



ACADEMY OF MUSIC AND DRAMA

Tuning the Snare Drum

Different colours on the snare drum

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Independent Project (Degree Project), 30 HEC, Master of Fine Arts in (Music with Specialisation in Orchestra Performance)

Spring Semester, 2023

Independent Project (Degree Project), 30 higher education credits

Master of Fine Arts in Symphonic Orchestra Performance

Academy of Music and Drama, University of Gothenburg

Spring Semester, 2023

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ABSTRACT

Key words:

Tuning, colour, tone, snare drum, orchestral percussion

The percussion in the orchestra is always seen as the rhythmic section and the section which gives different colours and effects to the main melody. No one really thinks about the tuning of the percussion instruments but on the timpani. All the membranophone instruments of the section must be tuned in order to make a good sound that fits in the orchestra. Focusing on the snare drum, this project reflects how the different tunings affect the sound, the colour and the tone that the snare drum creates. As a percussionist I have analysed the effect of different tunings in different snare drums and how this affects the music. This thesis has been immensely valuable in providing a fresh perspective on snare drum playing. Through extensive research and dedicated time spent with the instrument, I have significantly enhanced my comfort level and proficiency in both playing and tuning the snare drum. The importance of tuning has now assumed a prominent role in my approach to playing, regardless of the repertoire I am performing. I have gained a deeper understanding of how different tunings can profoundly impact the overall sound and character of the snare drum, allowing me to achieve a richer performance.

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1.Introduction

1.1 The little attention that is given to snare drum tuning

The topic I have chosen for this thesis is the tuning of the snare drum, and how different tunings can affect the character and sound produced by the same snare drum. I will explore various tuning methods to analyse their perceptibility to the musician's ear and their impact on music. This subject is challenging to study as it is highly subjective, for this reason, I will select specific parameters to visualize the disparities between tunings more effectively and present graphical representations of differences in the form of spectrograms.

Percussion is often regarded as the rhythmic section of the orchestra or any other musical ensemble. Within this section, the snare drum plays a significant role as one of the most popular instruments.

When we refer to tuning in percussion, especially for the snare drum, it is not typically associated with a specific pitch. In most cases, the snare drum is not tuned to a particular pitch. Tuning is more concerned with the tone quality and colour of the sound.

Many composers and symphonies strive to find a specific sound that matches the style and piece they are working on. This is no different in percussion, and perhaps even more crucial. As the instrument where tone quality makes a difference, playing Shostakovich is not the same as playing Debussy. You must blend your instrument with the orchestra; every instrument tunes before starting to play.

As a percussionist, this is not something common, but you must be prepared to play in the style of the piece. Just as other musicians prepare, we percussionists must also prepare before rehearsals by bringing the right instrument and tuning it correctly to deliver the best possible performance.

Without proper tuning, the snare drum, or any other percussion instrument with a membrane, would lose its brilliance and colour. Even if you have the best and most expensive snare drum, without proper tuning, it will not sound as good as it could with the right tuning. This thesis is not about finding the best way or method to tune the snare drum. The main goal of this thesis is to compare different tunings on the snare drum to determine if there are perceptible differences and if those differences could be better suited for different music pieces and styles.

1.2 Aim of the thesis and research questions

Every drummer and percussionist have their own opinions and methods for tuning the snare drum. Achieving a desirable sound is challenging because you cannot simply use a tuner to find a pitch on the drumhead. While a tuner may help define how you are tuning, it is not the primary focus during the tuning process. It is crucial to find a sound that complements the style of music and the overall orchestra.

The snare drum is an instrument that stands out in the orchestra and often takes the lead, providing direction to the performance. Therefore, the importance of its sound should be emphasized.

To shape this research, I have formulated three questions:

- How are the sound colour and character of the snare drum influenced by different ways of tuning it?
- Is the difference in tuning significant enough to impact in various repertoire pieces?
- What methods are effective for finding the different tones on the snare drum?

I have examined the aural results and the impact they have on non-percussionist musicians to determine if tuning truly has an effect on the music.

1.3 Method

To commence the research, I utilized two distinctly different snare drums: one made of maple wood and the other made of brass. Both snare drums were of the same size to ensure that the focus was primarily on the tuning aspect rather than other parameters. I recorded three different tunings: low tension, high tension, and middle tension. For each tuning, I performed three strokes: from pianissimo to fortissimo, followed by a roll transitioning from pianissimo to fortissimo and back to pianissimo. I repeated this process with the snares on and in all three tensions.

After completing the recordings, I organized the data into a table. Subsequently, I utilized the Sonic Visualiser software to visually analyze the recordings and compare what I heard with what I observed graphically. This allowed me to gain insights into the differences between the recordings and align my auditory perceptions with the visual representations provided by the software.

I employed different snare drums available at my school and the GSO to play on various instruments with different materials and tunings in orchestral projects and mock exams, during semesters 2, 3, and 4, the auditions we do in school to prepare to a real-life audition where the jury is formed by different teacher from our own instrument and from a different instrument as well. Additionally, I studied and asked other students regarding the sound of the snare drum. I did not use the results as I did the questionnaires in an informal way.

Furthermore, I experimented with different tunings while performing orchestral excerpts to ascertain if there were any specific tunings that could enhance the performance outcomes.

In order to analyze the impact of different tunings on sound, I recorded the performances and utilized music software to examine the characteristics of each tuning and observe how they affected the sound. I aimed to explore any

relationship between what we perceive audibly, and the information displayed in the software's spectrogram.

Finally, I put these findings into practice by selecting specific snare drum excerpts and studies to perform with a particular tuning. This allowed me to assess whether the tuning influenced or altered anything in the music and performance.

2. Introduction to the snare drum terms and technique.

2.1 Introduction to snare drum tuning technique

The snare drum consists of a body that can vary in terms of depth, diameter, material, and the method used to create the circular shape. In addition to the body, there are two heads: the top head and the bottom head. These heads are connected to the body using hoops, which are secured in place with rods.

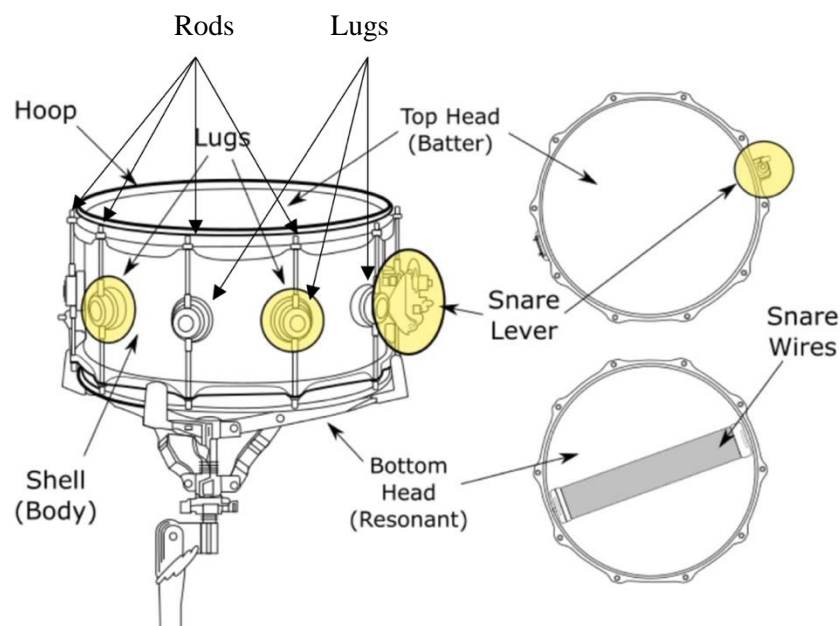


Figure 1 Snare Drum Parts- Tim Williams “How to get a killer snare sound in your home studio” *Williams Sound Studio* (2011), accessed June 3, 2023, <https://williamssoundstudio.com/recording/how-to-get-a-killer-snare-sound.php>

To tune the snare drum, you have to adjust the tension of the rods in both heads. If you put more pressure, the head will have more tension, if you put less the head will be looser. Usually, the snare drums have 6, 8, 10 or 12 rods. Each one of them affect individually the tune of the snare drum.

For achieving a uniform sound on the snare drum, it is crucial to ensure that all the rods have the same tension. Any variation in tension among the rods can lead to interference and an inconsistent sound. To achieve uniform tuning, there are various methods that can be employed. The specific order in which the rods are tightened or loosened can have an impact on the final tuning result. By following a specific order, it becomes easier to achieve consistent tuning across all the rods.

In the image below I ordered with numbers one of the most common ways to tune the snare drum uniformly. Choose the first one (1) and from there go to the opposite (2), then to the one next to the second one (3) and then repeat the first two steps. This is an efficient way as you tune the head in a uniform way from the very beginning. If you do the same turns in all the rods following this method, the result at the end of the first round of tensioning will be quite satisfactory.

In other methods, achieving the same tension in all the rods could be more difficult. Even if you turn exactly the same all the rods, the order of how they are tensioned affects the final result, as the rods affect individually to each other and to the tension.

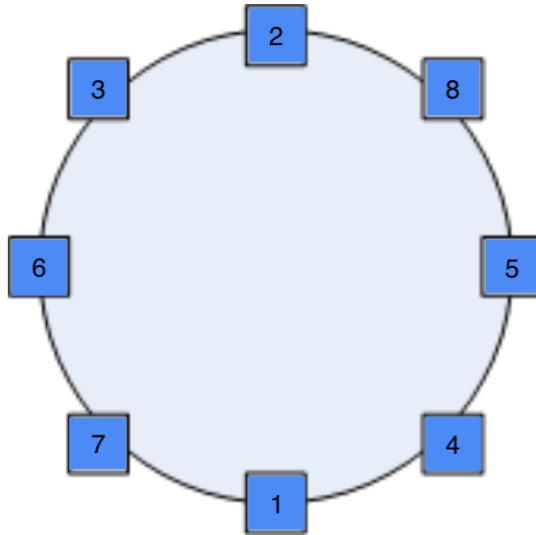


Figure 2 Recommended Tuning Order.

An effective method for checking the tension consistency among the rods is to place a finger in the middle of the snare drum to dampen overtones. Using a single stick, you can then play near each rod to assess its tuning. This allows you to audibly discern the pitch variation between rods and identify which ones are higher or lower. Based on your assessment, you can decide whether to correct the rods that are higher or lower in pitch. It is important to remember that each rod's tension can affect the others, so adjustments should be made while considering their collective impact.

2.2 Materials and sizes

There can be many different materials used to construct a snare drum. The biggest two families are the metal snare drums and the wooden snare drums. The most popular woods used in drum manufacturing are maple, birch, beech, oak, mahogany, poplar, and basswood. The most popular metals are the steel, brass, aluminum, copper, and bronze.

Each of these materials have their own characteristics, explaining them would give content for another thesis. In general, the wooden snare drums are warmer, the low frequencies are more predominant in them. Conversely, in the metal drums, the high frequencies take more importance.

Indeed, the quality of materials used in the construction of a snare drum plays a significant role in achieving the best tone quality. If the snare drum is made with inferior or inexpensive materials, regardless of the time spent tuning, it will be challenging to achieve a pleasing tone. This aspect particularly affects the body materials of the snare drum.

While it is ideal to have high-quality materials throughout the snare drum, including the heads, hoops, and rods, the body material has a more pronounced impact on the overall tone. The shell material contributes to the resonance, sustain, and overall character of the snare drum's sound.

However, it is worth noting that the quality and compatibility of all components, including the heads, hoops, and rods, can still have a subtle influence on the final tone, even if their impact may be smaller than that of the shell material.

A combination of high-quality materials and proper tuning techniques will ultimately lead to the best possible tone on a snare drum.

The standard snare drum is 5 inches deep and 14 inches of diameter, the depth can vary from 4,5 to 6 inches and they still are considered standard.

If a snare drum varies in depth, it can transform into a tenor drum, ranging from 7 inches up to 20 inches in depth. On the other hand, if the snare drum has a narrower depth, it is known as a piccolo snare drum, typically ranging from 3.5 to 2 inches in depth.

In addition to depth, the diameter of a snare drum can also vary. While it usually does not exceed 14 inches in diameter, smaller diameters are quite common, and these are referred to as soprano snare drums.

2.3 Meaning of the tuning in the snare drum

In contrast to instruments outside the percussion family, where tuning often refers to specific pitches measured in hertz, percussion instruments have different tuning considerations. Instruments like the xylophone, vibraphone, and glockenspiel are already pre-tuned and require expert assistance if they become untuned.

Timpani, on the other hand, are the only percussion instruments in the orchestra that tune with the A given by the oboe. They are tuned to specific pitches based on musical requirements.

Snare drums, categorized as membranophone instruments, fall into a different group. When it comes to tuning a snare drum, the focus is more on achieving a desired tone color rather than specific pitches. Pitch is rarely discussed among percussionists when referring to snare drum tuning. Instead, snare drummers typically have a desired sound in mind—a sound that combines tone and color to create a specific character.

Adjusting the tuning of a snare drum involves changing the tension in the drumhead. In addition to tuning, the tension itself is often mentioned. The amount of tension applied to the drumhead not only affects the tuning but also influences the way the snare drum is played. If the tension is too high, it can be challenging to control the rebound when striking the drum with sticks. Conversely, if the tension is too loose, there will be minimal rebound. Sometimes, performers intentionally adjust the tension to create a specific character or color, and they compensate for the rebound control by adjusting their grip and technique.

2.4. Technical specifications

I would like to present the equipment and setup utilized for the recordings, which served as the basis for the table presented in the upcoming section, 3.1. Additionally, I conducted audio recordings that were later represented graphically as spectrograms in section 3.2.

To ensure accurate and reliable recordings, the following materials and setup were employed:

Recording Equipment: Microphone: For capturing the snare drum sounds with precision, I utilized the NTI Audio Mini SPL measurement microphone. This microphone is specifically designed for accurate sound level measurements, featuring a flat frequency response across different spectrums. It ensures consistent signal reception, allowing for reliable and detailed recordings.

Interface: The Tascam DR-40X served as the audio interface for the recordings. This professional-grade device offers high-quality audio recording capabilities and provides various input and output options. Its advanced features contribute to the fidelity and clarity of the recorded snare drum sounds.

Snare Drums: Wooden Snare Drum: One of the snare drums used in the recordings is the 1980 Tama Pro Custom. This wooden snare drum has a size of 14x6.5 inches and features a solid maple shell with a thickness of 3.5mm.

To enhance its tonal characteristics, the drum is equipped with brass hoops and fitted with Remo Renaissance heads. The snare system employed is a mono wire snare system, allowing for precise control over the snare response.

Metal Snare Drum: The recordings also involved the use of the Pearl Philharmonic Brass snare drum. This metal snare drum has a size of 14x6.5 inches and features a brass shell with a thickness of 1.5mm. Its unique tonal qualities were further enhanced by utilizing an old timpani calf head. The drum incorporates a three-snare pearl system, combining wires, nickel cable, and strand cable to provide a range of snare responses and tonal variations.

Recording Sticks: To ensure consistent and controlled performance, I employed the Cooperman Graham Jones #1 model sticks. These sticks, weighing 64 grams each, are specifically designed for orchestral snare drum playing, offering a balanced feel and optimal control during snare drum playing.

By utilizing this carefully selected recording equipment and setup, I aimed to capture the nuances and intricacies of the snare drum performances. The resulting recordings were then analyzed and graphically represented as spectrograms in section 3.2, providing visual insights into the tonal characteristics and variations introduced by different tuning approaches.



Figure 3 Pearl Philharmonic Brass 6'5 Snare Drum. Picture by the author.



Figure 4 Tama Pro Custom 1980 6'5 Maple Snare Drum. Picture by the author.



Figure 5 Graham Jones #1 Sticks. Picture by the author.



Figure 6 Measurement Microphone. Picture by the author.



Figure 7 Tascam DR-40X. Picture taken from Thomann webpage. Accessed June 15, 2023. https://www.thomann.de/es/tascam_dr_40x.htm

Recording Setup: Both snare drums were recorded under identical conditions, utilizing the same room. The snare drum stand remained stationary throughout the recording process, with only the instruments themselves being swapped to maintain a consistent scenario across all recordings.

Measurements: The distance from the snare drum to the microphone was 168cm. The distance between the snare drum stand and the microphone stand measured 182cm. Furthermore, the microphone was positioned at a height of 162cm from the floor.

I employed those measurements as they accurately represent the specific positioning I would adopt while attentively listening to someone playing the snare drum. By carefully considering the distance and placement of the microphone, stand, and my own position, I aimed to create an environment that closely resembles a personal listening experience. This allowed me to engage in discussions about the sound quality and discern whether it resonated with my personal preferences and subjective assessment.

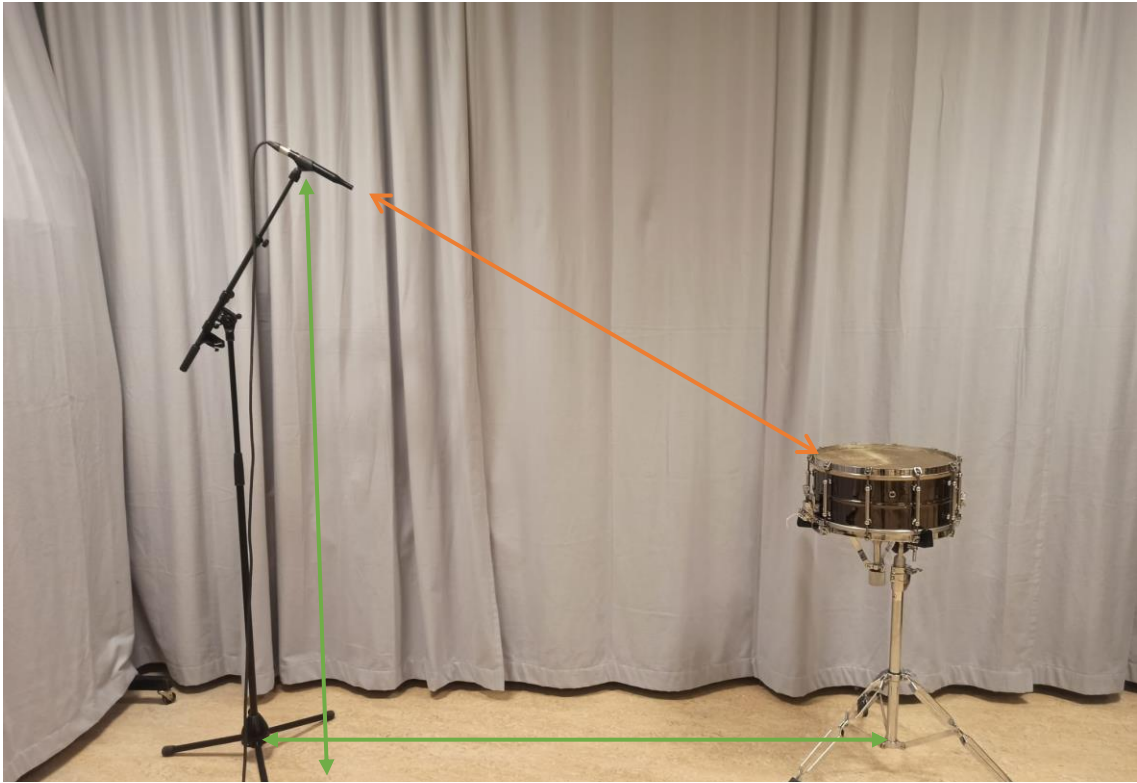


Figure 8 Recording set-up.

3. Different tunings and the effect of them in the music

3.1 Tuning Table

I have conducted a series of recordings to capture and analyse the various sounds produced by the snare drum. In order to comprehensively assess its tonal range and characteristics, I deliberately performed three distinct strokes: starting from pianissimo and gradually progressing to fortissimo. Additionally, I executed a roll moving from pianissimo to fortissimo. These performances were recorded with both the snares on and off.

After meticulously listening to the recorded audio, I engaged in an aural analysis. This qualitative assessment allowed me to identify the unique qualities of the snare drum's sound and assess how the presence or absence of the snares influenced its timbre and projection.

To present and organize the gathered information in a systematic manner, I have constructed a comprehensive table, which provides a concise overview of the various recordings and their corresponding attributes. This table serves as a useful reference for future analysis and comparison, facilitating a more informed understanding of the intricacies of snare drum tuning and its impact on the produced sound.

The table I created served as reference and guide into performing the orchestral excerpts presented in section 3.3. By examining and analysing

the distinct sound qualities achieved with the different snare drums and tension variations, I was able to mentally envision how these various tones could seamlessly integrate within the context of the orchestral excerpts.

Furthermore, to complement the subjective evaluation, I employed specialized software to visualize the recorded audio in a graphical format. By examining the spectrogram, I aimed to uncover any potential patterns or correlations that could provide valuable insights into the sound characteristics of the snare drum.

Through this combined approach of aural analysis and graphical representation, I have endeavoured to capture and interpret the diverse tonal palette of the snare drum, shedding light on the complex interplay between technique, tuning, and sound production.

<u>Tuning</u>	<u>Wood Snare drum</u>		<u>Brass Snare drum</u>	
	<u>Snares Off</u>	<u>Snares On</u>	<u>Snares Off</u>	<u>Snares On</u>
Timestamp	Audio1: 00:00-00:20	Audio2: 00:00-00:26	Audio1: 00:26-00:47	Audio2: 00:27-00:56
Low Tension	<p>Low warm sound where there are not any audible high overtones at all. In the loud part of the roll the sound is cracking as the head is synthetic and is not uniform as the natural head when is low. Is not a nice sound and I would not use it in any practical situation.</p>	<p>The high overtones appeared when the snares were turn on. The sustain of the note is longer. The roll is full and has a nice and uniform sound but sometimes specially at the end of the roll you can hear the head making some wired noises that you do not want while playing. Is not a nice sound and I would not choose this tension on this snare drum to perform anything.</p>	<p>Low deep sound, similar to the military drumming tradition. Specially in the roll you can hear noise from the head and the body rattling, confirming that it is to low tension. Not the perfect snare drum crisp sound but is a nice sound that it can be used in Mahler 5.</p>	<p>It seems that the pitch went up when putting the snares on. I still hear the low attack on the snare drum, so I think that the wires on the snare makes the high harmonics react more. As the head is really low tensioned, it vibrates more and the sustain off the note is longer specially when the snares are on. I would not use this in any situation as the sustain is too long.</p>
Timestamp	Audio3: 00:00-00:17	Audio4: 00:00-00:23	Audio3: 00:22-00:43	Audio4: 00:28-00:54
Medium Tension	<p>Still a warm sound but richer in overtones thanks to the wooden body. The roll is nice and full as in the low tension but is crispier as the head creates more natural rebound and affects in the wider range of overtones present in the sound but without making wired noises.</p>	<p>As happened before the overtones are heard more clearly when the snares are on. Is clear sound with many overtones but still warm. Is a nice all-around snare drum good to perform technical studies (Delécluse or Knauer) as it is clear and the tension on the head is idea to have a good control on the instrument.</p>	<p>Is a nice sound where the head makes resonate nicely the body and you have a metallic snare drum sound where the high frequencies are present but still has a deep military sound. I really like this snare drum and the sound that it produces, still a deep sound but crispy.</p> <p>Ideal to perform many Shostakovich Symphonies</p>	<p>The high frequencies have more sustain but the attack is clearer and quicker when the snares are on. As in the low tension tuning it seems that the high overtones are more present. As the head and the snares are in the middle setting of the snare drum you can hear that they work really well together, different than when we put them on the low tuning.</p>

		I would choose this sound to play orchestral excerpts such as <i>La Gazza Ladra</i> (Rossini) or <i>Scherezade</i> (Prokofiev).	or Prokofiev <i>Peter and the Wolf</i> where the snare drum has an aggressive character, and it has to cut through the whole orchestra.	This is the sound I would try to find when playing any Shostakovich symphony.
Timestamp	Audio5: 00:00-00:19	Audio6: 00:00-00:25	Audio5: 00:22-00:42	Audio6: 00:28-00:53
High Tension	I can hear higher in pitch sound comparing with the middle tension, but I think that they are similar. I do not hear much difference between both tensions, maybe this tension has less sustained. In this case I was not that afraid of breaking the head but breaking the lugs. I was feeling a lot of resistance when turning the rods. The head was really tense as well but I would take it bit further for the sake of this project.	In this case I cannot hear any difference with the middle tension. Both are almost the same when playing one after the other. Maybe in the single strokes there is more high overtones, and the low overtones are completely gone. But it could be me trying to hear a difference instead of actually hearing it.	Short attack and high pitch on the sound, but when playing loud single stroke specially the low overtones in the attack are still present creating a deep sound with many high frequencies. I like the sound but as I was recording, I could feel that the head was too tense and I was afraid that I would break. Is good to play the same repertoire as with the middle tuning but you lose the low overtones if you are not playing loud.	It has more sustain than without snares as happened before. Not low overtones even if playing loud, I only was able to hear them in the roll when it was getting louder. Is still scary to play with that much tension but the sound would fit the excerpt from Lieutenant Kijé-Prokofiev

This table only compares two snare drums and only goes to the extremes and the average tension of both extremes in the middle. This table is easily expandable if with the same snare drums, I would have added more tensions or if I add more snare drums with different materials and sizes.

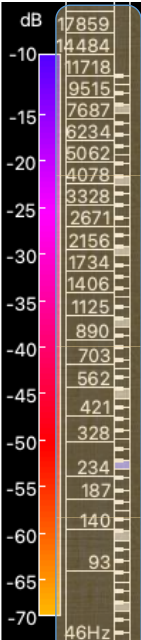
For this project I think that this table is enough as it helps me to demonstrate how different tensions work in different snare drums and how they affect in the sound. This table also shows how even if in different instruments the result follows a pattern.

3.2 Comparisons with Sonic Visualiser Software

Everything mentioned in the tables before are the result of what I research using my aural skills and my experience as a percussionist. To support the data in the table I have implement the use of Sonic Visualiser software to have a clear image of how the different frequencies behave in different snares and tunings. With the wave form and the spectrogram, we will be able to see if what I have heard from the snare drums has any relation with the result of the recordings.

The colour and the shape of the sound wave is important to read spectrograms. On the left of the spectrogram, there are the numbers of hertz of each frequency. The colour refers to the strength of the frequency in each moment in decibels. The colour purple means that that that frequency is sounding strongly in that determinate moment. Then the pink, red, and the weakest the yellow.

Decibels and different colours.



Different hertz levels.

Figure 9 Left Side of the spectrograms.

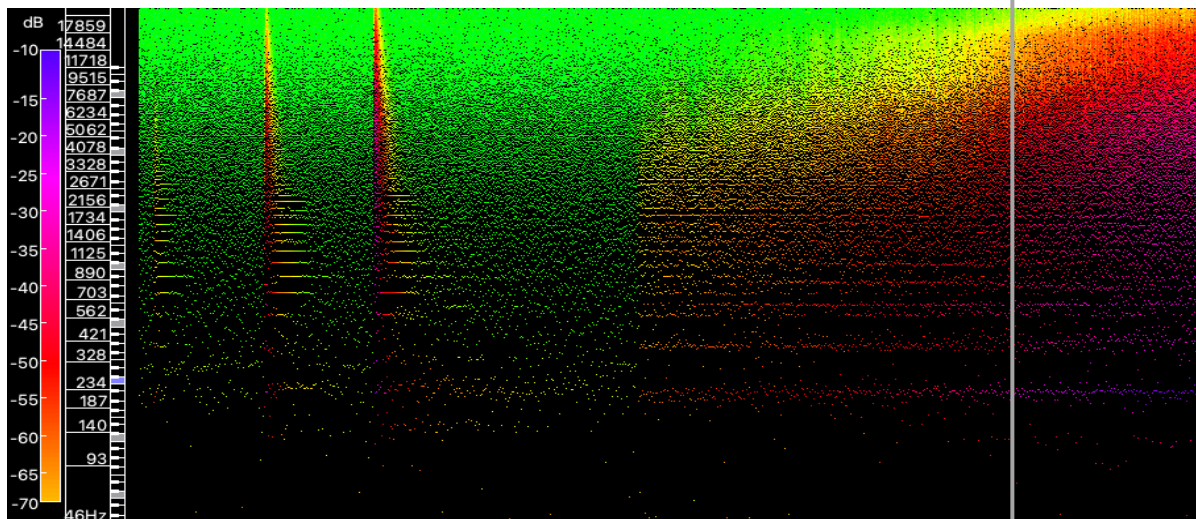


Figure 10 Example of Spectrogram

For example, in Figure 10 at the grey line to the right, the frequency from 234Hz. upward are the most prominent. Then from 328 to 7687 the colour is pink, and it gets weaker gradually until 17859 hertz.

Low Tension:

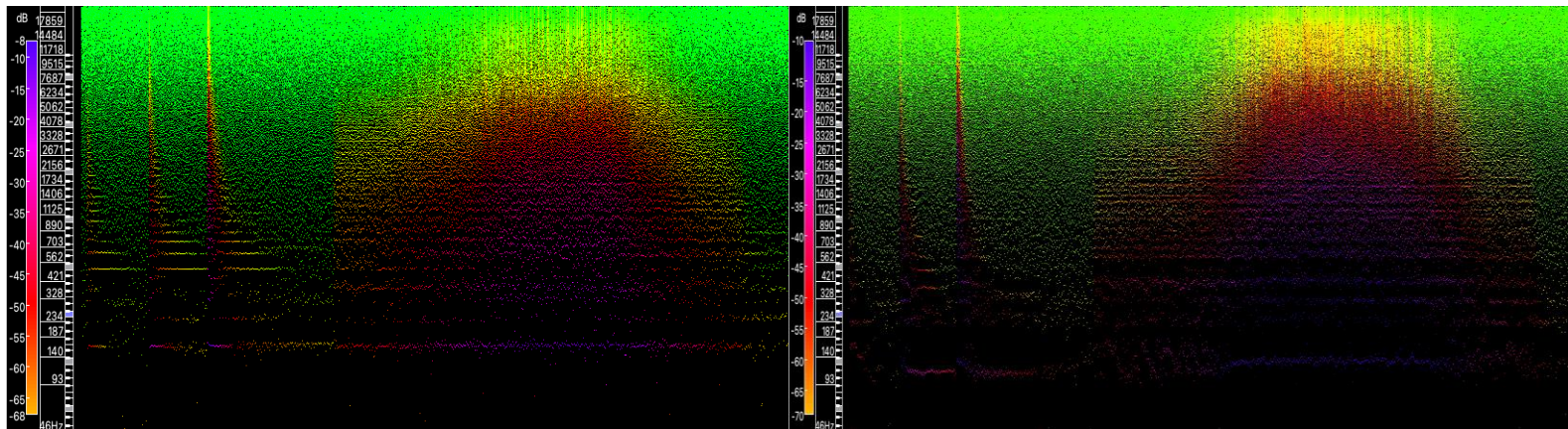


Figure 11 Wood Snare Drum Low Tension Snares off.

Figure 12 Brass Snare Drum Low Tension Snares off.

The sustain in the single strokes, Audio 1(0:00-0:05/0:20-0:27), is similar in both recordings. Nevertheless, in the roll, Audio 1 (0:05-0:19/0:28-0:45) the wave form has more iglu form in the wooden snare drum and the wave elongates more in the metallic snare as the sustain is bit longer on the last one.

The brass snare drum has more presence in the higher frequencies; however, it also has lower overtones. This can be appreciated in the audio 1.

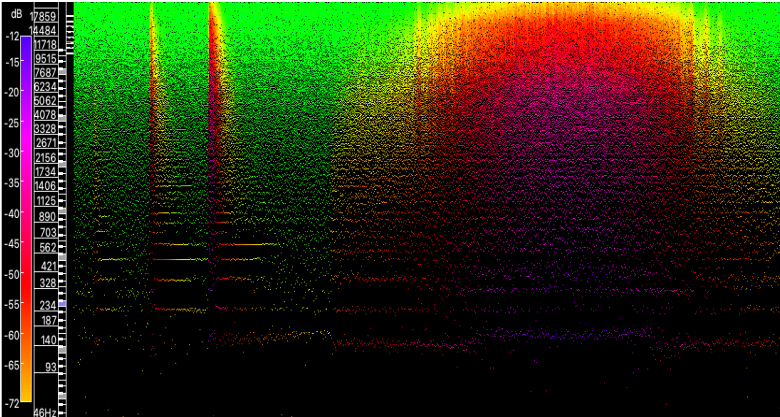


Figure13 Wood Snare Drum Low Tension Snares on

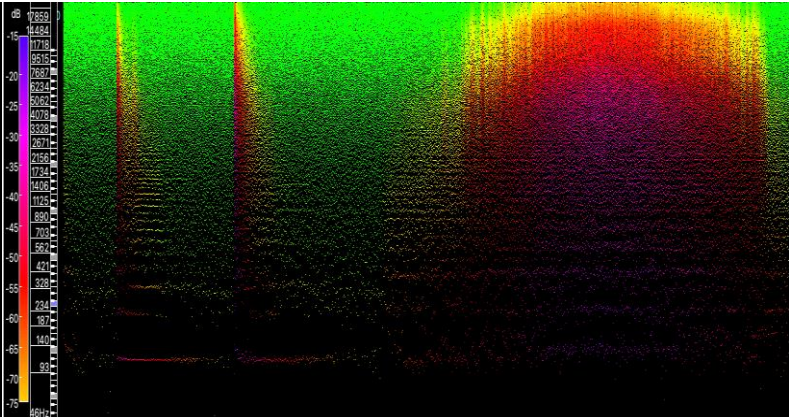


Figure14 Brass Snare Drum Low Tension Snares on

When comparing the sound with the snares off to the sound with the snares on, it becomes evident that activating the snares in both snare drums brings forth the emergence of high overtones. The wooden snare drum, in particular, showcases more pronounced middle and low frequencies compared to the brass snare drum. It appears that the snares have an impact on the note quality of the brass snare drum, leading to an extended sustain. Audio 2 provides a clear demonstration of how the snares affect the maple and brass snare drums in distinct manners.

Medium Tension:

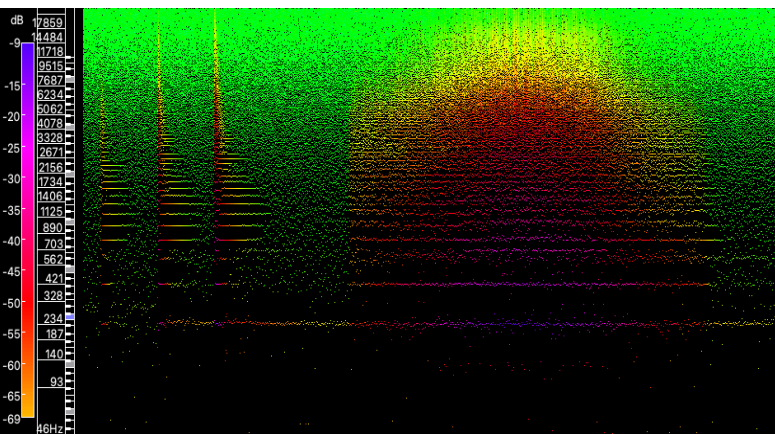


Figure15 Wood Snare Drum Medium Tension Snares off.

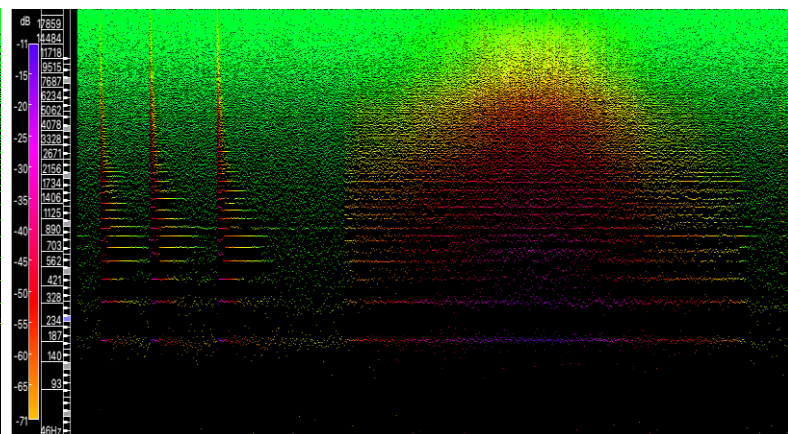


Figure16 Brass Snare Drum Medium Tension Snares off.

In this set up, the sustain in the brass snare drum is longer and it reaches higher overtones.

However, the brass snare drum starts near frequency 187 while the wooden drum is around 234. This could be why when hearing the audio 3, I heard that the wooden snare drum sounds higher in pitch and the brass drum has a deeper sound in comparison.

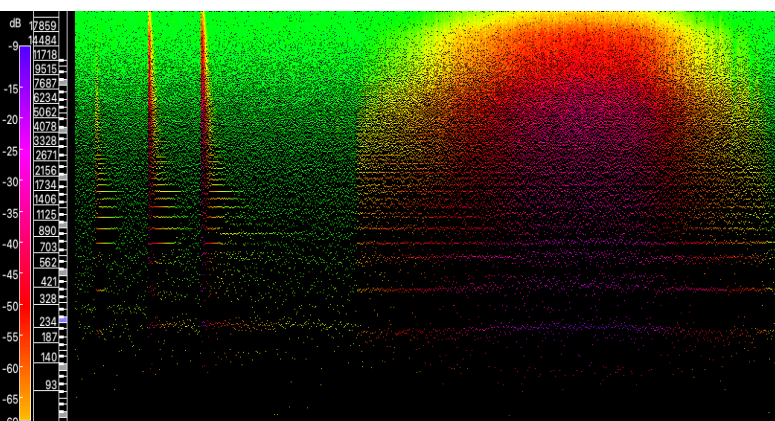


Figure17 Wood Snare Drum Medium Tension Snares on.

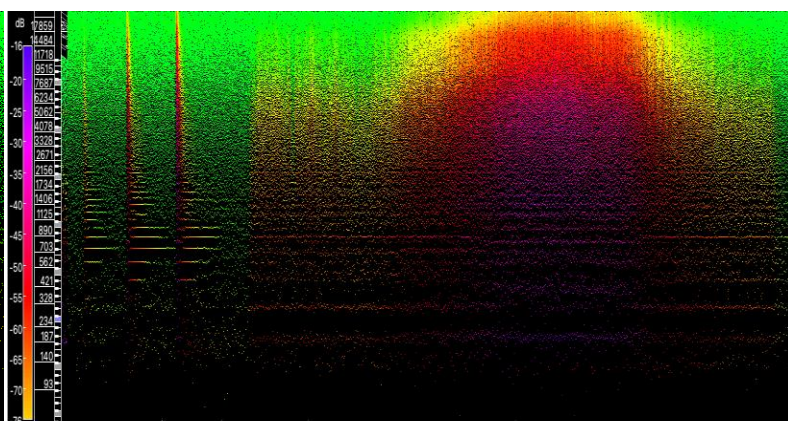
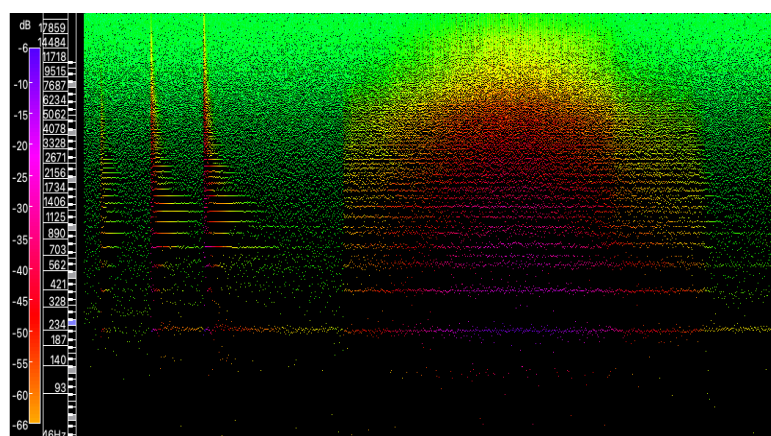


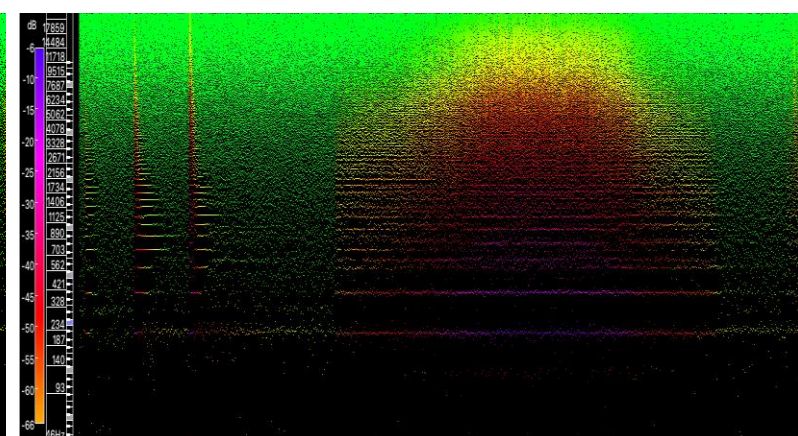
Figure18 Brass Snare Drum Medium Tension Snares on.

As observed previously with the low-tension spectrograms, the activation of the snares amplifies the presence of high overtones. In the case of the brass snare drum, the high frequencies exhibit greater prominence, particularly noticeable by the intensified purple coloration around 1400 hertz when compared to the wooden snare drum. While the sustain is relatively similar between the two drums, the wooden snare drum tends to have a slightly longer sustain. However, the attack is shorter in the case of the wooden snare drum, as evident in Audio 4 (0:00-0:04/0:22-0:28). This distinction is further emphasized by the sharper red colour line in the spectrogram. These differences in tonal characteristics are clearly discernible in Audio 4 as well.

High tension:



Spectrogram9 Wood Snare Drum High Tension Snares off.

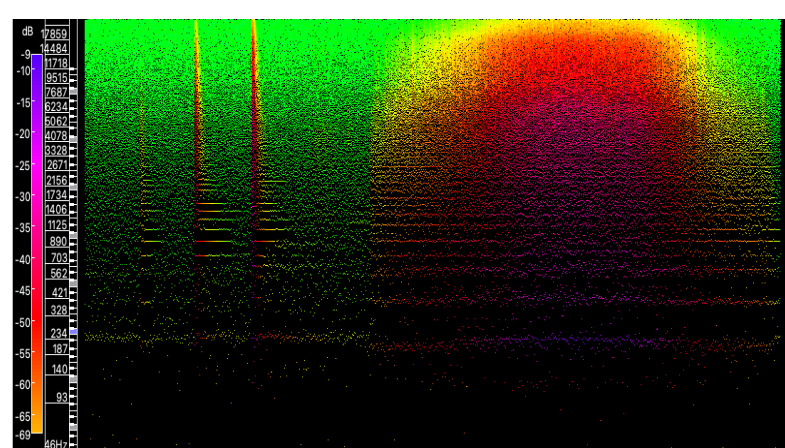


Spectrogram10 Brass Snare Drum High Tension Snares off.

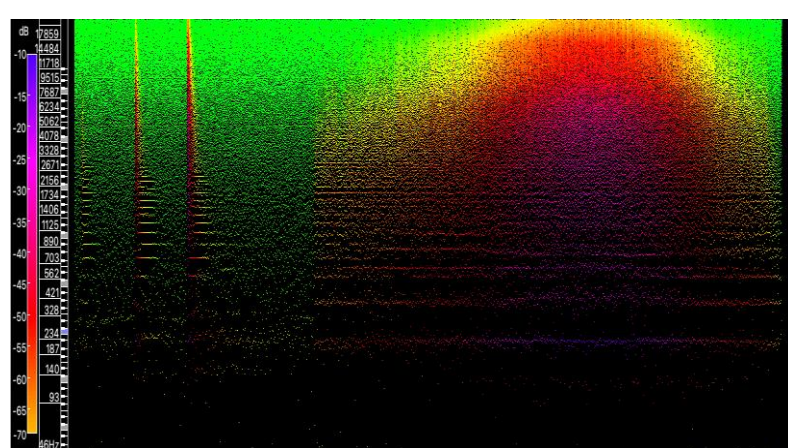
Both images are quite similar, but if we focus in the first two single strokes, Audio 5 (0:00-0:05/0:19-0:26), we can clearly see that the sustain in the wood snare drum is a fraction longer than in the brass snare drum.

The biggest difference in these two spectrograms is the roll, Audio 5 (0:07-0:18/0:29-0:44). The brass snare drum reaches higher frequencies, and the high overtones are more prominent.

However, the purple colour is not that strong in the middle frequencies comparing how present it is in the wood snare drum. This gives a warmer sensation as it can be heard in audio 5.



Spectrogram11 Wood Snare Drum High Tension Snares on.



Spectrogram12 Brass Snare Drum High Tension Snares on.

Upon activating the snares, a notable increase in overtones is observed across both snare drums, particularly in the wooden snare drum. The low frequencies remain present, consistent with the spectrograms examined earlier. However, the sustain is noticeably reduced in all instances. This can be observed both visually and audibly in the single stroke recordings. For a clear demonstration, I recommend listening to audio 6.

3.3 Practical use of the research

After conducting extensive research, both through aural analysis and graphical examination, I was eager to assess whether the diverse sounds produced by these two snare drums would enhance my performance of orchestral excerpts. I carefully selected a range of orchestral excerpts that frequently appear in audition lists and proceeded to perform them using various tunings.

Throughout the performances, I maintained a strong focus on both the act of playing and the resulting outcome, aiming to discern any discernible differences from my pre-project experiences. The selected repertoire includes *Symphony n°5*, Gustav Mahler; *La Gazza Ladra*, Gioachino Rossini; *Lieutenant Kijé*, Sergei Prokofiev; *Peter and the Wolf*, Sergei Prokofiev; and *Test Claire*, Jacques Delécluse (a study commonly encountered in auditions). All the audio recordings for these excerpts can be found in the dedicated folder.

Lieutenant Kijé

The image shows two staves of musical notation for a snare drum solo. The first staff begins with a box containing the number '1', followed by the tempo marking 'Doppio movimento' and a quarter note equal to 120 (♩ = 120). Below this is the word 'Solo' and the dynamic marking 'pp'. The notation consists of rhythmic patterns on a single staff, including eighth notes, sixteenth notes, and rests, with accents (>) placed over many notes. The second staff continues the rhythmic pattern with similar note values and accents.

Example 1 *Lieutenant Kijé*, mov I (bar 6-13), ed. by Raynor Carroll, *Orchestral Repertoire for the Snare Drum* (Pasadena: Batterie Music, 1997), 58.

This is one of the most famous snare drum excerpts, the piece is not well known outside the percussion world as is it is rarely performed. It was composed to accompany a film about the life of lieutenant Kijé.

This music has a close relation with the military music, that is why I have chosen the brass snare drum. Nevertheless, this excerpt requires a total control of the sound and the sticks as it has many grace notes that must come out clearly in a *pianissimo* dynamic. Tuning the snare drum high, helps to achieve a clear sound both technically and sound wise. The tension on the head makes the stick rebound easily which for a soft dynamic where total control is required might seem unhelpful. However, the grace notes come out with less effort thank to that tension. It also makes easier to play softer, as the head will react at the minimum contact with the stick head.

Test-Claire

The image displays the first page of the musical score for 'Test-Claire' by Jacques Delécluse. The score is written for a single snare drum and consists of seven staves. The first staff begins with a treble clef, a key signature of one sharp (F#), and a 6/8 time signature. The music starts with a dynamic marking of *p* (piano). The second staff features a *cresc.* (crescendo) marking and includes triplet rhythms. The third staff is marked *ff* (fortissimo). The fourth staff is marked *pp* (pianissimo). The fifth staff includes a *tr* (trill) marking. The sixth staff is marked *ff* and features a dynamic shift to *p* (piano) later in the staff. The seventh staff begins with a dynamic marking of *p* and includes a '7' above the first measure, likely indicating a seven-measure rest or a specific rhythmic pattern.

Example 2 First Page of Etude Test-Claire by Jacques Delécluse, *TEST-CLAIRE pour Caisse claire seule* (Paris: Alphonse Leduc Éditions Musicales, n.d), 2.

This is the study which often appears in audition repertoire lists. Same as the excerpt before, it requires total control to perform the grace notes and the quick demisemiquavers and semiquavers triplet rhythms.

Delécluse plays around with extreme dynamics, you have to be able to play everything evenly no matter the dynamic. A wooden snare drum is ideal for this kind of music, where is replicating some of the classical snare drum excerpts where usually wooden snare drums are used. For example, the last line of the page, is similar to *Capriccio Espagnole*. The maple shell gives a nice warm sound but still clear and full of high overtones.

a tempo ♩ = 69

pp

Example 3 Capriccio Espagnole, Figure 7, 4th Movement, ed. by Carroll, *Orchestral Repertoire for Snare Drum*, 46.

Peter and the Wolf

Example 4 Peter and the Wolf figure 49, ed. by Carroll, *Orchestral Repertoire for Snare Drum*, 64.

This excerpt corresponds when they are taking the wolf to the zoo in a triumphal parade. Is an easy excerpt to play if you only look at the rhythm and the technical side of it. The fact that appears so much in auditions is because the character and the phrasing take great significance. The brass snare drum in the middle set up brings a big sound and a metallic and a bit military sound that in my head matches

perfectly with the idea of the triumphal march. Furthermore, even if the tension on the head is not too high, is tense enough to bring all the rhythms clearly.

These facts facilitate to focus on phrasing as the sound character and the technical aspects are solved without needing to do anything but strike the head.

Shostakovich Symphony n°10

The musical score consists of six staves of music. The first staff (measures 38-41) is for trumpets and trombones, with a *ff* dynamic marking. The second staff (measures 42-43) is for snare drum, with a *ff* dynamic marking. The third staff (measures 44-45) is for snare drum, with a *sf* dynamic marking and a *Tacet to the end* instruction. The score includes various rhythmic patterns and rests, with measure numbers 38, 39, 40, 41, 42, 43, 44, and 45 indicated in boxes.

Example 5 Shostakovich 10th Symphony, Mov. 1, Figure 41-44, ed. by Carroll, *Orchestral Repertoire for Snare Drum*, 91.

Shostakovich gives to the percussion a big role in all his Symphonies. The 10th Symphony was composed after Stalin's death, the composer wanted to represent the freedom he gained after. This first movement represents the oppression

Shostakovich lived until Satin died. The snare has military character to represent and help to dramatize that oppression.

In this case I had a sound similar to Peter and the Wolf in my head, but darker and more tension in all the rhythmic patterns that are repeated each bar. With the same middle set up but this time placing a small piece of cloth on top of the head to kill the overtones I obtained the desired sound.

Mahler Symphony n°5



Example 6 Gustav Mahler Symphony 5, Movement 1, Fig. 6 percussion 2 part. Ed by Carl Friedrich Peters (New York: E.F. Kalmus, n.d. (1961))1.

This is not an excerpt, but I have chosen because when I was recording the low tension on the snare drum it remembered me to this motive that repeats in the begging and the end of the first movement of Mahler 5. This Symphony was composed before and after Mahler proposed to his wife, Alma Schindler. It represents the journey from mourning to joy that he lived in that period.

The first movement is a funeral march, this is the main reason why I remembered this piece while recording the low-tension sound in the brass snare drum.

In the marching tradition, the drums were set up without snares and often covered with a cloth when funeral marches are performed. Mahler writes “gedämpft” to let the player know about that. There two main ways to interpret that, striking on the cloth or putting the cloth on a side to kill the overtones.

With this particular snare drum, Pearl Philharmonic Brass 6,5, I decided to use the second option and strike directly on the head but having a cloth on the side dampening the snare drum.

4. Conclusion and Future Work

This research was the perfect excuse to spend time studying the tuning on the snare drum. After comparing many different snare drums and after tuning them in a different way I can say that now I can much broader knowledge about how to tune the snare drum in a way that it makes the best sound possible.

Regarding the initial question posed at the beginning of this project, I can confidently assert that tuning has a profound impact on the tone and color projection of the snare drums. By adjusting the tuning, the snare drum undergoes a complete transformation, allowing it to adapt to various musical styles with remarkable versatility.

Is the difference in tuning significant enough to affect repertoire pieces? As a percussionist, I would undoubtedly answer yes. It greatly aids in visualizing a desired sound in one's mind and then reproducing it on the snare drum. The musical phrasing and expressiveness flow more naturally, making it easier to internalize the melody while executing the rhythm.

Throughout countless hours spent tuning different snare drums, I have come to the realization that there is no foolproof method to achieve the desired sound. It requires a process of experimentation, continuously adjusting the tension on the rods until the desired sonic outcome is achieved.

4.1 Conclusion on the tuning table

One of the biggest parts of this project, has been the tuning table done in the point 3.1. I spent time with two different snare drums and tune them in different set ups, from the extremes to a mid-range tension in the middle of the register of the snare drums. In the table I describe the sound that I heard and the sensation that those tunings gave me.

Thanks to that table, I could find how the different snare drums behave and describe the different tunings and use them for different proposes. In the past Mock Auditions, Repertoire Classes and Orchestral Projects I have had the opportunity of playing the snare drum and putting in practice these different tunings on the instrument.

At the beginning of this thesis, I present a question regarding the relevance of the different tuning in the snare drum. I cannot respond with a yes or a no as in different situations the answer varies.

When playing with other percussionist in a chamber music situation or in percussion sectionals before the orchestral projects, the tuning of the snare drum is a topic that we always discuss. In percussion specific situations the snare drum tuning is important, and the difference of tuning is noticed and taken in account. In environments where the snare drum is on a spotlight, the tuning is also relevant. In Mock Auditions where not everyone was a percussionist, the members of the panel liked or disliked the different tunings used for different excerpts, but they all appreciated the interest.

Still in a musical environment, but without involving percussionist, the result changes. In a musical trained ear, the difference in tuning can be spotted easily. This unfortunately does not mean that the different tunings in the snare drum are relevant. When asking fellow musicians to hear between the different tunings on the snare, they all heard the difference clearly. However, in a practical situation, such as the orchestral projects, they were not aware about the differences made between rehearsals.

For a non-musically trained ear, the difference was not that obvious. Some people could spot the difference and explain what it was. In other cases, they could not hear a difference between similar tuning, they could not say if there was a difference between the maple and the brass snare drums in similar tunings.

The snare drum tuning is relevant for percussionist. For the rest the musicians, is not relevant as long as it sounds as usual snare drum and not something off putting as the sounds recorded in the extreme tensions.

4.2 Use of Sonic Visualiser

In addition to analyzing the different tunings through aural examination, I also utilized the Sonic Visualiser software and its spectrogram feature. This proved to be an invaluable tool in providing a visual representation of the distinct tones produced by the snare drums during the recordings. It allowed me to compare and contrast what I was hearing and provided insights into why certain sounds appeared warmer, higher in pitch, or possessed a deep resonance.

Interestingly, there were instances where the auditory perception did not align with the spectrogram findings. For instance, I initially perceived the maple snare drum to have a warmer tone, while the brass snare drum sounded higher in pitch. However, upon analyzing the spectrogram, it became evident that the brass snare drum was activating more low and middle overtones compared to the wooden snare drum, and the latter was actually reaching higher frequencies in terms of hertz.

This realization challenged the conventional wisdom I had been taught, which suggested that wood snare drums inherently possess a warmer tone, while metal snare drums produce brighter and more penetrating sounds. Thanks to the insights gained from Sonic Visualiser, it became clear that the characteristics of an instrument can vary depending on the tuning applied, and these preconceived notions may not always hold true.

4.3 Conclusion on performing the excerpts.

This was the most interesting part of the project, as I never thought too much about it before this project. I never thought that the tuning in the snare drum could affect that much in the performance.

I have not always have tune the snare drums before playing. If the sound was nice, that was enough to start playing. That was usually the case. Now, thanks to this project I will always check the tune before playing.

Even before starting to play the idea of changing the tune for the excerpt helps. You have to create an idea of the sound that you want for, to do that you must know the background of the music, and with which instruments you are interacting in that moment. This sets you up in a much better position for playing.

Personally, one of the most difficult parts when playing snare drum excerpts is the musicality and the fact that you must try to make the jury heard all the parts only with the snare drum. Is difficult to bring a melody to someone when you are only playing the rhythm. Having the right sound on the instrument makes this more natural and easier.

The phrasing comes naturally, I did not have to force anything or overthink to be able to phrase and sense the whole melody only by playing the snare drum excerpt. Thank to having the right tuning I gained a lot of musicality in an effortless way.

In some of this excerpts and studies, the other big challenge is the technique. Even if I cannot assure this always, in the studied occasions, the tension needed to achieve the desired sound helped in the technical aspect as well.

The tension affects the rebound created, and for some technically difficult excerpts the total control of the rebound is needed.

A nice tension is also needed to allow the rhythms to come out clearly. All the grace notes and quick rhythmic measures need to be understandable by the audience. Having the right sound also meant to have the right tension. This made the performance easier and less tense.

4.4 Future work

There are still many things that can be researched around this topic. I have only used two different snare drums, but if someone has access to more it would be great to compare them. Only with two snare drums is difficult to do it, but even now I could see some patterns repeating when the tune was changed and when the snares were set off or on.

With more time and more resources, it would be nice to see how more snares react and if a method for finding a specific sound in the snare drum can be created. I have started a table that I would like to go completing while I can try more snare drums.

Apart from snare drums, I have only used three different tunings and one microphone.

This can be easily expandable adding more tunings and more microphones. I also discovered a microphone by Neumann, Neumann KU100, which imitates the human head. This would be ideal for this project as it would have a closer relation with what a human ear hears.

If I keep studying this subject, I would also like to start moving the resonant head. I did not research much about the effect that this head has in the tuning in this project.

The continuation of this project can be done easily only adding few more parameters. And it could go much more technical if acoustics or physics are studied as well.

5 Final Thoughts

In snare drum tuning, there is no definitive right or wrong approach. The greatest accomplishment of this project was dedicating time to researching and exploring the relationship between tuning and sound in the snare drum, as well as developing a heightened awareness of the sound produced by the instrument.

While the snare drum may not be traditionally considered a melodic instrument, it plays a significant role within the percussion section and the orchestra as a whole. The sound it produces should always harmonize with the style and color of the orchestra, complementing the overall musicality.

As a result of this project, I feel that I have become a more accomplished musician. It goes beyond simply playing rhythms on the snare drum; I am now actively engaged in the process of creating music with it. While there is always room for further improvement and ongoing research, this thesis has prompted me to perceive and approach the snare drum from a fresh perspective.

Media List

Excerpts:

Lieutenant Kijé: The performance of the first bars of the “Birth of Kijé” movement.

Test-Claire: First page of the study *Test-Claire*.

Peter and the Wolf: The snare drum part of the parade at the end of the piece.

Shostakovich 10: 1st Movement of the Symphony, from figure 43.

Mahler 5: Performance of the snare drum part of the funeral march from Mahler’s 5th Symphony. As there is some waiting in the symphony, I have just repeated the pattern few times.

La Gazza Ladra: The initial opening rolls of the overture and few bars from the begging.

Audios:

Audio1: Wood snare drum low tension, snares on and off.

Audio2: Brass snare drum low tension, snares on and off.

Audio3: Wood snare drum medium tension, snares on and off.

Audio4: Brass snare drum medium tension, snares on and off.

Audio5: Wood snare drum high tension, snares on and off.

Audio6: Brass snare drum high tension, snares on and off.

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