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STRUCTURAL DEVELOPMENT OF HARMONIUM IN INDIA

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Abstract

The Harmonium was patented as an instrument by Alexandre-François Debain in Paris on 9th August 1840. The first Indian version of the Harmonium was developed by Dwarkanth Ghosh in 1870. Since then many makers like H.P. Bhagat, D.S.Ramsing, Paul and Co., etc. have contributed to the development of its structure, tonal quality, and wide acceptability in Hindustani Music. The knowledge of manufacturing is important for an artist since it plays an important role in choosing the best instrument to enhance his/her performance, proper maintenance, and further technical developments. The main objective of this paper is a) To highlight the structural development of the Harmonium in terms of its size, shape, weight, material, and mobility, b) To understand its manufacturing process over the years and c) to explore the current advancements in manufacturing and analyse its Impact on the cost efficiency, quality, and acceptability. This study has been conducted through field visits in reed manufacturing units and interviewing the manufacturers and Harmonium artists. Through this study, it has been observed that there is a decline in quality Harmonium makers due to high manufacturing costs, lack of skilled labour, and quality material which affects the overall efficiency of the instrument.

Keywords: Harmonium, Harmonium manufacturing, structural development, current advancements, cost efficiency. JEL: L6

INTRODUCTION

The Harmonium, now deeply rooted in Indian music, serves as a versatile instrument across classical, semi-classical, folk, and film music genres. While it's considered a keyboard instrument, it also falls under "Sushir Vadya" (wind instruments) in Indian classification due to its use of air to produce sound. Functionally, the Harmonium is a reed instrument, where air flows over reeds to create musical sound.

The modern Harmonium traces its origins back to Alexander Debain, who patented it in Paris on August 9, 1840. However, the concept of free-reed instruments existed much earlier, with the Chinese "Sheng" being introduced to Russia in 1770. The 19th century saw European makers exploring free reeds, leading to various early models such as the "Aeolin" (1816, Germany), "Physharmonica" , and later innovations like the "Aeolodicon," "Seraphin," "Orgue expressif," "aerophone," "Melaphone," and "Harmoniflute." These instruments laid the foundation for Debain's Harmonium, which later found its way into Indian music, becoming an essential and iconic part of the Indian soundscape.

The harmonium was introduced to India by two companies: 'TS Ramchandra and Co.' in Mumbai and 'Dwarika and Sons in Kolkata. Initially, harmoniums were imported from France, using reeds made by the French company Kasriel. Later, Germany also began manufacturing harmoniums, though their quality was slightly lower than the French ones, making them somewhat cheaper. The early imported harmoniums were pedal-operated (leg harmoniums), but eventually, hand-operated versions were developed, as pedal harmoniums were inconvenient for the seated posture typical in Hindustani classical music performances.

When World War I broke out in 1914, imports from France and Germany ceased, leading to large-scale harmonium manufacturing in India. In 1901, Jivanlal began making reeds in Bhavnagar, Gujarat, producing reeds similar in quality to those made by Kasriel. Later, companies like Mohanlal, Amrutlal, and Kukad and Co. joined in reed production. After World War II, harmonium imports stopped entirely, and all harmoniums were produced in India.

As the demand for harmoniums increased, cost considerations became more important, as the instrument was seen as a luxury. Manufacturers in Punjab responded by producing more affordable harmoniums, although these instruments tended to have a slightly harsher tone. Notable manufacturers, such as HP Bhagat, Chet

Singh Gurabakh Singh, Daya Singh Ramsing, Gopal Harishchandra, Haribhau Vishwanath, and Milind Musicals in Mumbai, along with Das and Co. and Paul and Co. in Kolkata, played a significant role in the development of high-quality Indian harmoniums.

WORKING OF HARMONIUM

A harmonium is a keyboard instrument that uses bellows to pump air and create pressure in the reed chamber. When a key on the keyboard is pressed, it opens a stop that allows the pressurized air from the reed chamber to escape through a gap around a free reed fitted on the reed board. This flow of air causes the reed to oscillate, producing sound.

MATERIAL USED FOR VARIOUS PARTS OF HARMONIUM IN INDIA

BODY

The body of a harmonium is a box that contains all of its components. The size and shape of the body depend on the artist's preferences. There are generally two types of bodies: the regular straight box type and the suitcase-type. The shape and size of the body can vary significantly from one maker to another. Teak wood is primarily used for making harmoniums. While Burma teak is considered the best option, its high cost has led many manufacturers to use African teak sourced from countries such as Nigeria, Ghana, and Tanzania. Indian teak is generally not used for harmoniums. The process begins with taking a large block of wood, which is then soaked in water to season it. This soaking process can last about 7 to 8 months. Seasoned teak is essential for ensuring the quality of the harmonium. Some makers opt for wood from large beams of old houses, as this wood is already well-seasoned and available at a lower price. English plywood is used for the bottom of the harmonium, typically sourced from the plywood used for packing imported parcels.

SOUNDBOARD

A sound box is a rectangular frame typically made of Sippi teak, which is a second-quality Indian teak. The height of the soundboard varies based on the type of reed board used: vertical or horizontal. Generally, the height of the vertical reed board is greater than that of the horizontal one.

REED BOARD

The reed board is made from a thin piece of Burma teak or Himalayan cedar (Deodar). The reeds are attached to the board with two screws, with the reed tongue positioned on the outer side. Holes are drilled below each reed to allow air to pass through. “Wood with low density will give more resonating and sweet sound”.

KEYBOARD

The keyboard consists of three main parts: the keys, the taper, and the bridge. The upper portion of the keys is made from American plywood, while the top white keys are crafted from acrylic, and the black keys are made of plastic. The keys are attached to a wooden stick made of steam beach wood on one side, and on the other side, a taper is connected. A taper is a small stick made from Himalayan cedar. The size of the taper depends on the number of lines and the placement of the reed board, ensuring that it properly covers the holes. All of these components are mounted on the bridge, which is constructed from steam beach wood and features compartments to accommodate the key sticks.

BELLOWS

The bellows are the lungs of the harmonium. They pump air into the instrument, and there are two types of bellows used: the internal and the external. The bellows are made of thin cardboard and chamois leather. The external bellows are located on the back of the harmonium and are equipped with a metal spring that allows them to open outward. They take air from outside and push it into the sound box and the internal bellows under pressure.

The internal bellows, which are not visible from the outside, push against a metal spring located below them. This action pumps air from the internal bellows toward the reeds, allowing the harmonium to produce sound.

SCREW

Many screws are used in a harmonium. Stainless steel screws are the best choice because they don't corrode; however, using good quality screws also increases the cost of the harmonium, leading to the use of lower quality screws in more affordable models.

REEDS

Reeds are the main components of a harmonium, producing sound by oscillating with air pressure. The quality of a harmonium is determined by the quality of the reeds used. In India, reeds are primarily manufactured in Punjab, Gujarat, and Delhi. Currently, Mohanlal J. Mistry and N.S. are known for producing high-quality reeds.

There are two main types of reeds: narrow tongue and broad tongue, as well as brass tongue and copper tongue (commonly referred to as red tongue). Despite the large-scale production of reeds in India, many people still prefer older reeds. This is because the new reeds often do not match the quality of the old ones, largely due to a lack of quality raw materials, although technical advancements have improved production capabilities.

LEATHER FOR PACKING

Goat leather is used for air packing in harmoniums due to its flexibility and durability. It helps maintain an airtight seal, preventing any air leaks that could disrupt the instrument's sound production.

Bellows Valves: Leather valves are located on both the internal and external openings of the bellows. They regulate air pressure, ensuring a steady airflow to the reeds. This consistent airflow is essential for producing a smooth and uniform tone.

Soundboard Sealing: Leather packing is placed where the soundboard meets the internal frame to prevent air leaks from the main air chamber. This enhances greater control over volume and tonal quality.

Keyboard Taper Packing: The leather packing beneath the keyboard taper enhances airtightness around the keys, improving responsiveness and sound projection.

STRUCTURAL DEVELOPMENTS IN INDIA

Harmoniums that were imported to India initially included the leg harmonium, which required the player to sit on a chair and operate the bellows using their legs. This design proved to be inconvenient for Indian classical performances. The hand harmonium was developed by Dwarkanath Ghosh, the founder of Dwarkin & Son Ltd, in 1875.

There is also another perspective: T.S. Ramchandra and Company from Mumbai had an agency for importing harmoniums made in Paris. The owner of this company consulted with many vocalists and players, gathering their feedback, which he then relayed to the manufacturers. This collaboration led to the design changes that resulted in the creation of hand harmoniums.

HARMONIUM MODELS IN INDIA

Standard Harmonium

Standard harmoniums come in three main styles: Bombay, Kolkata, and Punjab. The arrangement of the reed board can be either vertical or horizontal depending on the style.

Bombay Style: Bombay-style harmoniums primarily feature a vertical reed board and utilize English keys (stick keys). These harmoniums are typically heavier due to the use of high-quality wood. They are available

with or without a board and can have single or double-fold bellows. The tone produced by these harmoniums is sweet.

Kolkata Style: Kolkata-made harmoniums often have a combination of vertical and horizontal reed boards, where the Kharja line is horizontal and the Nar line is vertical. They also come with an English keyboard and are mostly without board. Seven-fold bellows are commonly used in Kolkata-style harmoniums.

Punjab Style: Punjab-style harmoniums are lighter in weight and feature straight-key keyboards. The placement of the reeds is primarily horizontal, and the bellows can be either two-fold or seven-fold. These harmoniums produce a loud and harsher tone.

In terms of height, weight, and cost, the Bombay style is the heaviest and most expensive, while the Kolkata style is moderate, and the Punjab style is the lightest and least expensive.

FOLDING HARMONIUM

Folding harmoniums were designed to address the issue of portability since standard harmoniums can be heavy and bulky to carry. In a folding harmonium, the upper portion is the same as a standard harmonium. However, the bottom bellow and the bottom spring are housed inside a box. When closing the harmonium, the top part can be lowered to fit into this box and a top box covers it like a suitcase. Once it is pulled up, it rests on latches placed on either side of the instrument. One drawback with folding harmoniums is that the bottom bellow spring remains pressed when the instrument is closed. This can lead to a change in spring tension, which sometimes affects the tuning of the harmonium.

In recent years, Dhanajay Patil, a renowned harmonium maker in Pune, has modified a standard harmonium. He designed it so that the bottom can be pulled out, featuring knob screws on either side to secure it in place. This mechanism is the opposite of a suitcase harmonium, where the top folds in. Additionally, Milind Musicals, a famous manufacturer in Mumbai, has designed a suitcase harmonium made from lightweight pine wood and Veneer Ply. This harmonium is engineered to be compact and easy to carry, making it suitable as hand luggage when traveling by airplane.

SCALE CHANGER HARMONIUM

Playing the harmonium in every scale requires significant skill and practice, so a scale changer was designed to simplify this process. This feature allows the player to shift the keyboard to the desired pitch, making it easier to perform in a more comfortable scale. The keyboard can be moved to the right or left as needed and can be adjusted to shift by three, five, nine, or twelve keys.

The keyboard is uniquely designed with each key's taper separated from the stick. When a key is pressed, the taper is lifted, generating the desired sound. Additionally, the scale changer harmonium includes a coupler mechanism, which is activated by pulling out a knob. This feature couples the keys of the preceding octave, allowing for richer sound, when playing in the middle octave (Madhya saptak), as the keys from the preceding octave (Mandra saptak) also play simultaneously, enhancing the overall volume.

However, a drawback of the scale changer harmonium is that it tends to go out of tune easily. These harmoniums come in both standard and folding designs. While they are generally not preferred for classical accompaniment in Maharashtra, they are widely used in Kolkata.

Dhananjay Patil, a harmonium maker from Pune, has designed his own version of the scale changer. In his design, the entire keyboard can be moved as a whole, and the taper is not detached as in regular scale changer harmoniums. He has placed springs above each key, which are held tightly in place by a metal strip on either side to ensure airtightness. This design provides a stable sound and is less likely to go out of tune.

SHRUTI HARMONIUM

The first shruti harmonium in India was developed by Mr. Earnest Clements, a civil servant during the British rule, and Mr. Krishnaji Ballal Devel from Sangli. It was manufactured by Mr. H.K. Moore in 1911. This harmonium was publicly inaugurated at the All-India Music Conference in Baroda in 1916, where it faced significant criticism from Pt. Bhatkhande and his followers.

Dr. Vidhyadhar Oak has designed and patented a unique 22-shruti harmonium. This harmonium features four reed boards and contains four shrutis under each key, with two shrutis tuned lower and two tuned higher. The design allows the player to select either the higher or lower shrutis at any given time. To facilitate this mechanism, there is a knob located beneath each key.

LIGHT WEIGHT HARMONIUM

Most artists travel by airplane, leading to an increased demand for lightweight harmoniums since they are easy to carry as hand luggage. Airlines have size and weight restrictions for carrying hand luggage, which is why nano lightweight harmoniums were designed. Carrying instruments in checked luggage is risky due to instances of mishandling by airline staff, which can result in damage to the instruments. The lightweight harmoniums weigh around 7 kg and are made of lower gauge wood and light woods like pine.

MAADHURIUM DIGITAL HARMONIUM BY RADEL

Radel Company has begun manufacturing a digital harmonium, though it is still in the early stages, as many harmonium players are reluctant to adopt it. Here are its specifications :

- - Lightweight with a scale changer that supports both Chromatic and Indian (Just Intonation) scales.
- - Generates stunningly realistic harmonium sounds.
- - Adjustable volume to suit user preferences.
- Features 8 harmonium voices (single, double, and triple reed).
- Digital LCD display for easy setting adjustments.
- Includes 5 demo tunes with gamaks.
- Pitch can be adjusted continuously over an octave.
- The Shadj can be set to any key of an octave based on user preference.
- Memory storage for 5 personalized user settings, along with an auto-save feature.
- Individual key fine-tuning to accommodate specific raags in Indian music, which can be stored in 10 memory slots with names.
- Tone can be adjusted to the user's liking.
- MIDI IN and OUT facilities available.
- Comes with a handy, height-adjustable, foldable stand for easy playing.
- Features a gamak lever for slides of notes required in Indian music and an emphasis lever to simulate traditional acoustic harmoniums.

CONCLUSION

Although the harmonium originated in France, it has become an integral part of Hindustani classical music. The manufacturers in India, with their innovative ideas, have made significant modifications to its design to suit the needs of Indian classical music and other genres. In the early days, owning a harmonium was a luxury. Today, due to advancements in manufacturing, people can afford lower-cost harmoniums, although high-quality ones still come at a premium price. The art of harmonium manufacturing is intricate, and the lack of

skilled labour, along with the increasing cost of quality material, makes it challenging for makers to manage prices effectively. Additionally, the manufacturers receive little support from the government, which, if provided, could offer some relief. Manufacturers have also expressed difficulties in availing G.S.T. reimbursement. Moreover, the rise of digital harmoniums could significantly impact traditional harmonium manufacturers. Lastly, crafting a good harmonium requires considerable hard work and expertise, and is essential to preserve this art form.

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