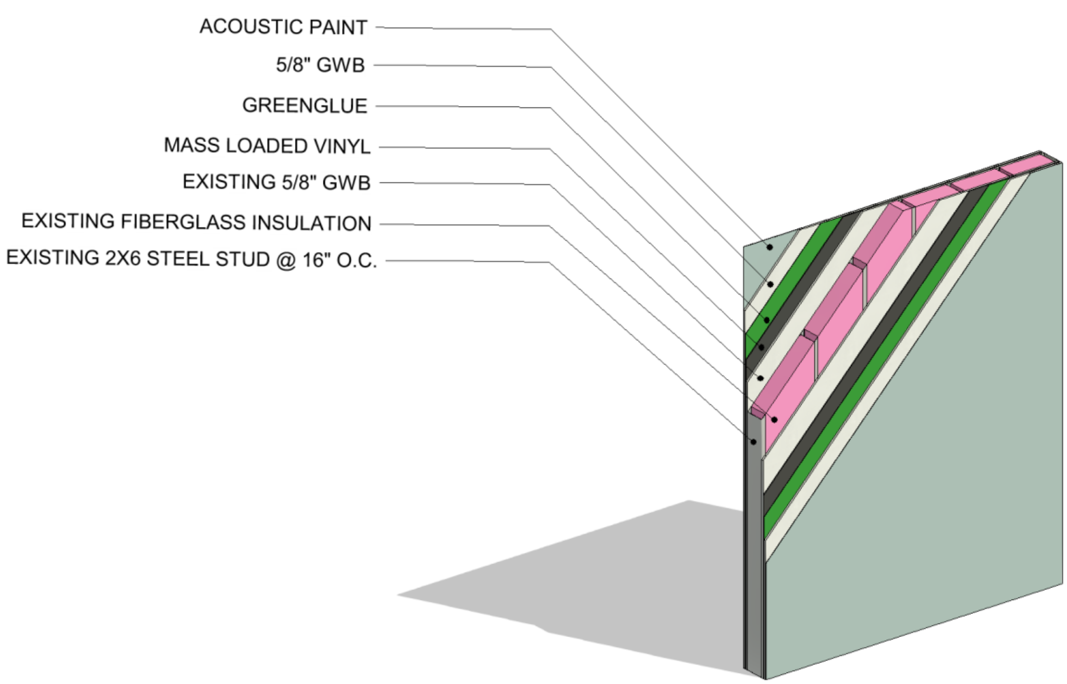

Figure 14- Visual of upgraded existing wall

Source: Author generated

5. Conclusion

There are not enough well-designed wall assemblies for soundproofing. In the world of construction, sound transfer is on the lower end of importance. However, creating a soundproof space should be at the top. The goal was to design a new wall assembly from the structural studs and add components to create a higher STC rated wall. Then examine the existing party wall that divides the suites in the student residence building and determine how to make it have a better STC rating than it currently has. Ultimately, the addition of three assembly components brought the existing wall up to a STC rating of 68. Compared to the existing wall with an STC rating of 52, that's an 30.7% increase in reducing the amount of sound transmitted into the other suite. And on top of that is a 36% increase above the minimum B.C. Building Code wall assembly STC rating of 50.

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